Proceedings of the 5th International Conference on Interdisciplinary Humanities and Communication Studies
DOI: 10.54254/2753-7064/2026.36582

Narrative Structure Transformation in Mixed Reality Moving Images: A Study on Cross-media Screenwriting Practice

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Abstract. Mixed reality (MR) fundamentally alters the spatial and temporal conditions of moving-image narratives. Unlike conventional cinema, where the frame dictates visual access, MR enables physical space and digital elements to coexist, repositioning the spectator as an active participant. This paper examines how narrative structures transform under these conditions and what this entails for screenwriters. Drawing on classical narratology and practice-based research, the study analyzes three works—Bettina Frankham's In a Minor Key, Alejandro G. Iñárritu's Carne y Arena, and Edward Berger's Submerged. Three principal shifts are identified: plot architecture becomes modular rather than sequential; point of view becomes embodied rather than optically directed; temporal organization becomes elastic rather than fixed. These findings suggest that traditional three-act models give way to spatially distributed, non-linear designs, requiring screenwriting to expand beyond the master-scene format toward diagrammatic and modular documentation. Cross-media screenwriting in MR is less about adapting film scripts and more about designing experiential systems that balance authorial intention with participant agency.

Keywords: mixed reality, narrative structure, cross-media screenwriting, interactive cinema, narratology

1. Introduction

The rectangular frame has governed moving-image narrative since cinema's inception. Mixed reality (MR) replaces this fixed window with a navigable space, unsettling the director's monopoly over attention. By overlaying digital objects onto the physical world or immersing the participant in a fully navigable 360° environment, MR dissolves the boundary between screen and space. The participant can walk around, look in any direction, and sometimes touch or alter the diegesis. These conditions force a reconsideration of how stories are structured and how screenplays are written.

Scholars and practitioners have begun to map this territory. Recent collections on screenwriting for virtual reality emphasize that the master-scene format is inadequate for describing spatial, multimodal, and interactive experiences [1]. At the same time, classical narratology must be stretched to accommodate participant agency and environmental storytelling [2]. The present study sits at the intersection of these two concerns. By "cross-media screenwriting," I refer to designing a narrative system intended to be instantiated across multiple platforms (e.g., linear film, interactive

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installation, mobile AR), rather than merely adapting a completed script from one medium to another.

The paper proceeds in four stages. First, it reviews theoretical tools for discussing MR narrative. Second, it identifies the principal transformations in plot, perspective, and time. Third, it examines three concrete works illustrating those transformations. Finally, it draws out implications for cross-media screenwriting practice. This paper does not propose a definitive theory of MR narrative; it offers a set of analytical coordinates for identifying structural shifts and their practical consequences for screenwriters.

2. Theoretical framework

2.1. Narratology and the moving image

Classical narratology, as articulated by Genette and refined by Bordwell and Chatman, treats narrative as a double structure: story (chronological events) and discourse (how those events are presented) [3-5]. In cinema, discourse is shaped by framing, editing, and sound design. The spectator is positioned as an implied observer whose gaze is guided by the camera. This model assumes a fixed viewpoint and a predetermined temporal order.

Interactive and immersive forms challenge both assumptions. When the viewer can choose where to look or trigger different branches by moving through space, the discourse is no longer entirely under authorial control. Ryan argues that story becomes a set of possibilities rather than a single path [6]. In MR, possibilities multiply because the physical environment participates in the telling. Objects in the room may become diegetic props; the participant's body becomes a site of action. Narrative analysis must therefore account for both authored structure and emergent structure produced by each user's trajectory.

2.2. Mixed reality as a narrative medium

Mixed reality occupies a middle ground between virtual reality and augmented reality. MR does both: it can occlude real objects, generate virtual ones that respond to real lighting, and allow the user to move freely between the two registers. The diegesis is no longer confined to a screen; it can leak into the physical room or retreat into a purely digital space [7].

Screenwriters face a dual challenge: designing events in three-dimensional space and deciding how much agency to grant the participant. Too little agency and the experience feels like a film wearing a headset; too much and the story collapses into unstructured play. The most successful works negotiate this tension by embedding clear narrative affordances—objects that invite interaction, spatial cues that guide attention, and temporal anchors that prevent the experience from drifting indefinitely.

3. Transformations of narrative structure

3.1. From linear plot to modular architecture

The three-act structure has long served as a default scaffold for conventional screenwriting. MR works frequently abandon this in favor of modular designs. Individual scenes or "beats" can be experienced in different sequences, or some modules may be skipped entirely depending on the participant's path. The overall experience still possesses a beginning and an end, but the middle is assembled rather than prescribed.

