Interactive Art Posters Based on Electronic Technology

Soorena Zohoori[1] ✉ iD, **Mehrnoosh Sakeniyandehkordi[2]** iD

1. Corresponding author, Department of Electronic and Electrical Engineering, University College London, London, WC1E7JE, UK. E-mail: s.zohoori@ucl.ac.uk
2. Department of Graphic, Farshchyan University, Tehran, Iran. E-mail: mehrnoush.sakeniyan@iau.ir

Article Info	ABSTRACT
	Interactive art posters have emerged as a transformative medium in contemporary visual communication, merging traditional graphic design with electronic technologies to create dynamic, participatory experiences. Unlike static posters, interactive designs engage audiences through motion, touch, sound, and digital media, allowing viewers to actively influence visual content and messaging. This review traces the historical evolution of posters, from early printed lithographs to modern digital and interactive formats, highlighting the contributions of influential artists and the integration of emerging technologies that have reshaped audience engagement. The study categorizes interactive posters into several types, including audio-responsive, motion-activated, touch-sensitive, augmented reality (AR), and Internet of Things (IoT)-enabled designs. Each type offers unique opportunities for visual storytelling, user participation, and multisensory engagement. Effective design principles emphasize aesthetic clarity, intuitive usability, accessibility, and contextual relevance, ensuring that technological elements enhance rather than distract from the intended message. Despite their advantages, interactive posters face significant challenges, including technical complexity, production costs, energy consumption, durability, and sustainability concerns. Additionally, designers must address accessibility issues and ethical considerations, such as privacy when using sensors or connected devices. These limitations underscore the importance of thoughtful design and careful integration of technology to achieve meaningful audience interaction. Looking forward, interactive poster design is expected to advance through the incorporation of artificial intelligence, augmented and mixed reality, eco-conscious materials, and networked cross-media applications. By combining creativity with technological innovation, interactive posters are poised to redefine visual communication, offering immersive, adaptive, and socially engaging experiences. This review provides a comprehensive overview of the field, highlighting trends, design strategies, challenges, and future directions in interactive poster design.

Introduction

Posters have long served as a powerful medium for visual communication, blending artistic expression with informational clarity to reach diverse audiences. Traditionally static in nature, posters have relied on design elements such as typography, imagery, and color to capture attention and convey messages. However, the emergence of digital and electronic technologies has redefined the possibilities of poster design, transforming them from passive visual artifacts into dynamic, interactive experiences.

Interactive art posters represent a significant evolution in this medium, offering audiences an active role in shaping their engagement with visual content. By incorporating electronic components (such as sensors, microcontrollers, LEDs, and digital displays) posters can now respond to touch, motion, sound, or environmental changes. This integration not only enhances aesthetic appeal but also deepens the communicative power of posters, bridging the gap between traditional graphic design and new media art.

The role of electronic technology in visual communication extends beyond technical novelty; it reshapes the way audiences perceive and interact with information. Unlike static posters, interactive designs invite participation, curiosity, and emotional connection, making them effective tools for education, advertising, cultural expression, and social engagement. As a result, interactive art posters stand at the intersection of art, design, and technology, reflecting broader shifts in contemporary visual culture toward interactivity and multisensory experiences.

The history of posters dates back to the late 19th century, when advances in lithographic printing enabled artists and designers to create vivid, large-scale visual works for public display. Posters quickly became a dominant medium for communication, serving both commercial and cultural purposes. From the colorful works of artists such as Jules Chéret and Henri de Toulouse-Lautrec to early advertising campaigns, posters were not only promotional tools but also artistic expressions that reflected the cultural and social dynamics of their time. Their accessibility and visibility in urban spaces made them one of the most effective ways to reach mass audiences.

As printing technologies advanced in the 20th century, posters grew more diverse in style, function, and distribution. Movements such as Art Nouveau, Constructivism, and the Bauhaus school left a profound impact on poster design, integrating principles of modern art with communication strategies. Posters were widely employed for political propaganda, social awareness campaigns, cinema promotion, and consumer advertising. During this period, posters evolved into both a cultural artifact and a collectible art form, embodying the spirit of their era while showcasing the interplay between text, image, and composition (Britannica, 2023).

