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Plug-and-Play. Video games as a tool for landscape representation

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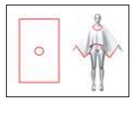
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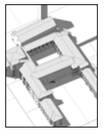
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Plug-and-Play. Video games as a tool for landscape representation

Plug–and–play. Il videogioco come strumento di rappresentazione per il paesaggio

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The representation of landscapes has accompanied the evolution of human civilisation, transitioning from traditional techniques to complex digital systems. In recent decades, video games have emerged as powerful tools within this trajectory, offering new ways to explore, simulate, and engage with virtual environments. Unlike static cartographic representations, game-based landscapes integrate spatial and temporal dynamics, enabling immersive experiences that unfold across multiple scenarios and time scales. This shift expands the role of representation: from visual description to a predictive, design-oriented process. Game environments thus provide new cognitive and operational tools for landscape architects. By modelling change, simulating environmental processes, and incorporating real-time feedback, they allow for critical exploration of evolving landscapes and support the formulation of adaptive strategies in speculative contexts. Within the Urban/Nomadic dichotomy, this paper investigates how video games reframe representation as a non-fixed, process-based experience. These digital landscapes reflect the nomadic nature of contemporary spatial engagement—fluid, iterative, decentralised—and propose new paradigms for the narration and design of landscapes.

La rappresentazione del paesaggio ha accompagnato l'evoluzione della civiltà umana, passando da tecniche tradizionali a sistemi digitali complessi. Negli ultimi decenni, i videogiochi si sono affermati come strumenti potenti in questo percorso, offrendo nuove modalità per esplorare, simulare e interagire con ambienti virtuali. A differenza delle rappresentazioni cartografiche statiche, i paesaggi nei videogiochi integrano dinamiche spaziali e temporali, consentendo esperienze immersive che si sviluppano lungo molteplici scenari e scale temporali. Questo cambiamento amplia il ruolo della rappresentazione: da descrizione visiva a processo progettuale e previsionale. Gli ambienti videoludici offrono così nuovi strumenti cognitivi e operativi per architetti del paesaggio. Modellando il cambiamento, simulando processi ambientali e incorporando feedback in tempo reale, essi permettono un'esplorazione critica dei paesaggi in trasformazione e supportano la formulazione di strategie adattive in contesti speculativi. All'interno della dicotomia Urbano/Nomade, questo contributo indaga come i videogiochi riformulino l'atto della rappresentazione in chiave non fissa e processuale. Questi paesaggi digitali riflettono la natura nomade dell'interazione spaziale contemporanea — fluida, iterativa, decentrata — e propongono nuovi paradigmi per la narrazione e la progettazione del paesaggio.

INTRODUCTION

The contemporary discourse on landscape representation finds itself increasingly entangled with the rapid transformations brought by digital technologies, immersive media, and simulation environments. In this evolving framework, the dichotomy Urban/Nomadic offers a fertile lens through which to reconsider the tools, logics, and languages used to represent, experience, and design landscapes. The urban, as structured, networked, and grounded, contrasts with the nomadic, understood as fluid, ephemeral, and transformative. This tension is not merely metaphorical: it defines how we perceive and interact with space in both physical and virtual dimensions. Video games, as spatially dynamic and temporally elastic environments, operate precisely at the intersection of these two conditions. They simulate worlds that are often grounded in recognizable architectural and landscape forms, yet allow for radically non-linear and personalized explorations. These interactive spaces are inhabited through avatars, traversed through embodied action, and interpreted through mutable narratives. This contribution explores how video games—when critically approached—can serve as tools for designing, simulating, and rethinking landscapes beyond the constraints of physical immobility and static visual codes.

REPRESENTING LANDSCAPE

Throughout human history, there has always been a desire to represent space and landscapes (Treib, 2008). Representation is the process by which perceptions, imaginations, and concepts are translated into tangible or immaterial forms. The notion of repraesentatio, already in Thomas Aquinas, is the



01.

Immersive landscape representation in the video game Uncharted. (Source: Naughty Dog)



02.