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Writers can no longer rely on the sequential logic of a traditional script. Instead they produce diagrams, flowcharts, or spatial maps showing how modules connect. Frankham's account of writing In a Minor Key is instructive: the production documents evolved into modular artefacts describing both spatial layout and interactive logic [1]. A similar emphasis appears in Dooley's case study of Fire Escape [8]. The screenplay becomes less a literary text and more a design specification. This modular reconfiguration directly impacts how participants perceive themselves in relation to the storyworld.

3.2. Point of view and embodied presence

Cinema traditionally offers either a third-person observational stance or a carefully controlled first-person viewpoint. MR collapses these categories. The participant occupies the same space as the characters and can look wherever the body allows. This freedom creates what Weaving calls the "optics of immersion": the writer must anticipate multiple possible gazes rather than a single directed look [9]. Williams, Love and Love have also developed practical guidance on managing attention and embodiment in cine-VR [10].

Some works respond by limiting mobility. Submerged places the viewer inside a WWII submarine and carefully orchestrates sound and visual cues so attention is guided even when the head can turn freely [11]. Other works embrace full mobility. Carne y Arena allows participants to walk among migrants in a desert simulation; the narrative emerges from proximity and duration rather than edited shots [12]. In both cases, the writer designs the physical and virtual architecture that shapes the participant's body and attention. Embodied presence also restructures the experience of duration, since physical movement through space consumes real time.

3.3. Temporal organization

Linear time remains the default for most cinematic stories. MR experiences often operate on multiple temporal registers simultaneously. Real-time physical movement coexists with pre-recorded virtual events; flashbacks may be triggered by location rather than by an edit; loops and revisitable scenes become possible. The result is a more elastic sense of duration. A five-minute authored sequence can expand into fifteen minutes of lived experience if the participant lingers, or contract if the participant rushes.

Writers must think in terms of temporal affordances rather than fixed durations. They specify the conditions under which time advances, pauses, or branches, accepting that each participant's clock will differ. This shift is especially pronounced in cross-media projects combining live performance, physical installation, and digital layers.

4. Case studies

4.1. In a Minor Key: the diagrammatic screenplay

Bettina Frankham's In a Minor Key is an interactive mixed-reality essay exploring sound, memory, and place. Because the work requires participants to move through a three-dimensional environment with multiple interaction sites, the conventional master-scene script proved insufficient. Frankham developed diagrammatic and modular screenplay artefacts mapping both the spatial arrangement of media elements and the branching logic of the experience [1].

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The narrative structure is deliberately open. Participants can approach interactive nodes in different orders, and the essayistic form tolerates incompleteness. What holds the experience together is not a tight causal chain but thematic and sensory coherence. For screenwriters, the project demonstrates that MR documentation can borrow from architecture, interaction design, and musical scores rather than forcing material into film-script conventions.

4.2. Carne y Arena: embodied witnessing

Iñárritu's Carne y Arena places the participant among migrants crossing the desert at night. The experience begins with a physical antechamber—cold concrete floors, discarded shoes—before the headset is donned. Once inside, the participant can walk freely among digital figures. There is no dialogue track explaining the plot; the narrative is carried by the participant's own movement and the unfolding of a border-patrol encounter [12].

Structurally, the work is closer to a short story than to a feature film. A single dramatic situation is expanded through duration and spatial proximity. The transformation lies in the replacement of edited sequence by embodied co-presence. The screenwriter's task becomes designing a situation rich enough to generate meaning without continuous authorial commentary. The physical installation framing the VR sequence extends the story into the real world, illustrating how MR narrative can migrate across media boundaries.

4.3. Submerged: guided immersion

Edward Berger's Submerged, produced for the Apple Vision Pro, returns to a more cinematic register while exploiting immersion. Set inside a WWII submarine, the seventeen-minute film uses high-resolution volumetric capture and directional sound to place the viewer among the crew. Although the participant can look around, the staging and sound design continuously re-orient attention toward the dramatic action [11].

The narrative structure remains recognizably linear—a rising sequence of tension culminating in a catastrophic event—yet the means of delivery have changed. There is no cut; the camera stays inside the confined space. The screenwriter must write with an awareness of continuous spatial presence. Dialogue, sound cues, and actor placement are calibrated to work without the safety net of montage. Submerged shows that classical plot architecture can survive in MR, but only if re-engineered for an embodied, continuous viewpoint.