By the late 20th century, traditional posters had established themselves as both functional and artistic mediums, balancing aesthetic innovation with practical communication. The development of offset printing and affordable mass production expanded their reach even further, making

posters a ubiquitous element of public life. Although the rise of digital media has transformed visual communication, traditional posters remain influential, continuing to inspire contemporary graphic designers and serving as a foundation for interactive and electronic poster design. Their evolution demonstrates how a static medium can adapt to changing cultural, technological, and artistic contexts, while retaining its power to inform, persuade, and engage.

Traditional posters have a rich lineage that stretches far beyond their modern visual appeal, tracing back to public announcements etched in wood and displayed in communal spaces. One of the earliest known printed advertisements in Britain, dating to 1477, advertised a handbook for priests and was produced by William Caxton, highlighting how communication via large-format prints emerged with the advent of early printing technology. Over time, the 19th century witnessed significant innovations in printing techniques (especially lithography) which enabled the production of vividly colored, large-scale posters. This evolution transformed posters from simple text-heavy notices into vibrant visual tools for mass communication.

The late 19th century, particularly the Art Nouveau period, marked a pivotal moment in poster history. Artists such as Jules Chéret, credited with pioneering the modern color lithographic poster in the 1860s, fused elegance and commercial messaging to create art that captivated urban audiences. Henri de Toulouse-Lautrec further elevated the medium with iconic works like the 1891 "Moulin Rouge" poster, which injected personality and a fine-art sensibility into promotional design. Meanwhile, Alphonse Mucha's 1894 poster for "Gismonda" not only solidified his status as the master of Art Nouveau but also marked the extent to which posters had transcended mere advertising to become collectible art objects.

As the 20th century dawned, poster design underwent further stylistic shifts in response to changing aesthetic and commercial landscapes. Movements like Plakatstil, led by artists such as Lucian Bernhard, embraced minimalism, favoring bold typography and simple color blocking to convey the message with striking clarity. Simultaneously, the proliferation of viral political posters (especially during both World Wars) and commercial film promotions reinforced the poster's role as both a propaganda tool and a cultural icon. These developments underscore how traditional posters continuously adapted, balancing artistic innovation with effective visual communication throughout history (Bajelan, 2023).

Electronic Technology in Poster Design

The integration of electronic technology into poster design has transformed the medium from static visual artifacts into dynamic, interactive communication tools. Traditional posters relied solely on printed imagery and text, but with the rise of digital components, designers now incorporate sensors, microcontrollers, and display systems to create immersive experiences. Technologies such as LED and OLED displays allow posters to feature animated visuals, shifting colors, or illuminated effects that immediately capture attention in crowded urban spaces. This

evolution reflects a broader shift in visual communication, where static media increasingly merges with digital interactivity (Venkatesan, 2019).

One of the most significant contributions of electronic technology to poster design is the ability to foster audience interaction. Posters equipped with motion detectors, touch sensors, or sound-responsive modules invite viewers to actively engage rather than passively observe. For instance, a poster might change its visual composition when someone approaches, play audio when touched, or display personalized content through connectivity with smartphones. These features enhance user participation and create memorable experiences, which are particularly valuable in advertising, education, and cultural promotion. The interactive quality of electronic posters also deepens emotional connections, transforming a simple message into an engaging dialogue between the medium and its audience (Wenqian Zheng, 2023).

Table1. Evolution of Electronic Technology in Poster Design

Period / Stage	Technological Features	Design Characteristics	Examples / Applications
Early Digital Posters (1980s–1990s)	Introduction of computer-based graphic design, digital printing	Static digital images, enhanced color and typography, easier reproduction	Commercial advertising posters, early desktop publishing outputs
LED & Screen-Based Posters (2000s)	LED screens, projection technology	Bright, illuminated, and animated visuals replacing traditional print posters in public spaces	Movie theaters, billboards in cities like Times Square
Interactive Posters (2010s)	Sensors (motion, touch, sound), microcontrollers (Arduino, Raspberry Pi)	Posters respond to user actions (e.g., touch, movement, voice)	Advertising campaigns, educational posters in museums
Augmented Reality Posters (2015s–Present)	AR apps, QR codes, smartphone integration	Posters include hidden layers of multimedia (3D models, videos) accessible via mobile devices	AR movie posters, cultural exhibitions, tourism promotion
IoT-Connected Posters (2020s)	Internet connectivity, cloud-based content updates	Real-time updates, dynamic personalization, integration with online platforms	Smart city posters, interactive public information boards
AI & Smart Posters (Emerging)	Artificial intelligence, data-driven personalization	Adaptive posters that analyze audience behavior and change content automatically	Personalized retail advertising, smart cultural campaigns

