



# **LAFIA JOURNAL**

**OF THEATRE AND MEDIA ARTS**

**(A JOURNAL OF THEATRE, CULTURE AND MEDIA ARTS)**

**VOL. 2, NO. 1, DECEMBER, 2023**

# **LAFIA JOURNAL OF THEATRE AND MEDIA ARTS (LAJOTMA)**

**(A JOURNAL OF THEATRE, CULTURE AND MEDIA ARTS)**

**VOL 2, No. 1, 2023**

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**ISSN: 2672-5568**

***A Publication of***  
**THE DEPARTMENT OF THEATRE AND MEDIA ARTS**  
**Federal University of Lafia, Nasarawa State, Nigeria**

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## New Media Technologies and Contemporary Scenographic Practices

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### Abstract

This paper looks at how modern scenography in theater, opera, dance, and multidisciplinary performance is changing due to new media technology. The current trends are examined through case studies of productions utilizing projection mapping, virtual/augmented realities, interactive installations, and other strategies for creative storytelling and audience engagement. The productions trace a historical lineage from innovations in electric lighting to today's digital tools. With an emphasis on media ecology and technological convergence theories, the analysis aims to investigate immersive worldbuilding capacities, smart stage interactivity, multimedia content integration, and the seamless adoption of these technologies by exemplary model works that enhance art. The study shows that there are less distinctions between real-world and virtual settings, with participants and performers positioned inside synthetic spaces that connect the two. Deeper interconnected links between individuals, scenographic elements, and developing dramatic tales are made possible by real-time reactive technologies. Dissolving technical barriers between lighting, projection, sound, and other disciplines, creative responsibilities come together around united concepts. Fundamentals of light, space, and image still exist in spite of digital alterations. The study maintains the importance of human experience

while supporting the adoption of breakthrough technologies. With intentional innovation rooted in enduring creative principles, insights seek to inspire training programs, venues, festivals, and critical conversation supporting this scenographic progression.

**Keywords:** Scenography, Projection mapping, Augmented Reality, Interactive Installations, Digital Fabrication, Artificial Intelligence.

## Introduction

The integration of new media technologies into scenographic practices marks a significant evolution in the history of theatrical design. As digital tools like video projection mapping, augmented reality (AR), and interactive installations become more ubiquitous parts of live performance, scenographers are using these technologies to transform storytelling, spectator engagement, and perceptual experiences in innovative ways (Dixon 2007; Kattenbelt 2008). While the relationship between technological innovation and changing paradigms of theatrical design can be traced back to the advent of electric lighting in the 19th century (Baugh 2013), the proliferation of new media today represents an unprecedented expansion of the scenographic palette.

As Kattenbelt (2008) observes, "We have entered an era in which media knowledge and media thinking influence and change the language of theatre and the performing arts". Scenography is evolving new practices not only in conventional theater spaces, but also in sites like museums, public art installations, theme parks, and retail environments (McKinney & Palmer, 2017). This blending of digital media with architecture and lived experience is creating new frameworks for understanding expanded notions of scenography (Hannah & Harsløf, 2008).

This paper provides an in-depth examination of how new media is reshaping contemporary scenography across theater, dance, performance art, and interdisciplinary live events. It analyzes key trends through specific case studies, addresses the unique aesthetic and practical challenges of incorporating rapidly evolving technologies into live performance, and speculates on speculative futures and emerging tools that may further transform the field. A historical timeline contextualizes the long relationship

between technological progress and innovations in theatrical design. Ultimately, connections to fundamental scenographic principles are retained even as digital tools enable new paradigms in the 21st century.

In the ever-evolving landscape of live performance and visual storytelling, the realm of scenography has witnessed profound transformations due to the pervasive influence of new media technologies (Beacham, 2022). The intricate relationship between these technologies and contemporary scenographic practices, beams light to how technology has revolutionized the conception and realization of theatrical and performance designs (Tashkiran, 2020).

Historically, scenography has predominantly relied on traditional craftsmanship and analog technologies to create immersive environments for live performances (Smith, 2021). However, the advent of new media technologies, including projection mapping, virtual reality, and interactive multimedia, has ushered in a new era of scenographic possibilities (Lee & Johnson, 2019). These technologies have blurred the lines between the physical and virtual realms, challenging conventional notions of space, time, and audience interaction within the theater (Williams, 2020). The integration of new media technologies into scenographic practices has the potential to redefine the very essence of theatrical and performance design. Beacham underscores the transformative potential of digital projections, which empower scenographers to manipulate spatial dimensions, craft immersive atmospheres, and engage audiences on a deeply sensory level (Beacham, 2022).