4.4. Comparative analysis: three architectures of MR narrative

The three case studies reveal not a single model but a spectrum of authorial control and participant freedom. Table 1 summarizes their differences.

Table 1. Comparison of narrative architectures across three MR case studies

Dimension	In a Minor Key	Carne y Arena	Submerged
Plot structure	Open, modular nodes	Single-situation expansion	Linear but without cuts
Participant perspective	Free choice of nodes	Full physical mobility	Constrained mobility + audio guidance

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Table 1. (continued)

Temporal elasticity	Highly variable	Determined by walking pace	Relatively fixed (17 min)
Authorial control	Low	Medium (via spatial staging)	High (via sound/visual cues)

What is striking is that higher authorial control does not necessarily produce stronger narrative coherence. In a Minor Key achieves cohesion through sensory and musical motifs rather than causal links. Carne y Arena delegates meaning-making to the participant's physical trajectory, yet its carefully designed antechamber ensures most participants experience a similar emotional arc. Submerged proves that classical linearity can survive in MR, but only by substituting montage with continuous spatial choreography.

This comparison suggests screenwriters should make an early strategic choice: a closed architecture (like Submerged), an open architecture (like In a Minor Key), or a situational architecture (like Carne y Arena). Each demands a different documentation strategy.

5. Implications for cross-media screenwriting practice

The three cases point toward practical adjustments in screenwriting method. First, documentation must become multimodal. Diagrams, spatial maps, interaction matrices, and rough 3D models become part of the writer's toolkit. Second, the notion of "scene" expands—a scene may be defined by a physical location rather than continuous dramatic time. Third, collaboration intensifies; writers work more closely with interaction designers, sound artists, and spatial architects [13].

Cross-media projects amplify these tendencies. When a story is intended to exist simultaneously as a linear film, an interactive installation, and a mobile experience, the writer must design a core narrative system that can be instantiated differently in each medium. The modular approach observed in In a Minor Key offers one workable model: narrative modules that can be sequenced, expanded, or contracted according to platform constraints. This logic appears in recent XR heritage projects adapting historical narratives into both cinematic VR and site-specific AR layers [14].

To make this tangible, consider a concrete example. In traditional screenwriting, a scene is headed by a slugline such as "INT. SUBMARINE - DAY" followed by action lines. In MR, the writer might produce: (1) a spatial coordinate diagram mapping all narrative objects within the 3D volume, annotated with their narrative functions; (2) a state-transition table specifying how narrative state changes based on participant behavior.

Table 2. Action-condition-consequence mapping for interactive narrative triggers

Participant action	Condition	Narrative consequence
Stays within 1m of Character X	> 5 seconds	Triggers dialogue B
Looks directly at Object Y	> 3 seconds	Unlocks visual memory C
Moves to Zone Z	Any	Advances to next spatial chapter

This dual documentation replaces the continuous prose of a master-scene script. It does not abandon character or theme, but translates them into parameters executable by an interactive system. As Frankham [1] and Dooley [8] confirm, such documents are typically co-authored with interaction designers and sound artists from the earliest stages.

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None of this implies that traditional craft becomes obsolete. Character motivation, thematic coherence, and emotional pacing remain essential. What changes is the distribution of control between author and participant. Writers who treat MR as merely "cinema plus interactivity" risk producing awkward hybrids. Those who treat it as a distinct narrative ecology are more likely to generate forms native to the medium.

6. Conclusion

MR is not an additional distribution channel for pre-existing stories. It reconfigures narrative architecture at its base—replacing linear causality with modular options, fixed perspective with embodied agency, and measured duration with variable temporal flow. For screenwriters, the master-scene format must be supplemented—and in some cases replaced—by diagrammatic, spatial, and modular forms of documentation.

The present study has offered a preliminary set of analytical coordinates. Three directions for further research emerge. First, larger-scale commercial productions would test whether the modular model scales beyond short-form experiences. Second, longitudinal audience studies could measure how different architectural choices affect comprehension and engagement. Third, the rise of generative AI poses a new question: if AI can produce modular narrative content on the fly, the screenwriter's role may shift from architect of fixed modules to designer of generative constraints. For the moment, the most productive stance is neither nostalgia for classical cinema nor uncritical enthusiasm for immersion, but careful attention to how story, space, and agency can be balanced in each new work.

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