



Research on the Design of Digital Media Space Based on Immersive Theater——The Evolution from ‘Place’ to ‘Field’

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ABSTRACT.

In the context of the deep integration of digital media and theatrical arts, digital media has become a core design element in the construction of immersive theatrical spaces, driving the transformation of theatrical spaces from physical venues to experiential fields. From a design perspective, this paper divides the spatial design of digital media in immersive theater into three progressive levels and analyzes it through works such as *Crazy Barbershop*, *Sleep No More*, *Only Henan: Theater Fantasy City*, etc, aiming to extract the design logic and practical strategies of immersive theatrical digital media spaces. This provides a reference and practical path for the innovation of digital media and immersive theatrical spaces.

CCS CONCEPTS :

Applied computing~Arts and humanities~Performing arts

Keywords: Immersive theater, Digital media, Space design.

1 Introduction

Immersive theater can be understood as a theatrical form in which audiences are placed within the performance environment and participate in the work through movement, choice, and embodied perception. In this form, audience mobility and spatial exploration become part of the dramaturgy of the work [1]. Audience participation is also shaped by specific modes of risk, agency, and responsibility rather than remaining a neutral or purely voluntary activity [2]. At the same time, immersive theater does not simply mean sensory enclosure or unrestricted audience freedom. The apparent freedom of audience mobility is still organized by the structure of the dramatic world. Its experience is further shaped by spatial arrangement,

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narrative clues, interactivity, and the audience's gradual assembly of fragmented information [3]. Therefore, theatrical space is no longer only a container for performance, but becomes a mechanism for narrative encounter and experience generation.

With the use of projection, sound-field design, real-time lighting, AR, and so on, digital media further reshapes this spatial mechanism. It does not merely enhance sensory effects, but participates in organizing spatial boundaries, information layers, movement paths, and perceptual cues. However, existing studies often focus on theatrical form or audience reception, while paying less attention to digital media as a spatial design mechanism. Therefore, this paper examines how digital media participates in the spatial construction of immersive theater and, through case analysis, explains how immersive theatrical space shifts from physical "place" to experiential "field" under digital media intervention.

2 Immersive theater and digital media space design logic

2.1 The spatial characteristics of immersive theater

Compared with traditional theater, immersive theater changes the fixed spatial relationship between stage and audience. In traditional theater, the stage frame, fixed auditorium, and "fourth wall" usually stabilize the viewing distance, and space mainly serves the presentation of a unified stage image. Immersive theater weakens this frontal structure by placing the audience within the performance environment, or by embedding them in a constructed dramatic situation (as shown in Fig. 1). Audience movement, spatial position, and embodied perception therefore become part of the way narrative information is encountered and understood.



Fig. 1. Image of the theater space layout for the immersive theater. (Via Internet)

This feature distinguishes immersive theater from site-specific or environmental performance. These may use non-traditional spaces but do not always make audience movement and narrative access part of the structure. In immersive theater, different rooms, props, sounds, lighting, or media cues often correspond to narrative fragments. The audience identifies clues and assembles information through spatial experience. Theatrical space thus becomes a mechanism for distributing information, guiding perception, and producing individualized narrative experience.

2.2 Spatial design attributes and interventional value of digital media

With the continuous involvement of digital media, technology is no longer only an additional stage effect. It gradually enters narrative expression, reopening both the physical and media boundaries of theater [4]. As immersive theater makes space central to narrative and experience, conventional spatial construction methods increasingly struggle to meet the demands of audience participation and multi-path storytelling. In this context, spatial form plays a more significant role in dramatic expression.

Manovich defines “augmented space” as “the physical space overlaid with dynamically changing information” [5]. This concept is useful for understanding how digital media add information layers to physical theatrical space. These media do not simply decorate the venue; they can extend spatial boundaries, reorganize visual and auditory focus, and create new relations between physical places and narrative information.