Twenty-five photos from a sequence of 192 images taken over the course of 26 minutes. (Source: Peter Baumgarten)

intellect's ability to internalize the image of a thing through similarity. Descartes and Hegel later posed deeper philosophical questions about the mediation between reality and thought. Over time, representation evolved into a linguistic and symbolic operation. The need to comprehend place has led to a spectrum of expressive means, from visual arts to digital technologies (Amoroso & Holland, 2022). Narration, central to visual arts, has always been linked to landscape. Stories unfold in spatial settings, from painting to cinema. These media offer immersive storytelling, though traditionally from a detached viewpoint. The digital era, especially through video games, radically redefines this paradigm (Attademo, 2021; Sabbion, 2021). In video games, landscapes are not only explorable but interactively experienced. Tools now surpass photorealism: games like Assassin's Creed, Tomb Raider, Uncharted, and Red Dead Redemption narrate landscapes with high visual and experiential fidelity. Assassin's Creed reconstructs historical cities with meticulous detail; Tomb Raider and Uncharted evoke mysterious, story-rich environments.
Red Dead Redemption spans vast terrains, from deserts to forests, offering full immersion. More recent titles, like Half-Life: Alyx, integrate stereoscopic vision for enhanced presence. In such games, narration becomes exploration: knowledge emerges through dynamic interaction. The concept of "being in a space" now extends to imagined, impossible, or future landscapes.

DESCRIBING TIME

To thoroughly and comprehensively understand landscapes, it is necessary to visualize environmental processes through analytical detachment and critical awareness. Representation is a valuable operation for grasping the vibrant essence of the landscape, its structural systems, complexity, and dynamism (Weiss, 1998; Lobosco & Tinti, 2022). Richard Weller (2020) distinguishes between two types of representation used in contemporary discourse: "hyper-real" and "hyper-object". Hyper-real representations are structured as picturesque images that emphasize and pursue a lush aesthetic. One of the characteristics of such representation is that it freezes the image in the future without focusing on the long preparatory phases preceding an environmental-landscape intervention.
The images associated with the hyper-real concept suggest—or at least seek to suggest—trust and comfort, evoking an imaginary ecological paradise. These images mask the landscape and its processes. Representing the landscape not as a scenic and idealized entity but as a process, is the central theme of hyper-object02 representation, which proactively includes the temporal dimension. Representational approaches should move beyond the idea of ecological sublimity with coherence and specificity. Flows, forces, behaviors, relationships—these are the factors that, in their becoming, continuously and inexorably shape the landscapes around us and, as such, must be included within the representation process. The ability to perceive and represent factors not directly perceptible from a human standpoint is a fundamental prerequisite for a critical exploration of the landscape. It is thus necessary to shift attention from the binary relationship of object-space to the ternary relationship of object-space-time. Within this complex and ever-changing context, representations attain a new instrumental significance. Engaging with the aesthetics of time itself is inherently challenging, but the primary difficulty is not merely illustrating change as the final image of a given process. Rather, it is to demonstrate how specific forms of human intervention (design) can influence, redirect, accelerate, or slow down the transformation of a particular landscape. In other words, the challenge of representation lies in resisting the allure of what could now be termed an ecological sublime inspired by the aesthetics of the Anthropocene. Instead, it calls for adopting a critical approach to representing the processes that shape the landscape, with the goal of analyzing and redirecting them toward design practices that align with contemporary realities.



03.

Sequence of frames depicting the re-greening process in the video game Terra Nil. (Source: DevolverDigital)

EMBODIED COGNITION AND MULTISENSORY REPRESENTATION IN VIRTUAL LANDSCAPES

What does it mean to "experience" a landscape in a virtual world? Beyond sight and sound, landscape perception is deeply tied to bodily movement, orientation, and presence. This insight is at the core of embodied cognition, which argues that cognition is not merely a function of the brain but is fundamentally shaped by bodily experience and action in space (Varela, Thompson, & Rosch, 1991; Gallagher, 2005). Traditional landscape experience has always been embodied: the perception of topography, vegetation, temperature, and sound contributes to a multisensory understanding of place. As game technologies evolve, the question arises as to whether these embodied dimensions can be simulated and translated into virtual space. Recent advancements in immersive interfaces, including haptic feedback, stereoscopic vision, and spatial audio, begin to approximate such experiences, enhancing the user's sense of presence and engagement. These developments align with ongoing research into the multisensoriality of digital environments, which explores how visual, auditory, and even tactile stimuli can be integrated into design tools and landscape visualization systems. While the current state of gaming does not yet fully replicate the somatic depth of real-world experience, it initiates a form of surrogate embodiment that allows users to interact meaningfully with simulated ecologies and processes. This surrogate experience retains cognitive and affective relevance for design exploration, particularly when it is structured around temporally dynamic representations. As such, game environments—when critically employed—may act as laboratories not only of spatial manipulation but also of perceptual experimentation, pointing toward future directions in landscape design tools that embrace both bodily cognition and sensory immersion.

