

Narrative Strategies and Steampunk Aesthetic Design Research in BioShock

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Abstract: *Objective:* This study examines the Steam Punk art style through the lens of the “BioShock” series, analyzing its manifestation in environmental design, character systems, and prop design, while exploring the narrative depth and game design strategies within the franchise. *Methodology:* Utilizing visual content analysis, cross-work comparisons, and qualitative interviews, this research deciphers visual symbols’ metaphorical roles in storytelling, spatial organization, and emotional modulation through frame-by-frame analysis of key scenes, incorporating semiotics and color psychology. *Results:* The game reconstructs the Steam Punk aesthetic through a “techno-archaeology” approach, achieving creative transformation of this style within contemporary contexts. A profound intertextual relationship emerges between the game’s artistic style and core mechanics. *Conclusion:* BioShock has not only expanded the expressive pathways of steampunk within design practice, but has also provided game design with an integrated paradigm of “narrative-mechanics-aesthetics” trinity. Future design research should emphasize the convergence of technological media and aesthetic experience, promoting the establishment of a “digital retrofuturism” framework for application in design education and innovation.

Keywords: BioShock; Steampunk aesthetics; Game design; Narrative depth; Cultural studies

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1. Introduction

The BioShock series is a classic case study in video game design. By seamlessly integrating visual systems and narrative structure, it has provided rich examples for design research. Centered on steampunk aesthetics, BioShock games synthesize Victorian decorative language, industrial mechanical symbols, and futuristic technological imagination into a unified visual system. This constructs a virtual world that blends historical texture with futuristic fantasy. For instance, “Columbia” in BioShock Infinite combines neoclassical architecture with suspended mechanical installations, which, instead of being merely a visual style, is also a concrete manifestation of design thinking in spatial storytelling and ideological critique.

A design studies perspective reveals that BioShock's visual system transcends mere "style" to function as a form of "design rhetoric." Its multi-dimensional design languages in games, including architectural spaces, prop systems, and character aesthetics, transform steampunk symbols into interactive narrative mediums. This enables players to visually decode themes like technological ethics and power structures during gameplay. This forms a design strategy that not only enhances a game's immersion but also demonstrates design's potential as a tool for cultural critique.

In this regard, this study systematically analyzes the design logic behind BioShock's steampunk aesthetics with a design studies research approach across three dimensions: visual construction, symbolic semantics, and interactive mechanisms. This further leads to an exploration of the implications for contemporary game design theory and practice.

2. Development phases and characteristics of steampunk art

The conceptual roots of steampunk art can be traced back to the 19th-century tradition of science fiction literature. Writers such as Jules Verne, H.G. Wells, and Mary Shelley provided the initial narrative blueprint for steampunk's aesthetic construction through their early works depicting mechanical civilization, technological ethics, and utopian fantasies ^[1]. As a term for an independent cultural movement, "Steampunk" was coined by K.W. Jeter in *Locus* magazine in 1987, marking its evolution from a literary metaphor into a cross-media artistic paradigm ^[2]. Its development broadly progressed through three phases: the nascent phase (1980–1995), characterized by literary subcultural exploration; the mature phase (1996–2010), which established cross-media dissemination and a stable visual system; and the contemporary era (2011–present), where digital media and global dissemination enabled formal expansion and cultural reconfiguration ^[3].

The nascent phase witnessed steampunk's major reliance on literary texts for imaginative experimentation, with its core themes centered on the relationship between technology and humanity within the Industrial Revolution. Gibson and Sterling's collaborative work, *The Difference Engine* (1990), is a landmark text of this era. Through the fictional evolution of Babbage's analytical engine, it presented an alternative historical trajectory for the Victorian technological singularity, establishing the core imaginative framework of "Retro-Futurism" ^[3].

Upon maturity, steampunk art transcended literary boundaries to a cross-media expression. The film "The Sky Captain and the World of Tomorrow" (2004) brought steampunk into mainstream visual culture through elements like airships and mechanical contraptions. The stylistic hallmarks of this era manifested as a symbolic reconstruction of Victorian material culture, featuring quintessential elements such as brass, gears, and steam pipes. Its aesthetic core can be summarized as "industrial romanticism" ^[3]. Academic discourse also delved into its sociocultural implications, with critical discussions spanning technological determinism, colonialism, and gender politics ^[4].

In the contemporary development phase, digital media is utilized to achieve aesthetic reproduction and global dissemination. The Dishonored series combines steampunk environmental narratives with social conflicts through first-person immersive experiences. In this respect, its virtual city Dunskeyl can serve as a prime example of digital reinterpretation ^[3]. Simultaneously, social media, virtual reality, and fan-driven creations have propelled multidimensional interpretations of steampunk. The emergence of styles like "Steam Gothic" and "Cyber-Steam" exemplifies its cross-genre fusion and global dissemination characteristics ^[5].