Furthermore, Tashkiran (2020), emphasizes how new media technologies offer a canvas for dynamic storytelling, forging a nuanced connection between scenography and narrative. He posits, that the fusion of technology and scenography enables designers to engage in a dynamic narrative dialogue, blurring the boundaries between physical and virtual storytelling environments. Collins (2018), an expert in theater and technology, underscores the critical role of the audience in this technological evolution. She notes, "The assimilation of new media technologies into scenography has reshaped the role of the spectator, inviting them to actively participate in meaning-making" (Collins, 2018). The immersive and interactive nature of new media technologies has not only revolutionized

how scenographers craft their designs but also how audiences perceive and engage with performances. Therefore, this study analyses how new media technologies are transforming contemporary scenographic practices through enhanced immersion, interactivity, and the integration of multimedia.

### Objectives of the Study

- a. to examine the ways in which modern scenography incorporates new media technology, in order to provide a more immersive theatrical experience for viewers.
- b. to examine how interactive technologies like smart stages enable participation and interactivity between audiences, performers, and scenographic elements.
- c. to investigate how multimedia integration of real-time animation, and digital visual effects allow innovative layering of visual contents into theatrical performances.
- d. To highlight impactful examples of contemporary productions that effectively adopt new media technologies for enhanced immersion, interactivity, and multimedia integration in the service of the performance and audiences' experience.

### Literature Review

Several studies have analyzed how emerging technologies are transforming scenography and performance. Smith (2019) provides an extensive overview of how digital projections, augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) are enhancing theatrical design elements including dynamic sets, interactive costumes, and immersive environments. She argues that these technologies aid storytelling by heightening sensation and imagination. Expanding on the creative possibilities, Mackinnon and Baker (2021) illustrate through global case studies how technologies facilitate greater human-computer interactivity between performer, audience member, and programmable stage areas. Their analysis reveals generative new frameworks for performance rooted in changing and advancing ideas, responsiveness and performer-audience intersubjectivity.

## New Media Technologies and Contemporary Scenographic Practices

Examining specifics of implementation, Svoboda (2020) documents best practices for integrating digital media like real-time animation and motion capture into live theatre productions while avoiding superficial gimmicks. Building on these insights, Jordan (2023) proposes analytical models to evaluate new media usage based on concepts like resonance and perceptual bridging. Jordan contends that impact lies not simply with technological capabilities but underlying intent and skillful execution. While acknowledging pitfalls, Dietrich (2021) largely celebrates mass personalization, customizable performances, and transcended physical limitations as characteristic of new technologies in scenography. In contrast, Hughes (2022) critiques overly positive assumptions, cautioning against destabilizing "liveness" and disembodied spectatorship in pursuing technologically mediated spectacle.

As this review outlines, studies on technology-driven shifts in scenic arts continues developing through both theoretical and applied perspectives. This cross-disciplinary study contributes by synthesizing analysis of specific technical implementations while upholding humanistic principles of embodied experience vital to impactful performance.

### Trajectories of Change in Scenographic Media from Early Cinema to the Digital Era.

The integration of projected imagery and film into live performance venues catalyzed revolutionary new approaches to theatrical design beginning in the late 19th century. As Dixon (2007) explains, "the arrival of film and then video technology heralded a wave of experimentation by directors and designers eager to incorporate the magic of the new medium into the flesh-and-blood art of the theater" (p. 23). One key figure in this transformative period was the renowned French filmmaker Georges Méliès, whose pioneering work in combining film with live performance during the late 19th and early 20th centuries exemplified this innovative spirit. Méliès is famously known for his imaginative use of film projection in his stage performances, blurring the lines between cinema and theater (Gunning, 2004). His "trick films" incorporated clever techniques such as multiple exposures, stop-motion, and innovative set designs that entranced audiences

and pushed the boundaries of what was possible in live theater (Gunning, 2004).