REPRESENTATION FOR DESIGN, AND VICE VERSA

In the representation of space within video games, landscape is no longer static or passively observed but becomes dynamic and interactive. The virtual world of video games is not merely a backdrop for player actions; on the contrary, it assumes the role of protagonist, evolving and adapting in response to interactions and induced stimuli. One of the most intriguing aspects introduced by video games is the inclusion of the fourth dimension: time, with a scale that can be either expanded or compressed relative to reality. This integration allows the observation of an environment not only in its spatial extension but also in its temporal evolution. Within seconds, players can witness the growth of a forest, the erosion of a ridge under atmospheric influences, or the transformation of a riverbed. These expanded and/or compressed temporal representations offer a new perspective on understanding and managing landscapes and the processes occurring within them. This novel capability to represent landscape evolution and environmental processes can significantly impact design cognition. Designers are no longer constrained to envision only the "completion of works" but can extend their vision and representation to much broader temporal horizons. It becomes possible to depict dynamic and continuously evolving processes, introducing multiple evolutionary scenarios influenced by anthropic or spontaneous variables. For instance, one could explore how a forest might evolve over time under conditions of constant rainfall, fire exposure, or silvicultural management, or how a wetland might adapt or express itself in response to the spontaneous dynamics of a river system. Recent game engines introduce these new possibilities, allowing the setting of generative factors such as plant growth, soil erosion, and many other dynamics.



04.

Simulation interface illustrating spatiotemporal evolution of urban green infrastructure and its cooling effects. (Source: Zhang et al.)

This capability enables the prediction of how a design will interact with the context and environmental processes over time, opening new frontiers in landscape design and proactive management. The ability to create virtual worlds that respond and adapt to the actions of the player-designer positions video games and their spatial representation methodologies as tools for simulation and design experimentation (Del Giudice, 2018). This allows for the exploration and evaluation of alternative strategic-design scenarios within a controlled and interactive digital landscape. In the field of landscape architecture, video games, understood as both tools and products of representation, can be employed to validate design choices, overcoming the limitations of mere imagination and recreating a virtual dimension where thought can be developed and modified before being concretely applied.

CONCLUSIONS

The interactive nature of video games transcends the dichotomy of stasis and change, offering a fluid and adaptive mode of landscape representation that aligns with the increasingly dynamic and interconnected realities of the Anthropocene. These digital environments do not merely depict space—they simulate evolving conditions, allowing landscapes to be investigated, manipulated, and understood through iterative experimentation. By incorporating time as an active design parameter, game-based simulations support the exploration of multiple future scenarios, making visible and testable the impacts of both natural processes and human interventions. In this perspective, video games emerge as experimental laboratories for nomadic thought, enabling the representation of landscapes not as fixed or final forms, but as shifting, processual, and relational systems. Their immersive interfaces bridge the gap between theoretical speculation and operational design, equipping landscape architects and planners with tools to navigate complexity, simulate resilience, and explore transformation. This is particularly critical in a context defined by environmental volatility, rapid urban expansion, and the urgent demand for adaptive strategies. Virtual landscapes shaped by in-game mechanics challenge the conventions of cartographic representation. Rather than offering static snapshots, they model growth, decay, and transformation in real time—stimulating critical engagement with the dynamics of ecological systems. Through real-time feedback and scenario-based prototyping, video games foster a nomadic engagement with landscape, where knowledge is situated, iterative, and multisensory. This contribution suggests that the future of landscape representation lies at the intersection of tradition and innovation—where digital simulations, guided by design intelligence, offer new ways of conceiving and intervening in space. In line with the Urban/Nomadic theme, video games exemplify a mode of representation that is both rooted and mobile, structured and open-ended. They reaffirm that representation is not a passive mirror of reality, but an active generator of visions, strategies, and ecological consciousness.

NOTES

01| The concept of a digital twin relates to a virtual replica of a physical entity or process, kept in near real-time sync with its real-world counterpart in order to enable simulation and monitoring activities. Digital twins allow practitioners to perform predictive analyses, test scenarios, and interventions optimization.
02| Coined by Timothy Morton (2013), the term hyper-object refers to objects or systems so vast in temporal and spatial scale that they defy full human comprehension. Classic examples include climate change or nuclear waste—phenomena that extend across immense durations and geographies.

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