Historically, steampunk has maintained a dual gaze toward industrial civilization—simultaneously captivated by mechanical romance and wary of technological alienation. This tension is amplified within virtual reality and interactive media, endowing the genre with deeper contemporary relevance.

Since the 1980s, steampunk has gradually developed a stable aesthetic identity. It centered on a dual construction of history and the future: on one hand, it drew on material symbols of the Victorian Industrial Revolution (steam machinery, gears, clocks, vintage clothing, etc.); and on the other hand, it integrated futuristic technological imaginings, generating a visual system that is “both nostalgic and avant-garde.” Its artistic expression extends beyond literature and film, permeating gaming, animation, and product design.

Visually, steampunk prizes fusing retro elements with modern technology. It often employs intricate mechanical structures, ornate decorations, and contrasting color schemes, so as to create an effect where opulence coexists with ruggedness. For instance, Katsuhiro Otomo’s animated film “Steamboy” uses precision machinery and dialectical storytelling to reveal the dual impact of technological advancement on society and humanity, embodying steampunk’s inherent humanistic critique.

Compared to cyberpunk, steampunk highlights the design expression of “historical materiality” more. Emphasizing the visibility of mechanical structures and the physical feedback of operations, it forms a “tangible technological aesthetic.” This characteristic lends it broad applicability and extensibility across fields such as game design, product design, and fashion design ^[3-4].

Concerning design, steampunk propels the practice of “Retro-Futurism.” Common product design elements like brass gears and exposed piping materialize the material translation of 19th-century industrial fantasies. The angular metal form of Tesla’s Cybertruck can be seen as a digital resonance of industrial romanticism within contemporary industrial design ^[6]. Besides, in the fashion industry, Alexander McQueen’s Fall/Winter 2013 collection achieved a cross-disciplinary fusion of gothic tailoring and mechanical aesthetics by grafting gear and steam valve elements, creating a distinctive “technological ballet” effect ^[7].

In the film, television, and gaming sectors, what is more intensely showcased is its narrative function. Hayao Miyazaki’s “Howl’s Moving Castle” blends Eastern fantasy with steampunk machinery to construct surreal imagery like the “moving castle”, poetically reflecting both technological worship and critique of industrial civilization ^[8]. The Dishonored series and BioShock Infinite employ environmental storytelling within virtual spaces to deliver dual critiques of technological utopianism and social contradictions. Particularly, Bioshock Infinite uses the visual design of its “sky city” to reflect contemporary society’s projection of technological anxiety. Its remastered version continues to receive high acclaim on Steam in 2023, demonstrating its enduring cultural resonance across time ^[9].

3. Steampunk elements in the BioShock series

BioShock recreates steampunk aesthetics through “Rapture.” Using layered architecture and dynamic decaying landscapes to symbolize class rigidity and technological alienation, it crafts a decadent and tense immersive space, as shown in **Figure 1**.



Figure 1. The underwater city “Rapture” (Image from Reddit Forum)

As shown in **Figure 2**, the games demonstrate a mature application of environment as a narrative medium. The underwater space of “Rapture” achieves a perfect fusion of spatial order and social critique through its layered architectural structure and dynamic decay visual presentation. Designers employed spatial semantic field strategies, juxtaposing Art Deco geometric order with the gritty textures of industrial machinery. Through the chromatic dialogue of verdigris and gilded hues, along with dynamic details like steam leaks and water droplet condensation, they constructed a visual realm that is both opulent and decaying. This design not only shapes a distinctive atmospheric setting but also, through the corrosion and mutation of material surfaces, hints at the inherent crisis within the technological utopia.



Figure 2. Big Daddy (Image from the Artbook)

Figure 3 unveils that the “Splicer” serves as a symbol of technological runaway. Its facial metal implants bear the crude scars of primitive surgical procedures, where exposed screws and sutures create a stark juxtaposition of flesh and steel. This deliberate preservation of early medical device characteristics hints at the chaotic state of an immature modification technology. Costume design draws from 1940s streamlined silhouettes, yet tears and scorch marks evoke traces of civilizational collapse. Dystopian limb deformities reference failed biomechanical experiments, where muscles, tendons, and mechanical components are forcibly fused—amplifying the theme of “technological alienation.” Notably, the characters’ details themselves function as narrative symbols. Patterns of circuitry inside Big Daddy helmets or the rusted textures of Splicer implants demonstrate the designers’ intent to convey the allegory of civilizational collapse through “material defects.” Character design thus transcends mere artistic form, becoming a tangible embodiment of steampunk philosophy within the games’ narrative.