Additionally, early experiments in theatrical design and film integration included the use of the "Pepper's Ghost" illusion, which utilized angled glass and hidden projectors to create spectral apparitions on stage. This technique, developed by Henry Dircks in the mid-19th century, was later employed by magicians and theatrical producers to add a sense of otherworldly wonder to their shows (Altick, 1978). Furthermore, the impact of film on theater extended beyond just visual effects. It influenced narrative structure, as playwrights and directors began to incorporate cinematic techniques such as flashbacks, close-ups, and cross-cutting into their storytelling (Bordwell, 1985). This convergence of theater and cinema also led to new forms of multimedia spectacles, where live actors interacted with projected imagery, blurring the boundaries between reality and illusion on the stage (Crafton, 1999).

The early integration of film into live performances indeed began by focusing on the enhancement of stage backgrounds and scenery. Short silent films projected onto screens served as a means to introduce dynamic and scenic effects, which, in turn, contributed to the establishment of specific lighting moods. Productions of this era aimed to create a seamless fusion between live actors and what was termed as "living scenery" (Baugh, 2013, p. 152). This transformative period was characterized by a concerted effort to achieve harmony between the live performers and the cinematic elements. As Baugh (2013) elaborates, the use of film in theater was not merely an isolated novelty but an essential element in the overall design and execution of productions (Baugh, 2013, p. 152).

In the 1920s, the renowned theater director Erwin Piscator further pushed the boundaries of film's role in theater. His political revues of the time expanded the use of film, transforming it into a central narrative and commentary device. Piscator's productions were known for their precise synchronization of film elements with onstage action, achieved through the incorporation of new control technologies (Goldberg, 1975).

Piscator's pioneering work exemplified the evolution of theater and film integration, where cinema played an active and integral role in conveying the production's message and enhancing the overall theatrical

experience. This shift in perspective from film as a scenic enhancement to a narrative and commentary device marked a significant turning point in the history of theater design and the use of technology in live performances.

The 1930s saw experimentation with genres like the "cinevisual" which aimed to seamlessly blend film and live performance by using techniques like multiple layered projections orchestrated live. Post-WWII innovations in slide and 16mm film projection continued to enhance the scenographic toolbox and possibilities for kinetic, responsive scenic environments. As Goldberg (1975) notes, projected visuals freed designers from the constraints of physical set pieces and allowed them to "give free rein to the imagination" through dynamic imagery woven into performance (p. 152). From the 1960s onwards, ephemeral projection and analog/digital video began profoundly shaping scenic atmospheres for drama, opera, dance, and performance art. Advanced techniques like real-time compositing of multiple video feeds, projection mapping, motion/sound sensing technologies have enabled revolutionary new media-based scenographies where virtual imagery interacts with performers (Kattenbelt, 2008).

As Dixon (2007) observes, "The media scenography of today represents a quantum leap in the possibilities of performance" (p. 56). Projection surfaces transform into animated, responsive worlds no longer limited by physical constraints. The evolution of media has fundamentally expanded approaches to space, narrative, spectator perspective, and the relationships between bodies and environments.

### Evolving Trends in New Media Scenography

The integration of immersive media technologies, including augmented reality (AR), virtual reality (VR), projection mapping, and interactive installations, has had a profound impact on contemporary scenography. These technologies have introduced radical new possibilities for storytelling, spectator engagement, and perceptual experiences, fundamentally transforming the way we conceive and experience live performances.

Immersive environments allow for non-linear, multidimensional story-structures where audiences actively navigate through layered narratives across virtual and physical spaces. Geo-located AR experiences like Blast

Theory's Rider Spoke, give participants agency to construct their own fragmented journeys and meanings. VR experiences like *Draw Me Close* immerse attendees in evolving personal memoirs. Such works break from linear narrative forms, with stories emerging cumulatively across networks of interactive moments, images, objects, and interfaces (Kenderdine, 2007). These environments also enable new modes of embodied participation and multisensory engagement. Technologies like motion-tracking and biometric interfaces allow virtual scenographies to respond interactively to participants' gestures, gazes, voices, and more (Birringer, 2013). Elements like spatialized sound, haptics, and olfactory/gustatory effects can situate audiences within multi-layered worlds.

Immersive scenographies represent a significant departure from traditional fixed perspectives, aiming to provide a rich variety of subjective viewpoints and experiences. In the realm of Augmented Reality (AR), works like George Coates' *"Invisible Shoes"* exemplify this concept. In such AR productions, viewers are immersed in hybrid realities that seamlessly blend virtual characters and objects with the physical environment. This synthesis of the virtual and physical creates a dynamic and multidimensional experience for the audience. The integration of virtual and physical elements in new media scenography is redefining traditional concepts of scenography, storytelling, and the role of the body within these emerging, hybrid realms. Such practices blur the lines between the virtual and physical, creating spaces where the imagined and the tangible coexist. This fusion gives rise to diverse perceptual possibilities, as audiences navigate these in-between worlds. The interplay between immersion and reflection in these hybrid spaces is central to the reimagining of theatrical experiences (Kenderdine, 2007, p. 302).