However, Manovich’s concept cannot be directly equated with immersive theatrical space. His discussion mainly explains the informational overlay of physical space in new media environments, while immersive theater also depends on live performance, embodied movement, narrative rhythm, and affective experience. In other words, the digital layer in immersive theater is not only an information surface, but part of a performative situation. It must work together with actors, audience movement, spatial atmosphere, and dramatic timing.

Therefore, the value of digital media intervention lies not only in enhancing sensory effects, but in its ability to participate in spatial organization. Images, data, sound, lighting, and interactive mechanisms make theatrical space a dynamic system that can be adjusted and reorganized during performance. Audience movement and information reception are also incorporated into design.

3 Evolution of spatial construction design

3.1 Instrumental assistance: Refined creation of situational atmosphere

The initial level of digital media involvement in immersive theatrical space is its use as a tool for creating atmosphere. At this stage, however, digital media does not yet organize spatial structure or generate narrative logic. It mainly supplements the physical space by enhancing the dramatic situation through visual and auditory effects, showing clear detachability and serviceability.

Small theaters higher demands on spatial immersion because of their limited scale. Adapted from the classic *Shear Madness Salon*, *Crazy Barbershop* is a representative example of small-theater immersive theater. The play is built around a physical barbershop setting and uses nine digital speakers to form a 5.1 stereo sound system. Unlike the single and fixed sound output of traditional drama, this directional sound design strengthens the realism of the space.

At the beginning, background sounds, the retro reverberation of a phonograph, and physical props work together to create the everyday atmosphere of a barbershop. The

sound of a noisy “second-floor landlord,” although no such real space exists, creates a sense of virtual spatial depth through digital reverberation. The lighting also works with the sound design: warm 4000K light creates the nostalgic atmosphere of a 20th-century American barbershop, while cold white focused lighting during the interrogation scene directs the audience’s attention and heightens dramatic tension.

Crazy Barbershop’s design logic is sensory calibration, not spatial reorganization. Sound and lighting adjust the audience’s perception of depth, atmosphere, and dramatic focus, but do not redefine the function of the space. From the audience’s perspective, digital media helps them enter the fictional situation faster, yet does not alter how the narrative is accessed. Even without these digital media elements, the murder-investigation narrative and audience interaction could still work. This case therefore belongs to the level of instrumental assistance: digital media enhances atmosphere and realism, but remains limited to improving experiential quality, rather than supporting complex spatial narratives or multi-path experiences.

3.2 Structural reconstruction: Narrative Translation of Physical Space

Instrumental assistance has clear limits in spatial narrative and structural expression, so digital media further moves toward structural reconstruction. Its focus is the narrative translation of physical space. At this stage, digital media begins to participate deeply in the construction of theatrical space. Polydorou notes that immersive narrative experiences “use technology as a tool to expand the narrative spaces,” and that their stories often “need to be carefully pieced together by the audience” [6]. This suggests that digital media does more than strengthen spatial effects. By reorganizing spatial information and guiding the audience’s movement, it transforms theatrical space from a narrative container into a narrative structure that can be explored and assembled. In this process, discrete physical spaces are connected into a narrative structure with internal logic, and the relationship between digital media, space, and narrative becomes closer, showing a degree of semi-inseparability.

This narrative translation is mainly reflected in digital media’s coding of spatial information. Originally independent areas are given clear narrative functions and become narrative nodes that can be perceived and interpreted by the audience. *Sleep No More* Shanghai Edition, hereinafter referred to as *Sleep No More*, is based on the multi-storey physical space of a building. Through a directional soundscape system and dynamic lighting devices, the whole building is transformed into a spatial text with narrative function. Its soundscape system does not use global sound effects, but divides different narrative areas through directional pickup and volume control. In the *Macbeths*’ conspiracy scenes, for example, their voices are only clearly audible in the bedroom and nearby areas. This strengthens the secrecy of the conspiracy, marks the bedroom as a key narrative node, and guides the audience to approach it for clues. The mental hospital area creates a suspenseful narrative unit through heartbeat sounds, object collisions, and low lighting. The lighting system also constructs a “light boundary” through changes in brightness, focus, and color, helping the audience identify different narrative contexts and guiding their movement choices [7].