Figure 3. Splicer (Image from Reddit Forum)

Props and equipment, as vital mediums for in-game interaction, similarly embody steampunk’s “temporal dislocation” characteristic, transforming the aesthetic of steampunk art into tangible, interactive vessels. In weapon design, the Electroshock Trap draws inspiration from 19th-century medical electroshock devices. While retaining historical details like brass casings and spiral electrodes, its functionality employs quantum energy for intelligent tracking—creating a juxtaposition of “historical appearance-futuristic function.” This

trans-temporal logic preserves steampunk's mechanical precision while expanding technological imagination.

Tool-based props like the hacker device incorporate a visual light-flow interface built upon the Enigma cipher machine, transforming traditional mechanical logic into digital interaction. This design embodies a dual overlay of symbolic and technological layers. Regarding consumables, the emergency gas stove combines the form of a Victorian camping stove with an "Adamite" reaction mechanism, achieving a fusion of thermodynamics and bioenergy. This design not only recreates the energy logic of the industrial era but also implicitly offers a critical reflection on modern energy systems.

The collectible "Audio Diary" replicates the form of Edison's wax cylinder phonograph, yet its content no longer carries sound itself, but memory information of genetic encoding. This disjunction at the medium level renders it a cross-disciplinary symbol bridging 19th-century acoustic technology with future life sciences.

The chemical injector epitomizes steampunk's contradictory aesthetics. The apparatus retains the physical characteristics of 19th-century apothecary tools, yet its potions derive from genetically engineered substances. Players must follow traditional mixing protocols to trigger surreal biological effects, juxtaposing "technological ritual" with "scientific conversion." This dual logic underscores steampunk's consistent critical consciousness: perpetuating industrial-era forms while continually exposing technology's inherent paradoxes and crises.

4. Creation of cultural atmosphere in the BioShock series

The design value of the BioShock series lies in its construction of deep intertextuality between design strategy and game mechanics—aesthetic form and interactive logic permeate each other, forming a self-consistent design system.

The games employ a customized engine technology to translate aesthetic aspirations into concrete rendering solutions. To accurately convey the visual characteristics of underwater environments, the development team rewrote the local lighting and reflection models, transforming physical concepts like "dampness" and "corrosion" into perceptible material metaphors. Here, technology transcends mere utility to become a foundational medium for conveying design intent. Its visual assets aren't generic appropriations of "steampunk" or "Art Deco" styles, but rather stem from a rigorous approach rooted in design archaeology. As documented in *BioShock: Breaking the Mold Developer's Edition (Artbook)*, the team conducted systematic field sampling of Art Deco landmarks like New York's Rockefeller Center, meticulously recording the construction logic behind their brass trim, radiating linear patterns, and geometric facades. This historical sampling aimed not merely at replication, but at extracting the aesthetic DNA of a specific era (the 1930s–40s) and translating it into interactive design symbols within the games.

The games utilize design archaeology to systematically sample and translate Art Deco aesthetics. Through field research of New York landmarks, the team extracted the era's defining aesthetic DNA and reconstructed it into an internal symbolic system. This translation ensures visual elements not only achieve period accuracy but also function as interactive narrative carriers. It is a translation process from historical artifacts to virtual symbols, which guarantees the game's aesthetic language possesses both precise period coding and internal consistency. It elevates "steampunk-mechanical" visual elements beyond generic collage, transforming them into a symbolic system that players gradually decipher through interaction—a system

imbued with specific historical context and capitalist discourse.

The game's most innovative aspect lies in its complete mechanization of aesthetic style. Level design fundamentally simulates industrial processes through interaction: actions like operating valves and adjusting pressure actually embody the bodily discipline imposed by industrial systems. This design creates an isomorphism between progression paths and production workflows, transforming abstract themes of technological critique into concrete bodily memories.

Here, the "clearance path" and "production line process" form a homomorphic relationship. As players advance through the games, the logic their bodies follow mirrors the "industrial system" logic that underpins the fictional world within the games. Through interactive design, creators micro-manifest the grand theme of "technological alienation" into the physical memory of repeatedly flipping switches and calibrating gauges under the player's fingertips. This behavioral shift in narrative complements the game's traditional environmental storytelling through audio logs and contextual props. Its strong interactivity and immersion yield deeper semantic layers. UI design follows suit: the hydraulic system interface directly employs visual metaphors of mechanical pressure gauges and valves, transforming the abstract resource management mechanic into a visible, tangible, and world-consistent physical process.

BioShock achieves deep intertextuality between design strategy and game mechanics through the materialization of technological media, systematic translation of design symbols, and narrative integration of interactive mechanisms. Its design no longer serves merely as a shell for gameplay but becomes an intrinsic structural force within the gaming experience. Ultimately, it achieves the unity of "design that is visible, usable, and even thinkable" as articulated by Donald Norman, offering a comprehensive paradigm for digital-age design practice that integrates style, narrative, and interaction.