Furthermore, the incorporation of augmented reality (AR), QR codes, and Internet of Things (IoT) technologies has expanded the communicative potential of poster design beyond the physical surface. Through smartphones or wearable devices, audiences can access virtual layers of information, videos, or 3D visualizations linked to the poster. At the same time, IoT-enabled posters can connect to broader digital networks, updating content in real time or synchronizing with other media platforms. Such innovations demonstrate how electronic technology not only enriches aesthetic possibilities but also integrates posters into the ecosystem of digital

communication. As a result, electronic poster design bridges traditional graphic design with emerging technologies, redefining the role of posters in contemporary visual culture (Venkatesan, 2019; Wang, 2024; Zohoori, 2025).

Types of Interactive Art Posters

Interactive art posters can take many forms, depending on the technologies and sensory elements they employ. Audio-responsive posters react to sound, such as music or voices, creating dynamic visuals that change with acoustic input. Motion-activated posters use sensors to detect human presence or movement, allowing images, lights, or animations to shift as viewers approach. Posters with touch-sensitive surfaces invite direct engagement, enabling audiences to trigger sounds, reveal hidden visuals, or alter colors with their fingertips. These approaches transform posters into experiential mediums, encouraging active participation rather than passive observation (Kanaya et al., 2014).

More advanced formats include augmented reality (AR) posters, which extend beyond the printed surface by using smartphones or wearable devices to display 3D models, animations, or multimedia layers. Similarly, IoT-connected posters can synchronize with online platforms, providing real-time updates or personalized content based on data. Such posters are increasingly used in advertising, education, and cultural events to strengthen audience engagement. Together, these different types illustrate how interactive art posters bridge the gap between traditional design and emerging technologies, making visual communication more immersive and memorable (Köksal & AluÇ, 2022; Xuhua & Fei, 2024).

Design Principles for Interactive Posters

Designing interactive posters requires a balance between aesthetic appeal and technological functionality. The visual design must remain clear and compelling, ensuring that graphics, colors, and typography attract attention without overwhelming the interactive elements. Effective posters maintain strong visual hierarchy, guiding the audience's eye naturally toward both the message and the interactive feature. This balance is crucial, as excessive visual complexity or poorly integrated electronics can distract viewers rather than enhance engagement.

Another principle is usability and accessibility. Interactive posters must be intuitive, allowing users to understand how to engage without lengthy instructions. Clear affordances (such as touch-sensitive areas, motion cues, or QR codes) help audiences interact seamlessly. Accessibility also plays a key role, ensuring that designs are inclusive for people with different abilities. For example, posters that respond to sound or motion can engage audiences who may have limited visual or tactile interaction, making the experience more universal.

Finally, context and purpose strongly influence the design approach. Interactive posters should align with their environment and intended audience, whether used in advertising, cultural

exhibitions, education, or social awareness campaigns. Sustainability is also an emerging principle, encouraging the use of low-energy technologies and recyclable materials to reduce environmental impact. By integrating creativity with thoughtful technological application, interactive posters not only communicate effectively but also provide memorable, engaging, and responsible experiences (Kanaya et al., 2014).

Challenges and Limitations

Despite their growing potential, interactive posters face several technical challenges that limit their widespread adoption. The integration of electronic components (such as sensors, LEDs, or microcontrollers) often increases production complexity and cost compared to traditional printed posters. Durability is another issue, as electronic parts are vulnerable to environmental conditions like humidity, dust, or physical damage, which can reduce the poster's lifespan. Moreover, energy consumption remains a concern, especially for posters designed to operate continuously in public spaces.