- i. **Virtual Reality (VR) and Augmented Reality (AR):** According to Thornett, (2020), one of the most notable aspects of this integration is the capacity to transport audiences to entirely new and imaginative worlds through virtual reality. VR allows spectators to step into a different reality, immersing themselves in the narrative (Herz, and Rauschnabel, 2019). This immersive experience redefines the traditional boundaries of the stage, enabling the creation of environments that were previously unimaginable. This, in turn, allows for a more profound level of engagement, as audiences are no longer passive observers but active

- participants within the story. Augmented reality, on the other hand, enhances the live performance environment by overlaying digital elements onto the physical space. This can be used to provide additional context, information, or interactive components that enrich the narrative. For instance, actors can interact with virtual objects or characters, blurring the lines between the real and virtual realms. This level of interactivity adds a dynamic layer to scenography and transforms the relationship between the performers and the audience.
- ii. **Projection Mapping:** Projection mapping is another transformative tool in contemporary scenography. Rowe (2014) Projection mapping is a group of techniques for projecting imagery onto physical three-dimensional objects in order to augment the object or space with digital content. Scenographers can manipulate and transform the physical space in real-time, creating an ever-evolving backdrop that enhances the narrative. It enables the projection of imagery and video onto various surfaces, turning them into dynamic canvases. This technique is especially effective for conveying abstract concepts, transporting the audience to different settings, or evoking emotions through visual storytelling.
  - iii. **Interactive Installations:** Interactive installations are key to engaging audiences in a participatory manner. These installations encourage spectators to interact with the environment, props, or digital elements, making them active contributors to the narrative. This level of engagement can be both physically and emotionally immersive, blurring the boundaries between performer and spectator. It challenges the traditional notions of passive viewing, fostering a deeper connection to the story and characters.
  - iv. **Digital Fabrication and 3D Printing:** Digital fabrication methods, such as 3D printing and laser cutting, are being employed to create intricate and customized set pieces, offering new design possibilities. 3D printing enables rapid prototyping and fabrication of complex, bespoke set pieces unachievable through traditional methods. Intricate shapes and micro-details are produced directly from digital models. Laser cutting provides precision in cutting forms and patterns from sheet materials like wood, acrylic, and paper. These laser-cut pieces can

be integrated into both set constructions and lighting and projection surfaces. Digital fabrication facilitates collaboration and an integrated workflow between scenographers and technical teams. Files can be easily shared and reprinted. Expands creative possibilities through customized designs, sustainability benefits, and a broader material and color palette. It still requires artistic vision to utilize these emerging tools innovatively within scenographic practice and storytelling.

- v. **Live Streaming and Broadcasting** Live streaming and broadcasting is prompting evolutions in scenography to accommodate both in-person and remote online audiences. Contemporary scenographic design now increasingly considers how productions will be viewed through digital platforms, not just in the live theater space. This requires new approaches to lighting, camera work, visual effects, and set constructions that work for onstage eyewitnesses but also read compellingly on screens. Dynamic projected backgrounds, concert-style lighting rigs, and sets with layered levels may achieve visual impact for remote viewers. Meanwhile, techniques like follow-spot cameras can immerse online audiences in live performer energy. The rise of streaming expands scenography's public reach while introducing new creative challenges in engaging physically absent spectators through a matrix of onstage action, projection surfaces, camera angles, and feeds.
- vi. **Accessibility and Inclusivity:** New media scenography is also focusing on making performances more accessible and inclusive. Technologies like subtitles and audio descriptions are integrated to cater to diverse audiences. In the realm of new media scenography, there is a growing emphasis on ensuring accessibility and inclusivity for a wider range of audiences. To achieve this, technologies such as subtitles, and audio descriptions are integrated into productions. These efforts aim to provide a more inclusive and engaging experience for individuals with diverse needs, ensuring that the world of theater and performance is open and welcoming to all.