In this way, physical space is no longer only a performance venue, but becomes a narrative structure that can be gradually read by the audience. When discussing immersive narrative experience, Polydorou points out that “ narrative information was spread around the physical and the virtual 3d space”, while the story itself “needs to be carefully pieced together by the audience” [8]. So the audience’s movement and exploration are not merely changes in viewing position, but are directly related to the acquisition, and understanding of plot clues.

Only Henan: Theater Fantasy City renovates the railway station theater through 360-degree circular screen projection, surround sound, and coordinated lighting, creating a spatial form that serves the narrative of the play. Centered on Li Shiba’s life, the play uses dynamic projection on a circular semi-transparent screen to turn key moments from his birth to sacrifice into a panoramic visual narrative surrounding the audience. The changes in projection, lighting, and color compress and shift narrative time, while also strengthening the emotional tone of different life stages. The combination of live actors and projected images further makes the theater space an important site of narrative expression. Without this digital media design, the railway station theater would return to an ordinary enclosed space, and the integrity and emotional force of Li ’s story would be greatly weakened.

Taken together, *Sleep No More* and *Only Henan: Theater Fantasy City* show that structural reconstruction depends on transforming digital media from sensory effects into mechanisms of spatial narration. In *Sleep No More*, directional sound and lighting operate as implicit navigation mechanisms, distributing narrative access across rooms and guiding the audience to approach, stop, or follow without direct instruction. In *Only Henan: Theater Fantasy City*, circular projection, surround sound, and lighting translate Li’s life narrative into an enveloping visual-spatial structure, reorganizing narrative time and emotional rhythm within the railway station theater. Although the former relies more on exploratory movement and the latter on immersive audiovisual reconstruction, both cases show how digital media turns physical space into a narrative structure that can be read, followed, and assembled by the audience.

The narrative translation of physical space means that digital media embeds dramatic logic and information into spatial structure, transforming space from a background into part of the narrative itself. Compared with instrumental assistance, digital media here shifts from an environmental enhancement tool to a spatial organization mechanism, turning immersive theatrical space from a static container into a dynamic structure with narrative logic.

3.3 Grammatical creation : spatial rule generation of virtual-real integration

Digital media moves beyond the narrative translation of physical space and enters the stage of grammatical creation. It begins to define the operational logic of immersive theatrical space through rules that integrate the virtual and the real. As Strutt et al. note, digital media with real-time interactive capabilities “may prove to be a new medium, not merely a new tool” [9]. Thus, digital media moves beyond assistance to

organize perception, interaction, and narrative, tethering virtual information to physical sites. Through interactive rules and perceptual logic, it defines spatial accessibility, visibility, and narrative authority, obliging the audience to follow its rules in exploring space.

Spatial rules for virtual–real integration depend on digital media’s interactive interface design: physical space anchors virtual information, linking physical actions to virtual feedback. In *Beyond Gravity*, a vast theater simulating the “Gravity” spacecraft uses AR and mobile apps to turn theater devices into nodes triggering virtual information (Fig. 2). Scanning physical devices yields virtual audio-visual content like crew logs and mission records, while operating consoles triggers dynamic AR images. Physical space thus becomes not just a venue but an interactive field linked to virtual information. Without digital media, the theater’s sci-fi setting, narrative logic, and interaction system would be hard to sustain.



Fig. 2. Information bubbles containing sound and visuals obtained by viewers scanning physical installations in the theater space using a mobile device app. (Via Internet)

Coding spatial functions is another way digital media establishes virtual–real rules, defining narrative authority and functional attributes so the same physical space shifts with plot or audience action. In *Beyond Gravity*, the control room remains ordinary until captain authority is unlocked; then, AR activates holographic fleet projections, turning it into a command center, while bulkheads overlay shield values and navigation coordinates as the plot unfolds. Spatial functions are thus dynamically generated by digital rules, not physical structure alone.