Table2. Challenges and Limitations of Interactive Art Posters

Category	Challenges / Limitations	Explanation / Examples
Technical	High production cost	Integration of LEDs, sensors, microcontrollers increase cost compared to traditional posters.
	Durability issues	Electronics are vulnerable to humidity, dust, and physical damage, reducing lifespan.
	Energy consumption	Continuous operation in public spaces requires energy management and efficient power sources.
Design & Usability	Complexity vs. clarity	Poorly integrated interactivity can distract from the main visual message.
	Intuitive interaction	Users may not understand how to interact with motion sensors, touch areas, or apps, causing frustration.
	Accessibility	Not all audiences can engage fully; e.g., visually impaired users may need alternative sensory feedback.
Social & Environmental	Sustainability concerns	Electronic posters generate e-waste if components are not recyclable or modular.
	Privacy and data	Sensors or IoT connectivity may raise privacy issues, affecting audience trust.

Another limitation lies in the balance between technology and design. While interactivity can enrich audience engagement, poorly implemented features may overshadow or even confuse the main visual message. If the technology is too complex or unintuitive, audiences may fail to interact effectively, resulting in frustration instead of engagement. Additionally, designers must ensure accessibility, as not all viewers may have the ability (or willingness) to use smartphones, apps, or interactive tools to experience the poster fully.

Finally, social and sustainability concerns also shape the limitations of interactive posters. Unlike paper-based posters, electronic versions may contribute to electronic waste if not designed with recyclable or modular components. Some audiences may also resist technological posters due to privacy concerns when sensors or data collection are involved. These factors highlight that while interactive posters hold immense promise, they must be carefully designed and implemented to overcome practical, artistic, and ethical barriers (Wang, 2025; Zhang, 2025).

Future Directions in Interactive Poster Design

The future of interactive poster design lies in the integration of advanced technologies, particularly artificial intelligence (AI) and machine learning. These technologies enable posters to analyze audience behavior in real-time, adapt their visual content dynamically, and deliver personalized messages based on interactions. For example, AI-powered posters in retail spaces could change product highlights depending on viewer demographics, engagement patterns, or environmental cues. Such intelligent interactivity not only enhances audience engagement but also allows designers to evaluate the effectiveness of visual communication strategies more systematically.

Another promising direction is the expansion of augmented reality (AR) and mixed-reality applications. Future interactive posters will likely integrate seamlessly with smartphones, wearable devices, or AR glasses to provide immersive, multi-layered experiences. Users could access 3D models, animations, or educational content superimposed onto the physical poster, transforming the traditional poster into an interactive portal. This convergence of physical and digital media will enable more complex storytelling and experiential design, particularly in museums, exhibitions, and cultural campaigns.

Sustainability and eco-conscious design are becoming increasingly critical in the development of interactive posters. Future designs are expected to incorporate low-power electronics, recyclable materials, and modular components to reduce environmental impact. Solar-powered LEDs, biodegradable circuits, and recyclable plastics are some examples of how technology and environmental responsibility can be harmonized. By prioritizing sustainability, interactive poster design can remain innovative while minimizing ecological footprint, responding to growing societal awareness of environmental issues.

Finally, hybrid and cross-media approaches will redefine the role of interactive posters in communication networks. Posters may be integrated with IoT devices, social media platforms, and digital signage systems, allowing synchronized campaigns across multiple channels. This interconnected ecosystem will enable real-time content updates, user-generated feedback, and collaborative storytelling. In combination, AI, AR, sustainability, and networked media suggest that interactive poster design will evolve into a versatile, adaptive, and participatory medium that

bridges the gap between traditional graphic design and next-generation digital experiences (Bilozub et al., 2025; George, 2025).

Conclusion

Interactive art posters represent a transformative evolution in visual communication, bridging the gap between traditional graphic design and emerging electronic technologies. Unlike static posters, these interactive designs engage audiences through motion, touch, sound, and digital media, creating experiences that are both memorable and participatory. The integration of sensors, LEDs, microcontrollers, and digital displays has expanded the expressive potential of posters, allowing designers to convey messages dynamically and innovatively while enhancing viewer engagement.