5. Design practices and innovation pathways in the BioShock series

The design value of BioShock lies not only in its aesthetic achievements but also in its establishment of a comprehensive and transferable design methodology, providing an operational paradigm reference for design practices in the digital age. By analyzing its design system, people can distill three levels of practical insights and innovative pathways.

At the design paradigm level, BioShock demonstrates the effectiveness and creativity of the "design archaeology" approach. Rather than merely appropriating historical styles, the games achieve a systematic reconstruction of visual elements through deep sampling and symbolic translation of material culture from a specific era (the 1930s–40s). This translation transcends superficial stylistic mimicry, fusing Art Deco's geometric order, the functional aesthetics of industrial machinery, and futuristic visions of biotechnology into an original "biomechanical cyberpunk" subgenre. The core value of this design approach lies in breathing new life into historical elements within digital media—preserving their capacity for dialogue with historical contexts while unlocking narrative potential for the future.

Concerning visual construction, the games achieve a deep coupling between scene design and ideological critique. The underwater decay of "Rapture" and the aerial splendor of "Columbia" are not merely visual spectacles but also social critiques articulated through design language. The geometric order of Art Deco crumbling under seawater erosion, brass materials oxidizing in high-pressure environments—these meticulously designed material details constitute a visual deconstruction of the technological utopian

ideal. Here, design transcends mere ornamentation to become, in Foucault's terms, a spatial practice of "heterotopia"—both a metaphorical reconstruction of real society and a visual revelation of its inherent contradictions.

Regarding interactive mechanics, the games pioneer an "embodied cognition" design paradigm. By transforming industrial processes (pressure regulation, valve operation, energy distribution) into core gameplay actions, it fosters players' physical understanding of technological systems through hands-on manipulation. Details like the UI design for hydraulic systems and the mechanical visualization of weapon modifications transform abstract game mechanics into physical processes consistent with the game's world-building. This design strategy achieves the unity of "visibility and comprehensibility" emphasized by Donald Norman, making aesthetic style not merely external decoration but an intrinsic component of the interactive logic.

Respecting cultural value, BioShock demonstrates the potential of design as a medium for technological critique. Through a visual narrative of mechanistic worship and human augmentation, the games continue the tradition of critiquing technological rationality that began with the Arts and Crafts movement, yet advances it into the new context of digital media. Design not only shapes visual identity but also engages in discussions of technological ethics, endowing the steampunk stylistic tradition with new intellectual depth in the contemporary era.

Based on this analysis, design innovation solutions for the future can be further proposed. Parametric style generation systems can automatically produce consistent visual solutions by adjusting era parameters and technological trajectories; standardized designs for dynamic narrative objects provide reusable building blocks for interactive storytelling; and unified specifications for cross-media design languages ensure aesthetic coherence in derivative works. These concrete proposals not only expand the creative boundaries of game design but also offer referenceable pathways for innovation in related fields.

Ultimately, BioShock's design practice points to a core proposition: exceptional digital product design achieves a perfect unity of form, function, and meaning. The design principles and methodologies it establishes are not only applicable to the gaming domain but also hold significant implications for broader digital art and interactive design, charting a course for creating culturally profound and aesthetically valuable works in the digital age.

6. Conclusion

This study, grounded in the research perspective of design studies, reveals through a systematic analysis of the BioShock series its innovative path of elevating steampunk aesthetics from a visual style to a design paradigm. By employing unique design strategies, the game constructs a highly unified intertextual system across symbolic, experiential, and critical dimensions, offering an enlightening model for design practices in the digital age.

The research also identifies existing challenges and future research directions. Technologically, despite continuous hardware advancements, achieving photorealistic retro textures still demands substantial development resources. Procedural generation and AI-assisted tools offer new solutions, yet balancing efficiency gains with artistic integrity remains an open question. Culturally, the localized adaptation of steampunk during its global dissemination is a critical issue. Integrating diverse cultural elements while

preserving core stylistic features to create regionally distinctive variants requires further practical exploration and theoretical research.

BioShock's design practice demonstrates that exceptional digital product design achieves a perfect unity of form, function, and meaning. Its established "narrative-mechanics-aesthetics" triadic paradigm not only provides a vital reference for game design but also illustrates to broader design practices how systematic design thinking can construct culturally profound and critically conscious experiential worlds within digital media. Future design research should build upon this foundation to further explore the application of emerging technologies like parametric design and generative AI in stylistic innovation. Concurrently, it must deepen discussions on design ethics and cultural critique, propelling the theoretical development and practical innovation of design studies in the digital era.

Disclosure statement

The author declares no conflict of interest.

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