A Most Favored Nation, created by the UCLA REMAP team, uses AR to construct a dual-world spatial cognition rule. Overlaying real Axis and virtual Allied world lines in a physical space, it requires AR devices to perceive two parallel narratives (Fig. 3). Real scene and virtual narrative coexist, with plots connected across worlds via digital media. Digital media thus expands spatial information and shapes narrative understanding, turning physical space into a multidimensional venue for parallel stories.

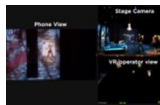


Fig. 3. Comparison of the two world lines in *A Most Favored Nation*. (Via Internet)

Beyond Gravity and *A Most Favored Nation* show that grammatical creation depends on digital media’s ability to define spatial rules rather than merely organize spatial information. In *Beyond Gravity*, AR scanning, mobile interaction, and authority unlocking transform physical devices from scenic objects into functional interfaces. The audience must perform specific actions to activate information and spatial

functions, so what can be seen, entered, or used is determined by digital rules. In *A Most Favored Nation*, AR constructs a perceptual rule for parallel narratives: the audience can understand the dual-world structure only by following the visual and cognitive logic established by digital media. Although the former emphasizes rule-based interaction and the latter emphasizes rule-based perception, both cases show that digital media becomes the grammar through which immersive theatrical space operates.

At this level, digital media moves from designing space to generating spatial rules, its relation to immersive theatrical space evolving from intervention to symbiosis. It becomes essential to spatial operation—without it, the play’s narrative carrier, interactive logic, and experience would be fundamentally affected. Through virtual–real interfaces, spatial function coding, and cognitive rule construction, digital media extends space beyond physical scale into a digitally governed virtual–real field. The audience’s spatial experience shifts from exploring physical places to practicing digitally defined rules, marking digital media transforms from tool to spatial grammar.

3.4 From tool to grammar : the transformation of immersive theater space to field

The three-level evolution of digital media in immersive theatrical space drives a shift from physical “place” to experiential “field”— “place” being a performance container, “field” a dynamic system where space generates narrative, relationships, and experience. This shows digital media moving beyond surface decoration into deeper spatial logic, with the three levels often coexisting, not simply replacing one another.

The place stage corresponds to instrumental assistance: space relies on physical entities, and digital media serves mainly as detachable sensory enhancement. In *Crazy Barbershop*, the barbershop setting, fixed structure, and narrative can exist without digital media; lighting and sound design only strengthen atmosphere and immersion.

Structural reconstruction forms the transition from place to field. Through narrative coding and path guidance, digital media turns physical space into a structurally narrative space. In *Sleep No More* and *Only Henan: Theater Fantasy City*, digital media tightens the space-narrative connection; field characteristics begin to emerge, though space still operates through physical structure and a preset plot.

Grammatical creation marks the formation of the experiential field. Here, digital media becomes the grammar defining spatial operation, and physical place an anchor for virtual–real interaction. *Beyond Gravity*’s virtual–real interface and *A Most Favored Nation*’s dual-world cognitive rules both use digital rules to construct spatial perception, interaction authority, and narrative mechanisms, so accessibility, visibility, and functionality are digitally determined.

Thus, the shift from place to field transforms space from background to carrier of experience, from physical environment to a composite of narrative, interaction, and perception. This responds to the demand for audience participation and multi-sensory

experience, and reveals digital media not as a mere technical addition, but as a key design element reshaping spatial logic and experiential structure.

4 Conclusion

With the rapid development of technology, the convergence of digital media is reshaping our understanding of theater [10]. In immersive theater, digital media shows a progressive shift. This change not only improves immersive experience, but also extends digital media from sensory enhancement to spatial organization and rule generation. These three types of practice coexist rather than replace one another. As XR, real-time interaction, and artificial intelligence develop, their relationship with theatrical narrative and emotional communication requires further study.

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