This review has highlighted the historical trajectory of poster design, from static printed works to dynamic and interactive formats. It has also identified the diverse types of interactive posters (such as audio-responsive, motion-activated, touch-sensitive, augmented reality, and IoT-enabled designs) and the key principles that guide their creation. Effective design balances aesthetics, usability, accessibility, and context, ensuring that technology enhances rather than overshadows the communicative and artistic intent.

Despite their potential, interactive posters face significant challenges, including technical limitations, cost, energy requirements, and social or environmental concerns. Poorly implemented interactivity or complex systems can hinder audience engagement, while sustainability and ethical considerations remain central in developing responsible designs. These limitations underscore the need for careful planning, user-centered design, and innovative problem-solving in future applications.

Looking ahead, interactive poster design is poised to evolve further through the integration of AI, augmented reality, sustainability-focused technologies, and networked cross-media applications. Such advancements will enable adaptive, personalized, and immersive experiences that transform posters into versatile communication tools. By synthesizing technological innovation with creative visual design, interactive posters will continue to redefine the landscape of visual culture, making the medium both more engaging and socially impactful.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable.

Acknowledgements

Funding

Conflict of interest

The authors declare no conflict of interest.

References

Bajelan, N., Davodiroknabadi, Abolfazl., Sakenyandehkordi, Mehrnoosh. (2023). Designing of the Fabric Stickers to Implement Environmental Graphics. *International Journal of Applied Arts Studies, 7*(3), 71-78. https://doi.org/http://www.ijapas.ir/index.php/ijapas/article/view/3

Bilozub, L., Volodymyr, O., Osadchyi, V., Diachenko, A., & Bondarchuk, Y. (2025). Digital Art and Design for a Sustainable Future: Innovation, Ethics, and Identity. *European Journal of Sustainable Development, 14*, 381. https://doi.org/10.14207/ejsd.2025.v14n2p381

Britannica, E. (2023). *Poster*. https://www.britannica.com/topic/poster

George, D. (2025). Appropriation in Art: The Fair use doctrine and the Future of Contemporary Art. *Journal on Development of Intellectual Property and Research, 1*, 2-23. https://doi.org/10.64618/gzbczj09

Kanaya, I., Kanazawa, M., & Imura, M. (2014). *Interactive Art To Go* (Vol. 2014). https://doi.org/10.1145/2663806.2663871

Köksal, F. N., & AluÇ, E. (2022). Poster As An Evolving Media From Traditional To Digital. *The Turkish Online Journal of Design Art and Communication, 12*, 666-681. https://doi.org/10.7456/11203100/008

Venkatesan, M. C., A. F. (2019). Digital posters for interactive cellular media and bioengineering education [Research Support, Non-U S Gov'tReview]. *Commun Biol, 2*(455), 019-0702.

Wang, J. (2025). Creation and Research of Interactive Art Design Works Integrating IoT Technology. *International Journal of High Speed Electronics and Systems*. https://doi.org/10.1142/s0129156425407235

Wang, Y. L., Yiye. (2024). Research on Dynamic Poster Design in the Digital Age. *Highlights in Art and Design, 7*, 12-16. https://doi.org/10.54097/e3mmwv49

Wenqian Zheng, D. Z., Mei Lyu. (2023). Research on Digital Application and Advantages in Dynamic Poster Design. *3rd International Conference on Internet Technology and Educational Informatization, China*.

Xuhua, & Fei. (2024). A Comparative Study of Media Symbols from the Perspective of Visual Grammar: A Case Study of Marine Ecological Protection Posters in China and Western Countries. *Journal of Humanities and Social Sciences Studies, 6*, 117-130. https://doi.org/10.32996/jhsss.2024.6.10.13

Zhang, Q. (2025). Interactive Contemporary Art: Interactive Emotional Experience in Installation Art. Education Reform and Development, 7, 75-79. https://doi.org/10.26689/erd.v7i3.9980

Zohoori, S. (2025). From Loom to Light: Electronics in Textile Art and Design. *International Journal of Applied Arts Studies, 10*(1), 121-130. https://doi.org/http://www.ijapas.ir/index.php/ijapas/article/view/587