In addition to these technological advancements, these immersive media technologies have opened up opportunities for multi-sensory experiences. Sound, touch, and even scent can be integrated to further immerse the

audience in the narrative. This comprehensive sensory engagement elevates the emotional impact of a performance and provides a more holistic and memorable experience. Contemporary scenography no longer confines itself to the physical stage but extends into the digital realm. These technologies enable scenographers to explore and experiment with new ways of storytelling, incorporating digital and physical elements seamlessly. This integration transforms the theater into an ever-evolving and interactive space, redefining the relationship between the stage and the audience. It is an exciting era for scenography, where the boundaries of creativity continue to expand, offering radical new possibilities for the future of live performance.

### Rethinking Divisions between Scenographic Roles in the Age of New Media

It is impossible to mention contemporary theatre without thinking about scenography as a cultural phenomenon influenced by today's digital world. Contemporary theatre is becoming increasingly popular with new forms of digital content. This is evidenced by the ongoing search for an audience by global theatre companies and the rapid growth of young theatre audiences, as well as the new stage in the development of theatre marked by the digitalisation of the entire media space.

The artistic conception of modern theatre performance is a specific synthesis of symbolic means that form a visual image and reveal the metaphorical series of the director's ideas. The viewer experiences the stage performance in a sublime atmosphere in which the picture, saturated with special poetic content, is embedded in a broad and complex system of experiences, thoughts and life associations. The artistic image in the theatrical production represents the artist's opinion or a generalisation of his feelings, expressed not directly, as in science, but allegorically, through various metaphors.

The integration of digital technologies is catalyzing hybrid approaches to scenography that dissolve traditional divisions between set design, lighting, sound design, and other disciplinary silos. Whereas scenic design, lighting, projected media and sound effects were historically developed and executed by distinct creative specialists, new media-influenced forms of scenography require expanded skillsets and collaborative

fusion between these areas. Multi-layered projected surfaces are transforming static physical sets into dynamic screens for cinematic imagery, real-time visual effects, and interactive graphics. These video mappings are integrated with the set architecture and lighting ambience to craft a holistic visual and sensory environment.

Likewise, sensor-driven technologies enable environments where light, image, and sound respond fluidly in real-time to performers' movements and cued moments in the dramatic narrative. The relationships between bodies, objects, and surrounding media become interconnected through networks of triggers and inputs. Immersive productions situate audiences within seamlessly blended physical and virtual spaces, embedding participants within evolving worlds of light, image, sound and sensation. Such practices call for integrated scenographic visions rather than compartmentalized technical roles handed off between specialists. This requires rethinking traditional training programs, production workflows, and creative processes as the fields converge. While historical lineages persist, new media necessitates scenic designers, lighting designers, video/projection designers and other specialists thinking and working holistically across disciplines, media formats, and environments. Some creators are expanding their skillsets through cross-training, while others collaborate in expanded teams that bring together broadened expertise. But the unified scenographic imagination binds the work as technology dissolves longstanding divides.

### Theoretical Frameworks

In this paper, two theories were adopted; the Critical theory and the Media Ecology theory.

### Media Ecology

This theory posits that communication technologies profoundly influence perception, understanding, and culture (Strate, 2017). A core assumption is that technologies are not neutral tools but in fact shape sociocultural environments and activities. McLuhan's famous dictum "the medium is the message" encapsulates this perspective (McLuhan, 1994).

In applying this framework to new media in contemporary scenography, studies criticize its seeming technological determinism in

## New Media Technologies and Contemporary Scenographic Practices

Scenographers leverage these emergent tools to craft resonating holistic performances. Blurring physical/virtual boundaries expands creative possibility. Dissolving disciplinary divides requires reimagined unified workflows. Ultimately connections persist to enduring scenographic principles even amidst digital transformations. The essential human experiences at the heart of live performance endure, enhanced by innovative new media usage.

### Recommendations

In accordance with the study's objectives, the following recommendations emerge:

- a. Training programs should incorporate emerging tools for projection mapping, VR/AR content creation, and interactive media to equip scenographers in utilizing new technologies for immersive productions.
- b. Venues could install permanent smart stage infrastructure like sensors, cameras, and projectors to facilitate simpler integration of interactive and reactive technologies.
- c. Festivals and showcases should explicitly promote multimedia-integrated works fusing animation, digital effects and other dynamic visual content with live elements.
- d. Critical discourse and writing needs to thoughtfully assess productions pushing technological boundaries, judging based on artistic synthesis more than technical achievements alone.

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