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EDITORIAL

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How Can Games Transform Cities? Geogames as Tools for Research, Education, and Urban Praxis

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Abstract

Geogames have matured from an emergent field in the 2000s into a transformative intersection of game design, geographic information science, and games with a purpose. This thematic issue advances the geogames research, education, and praxis agenda through 10 articles organized into two sections. Section 1 establishes geogames as rigorous research and educational instruments, exploring their theoretical foundations, methodological applications, and pedagogical value for fostering spatial literacy and emotional engagement. Section 2 demonstrates geogames as operational tools for real-world urban planning, showcasing their implementation in participatory consultations, communicative planning, and sustainability initiatives. These contributions frame geogames as a socio-technical epistemology rather than mere representational or engagement tools, revealing their capacity to address complex contemporary urban challenges. By bridging virtual simulation with material intervention in games, this issue presents a unified framework for reimagining research, teaching, and the transformation of urban spaces through geogames—where the concept of Gaia (Earth as a living system) converges with gameplay—in an era marked by unprecedented spatial, environmental, and social challenges.

Keywords

game-based learning; game design; geogames; participatory planning; urban planning

1. Introduction: Can Games Transform Cities?

Cities are increasingly confronted with complex, interdependent challenges, including climate change, social inequality, spatial injustice, and the urgent need for sustainable and regenerative urban transformations. These challenges have catalyzed a fundamental epistemological shift in urban research, education, and planning practice, moving away from positivist, linear models that treat cities as systems amenable to top-down and expert-driven control. Traditional approaches have relied on static spatial representations—master plans, zoning maps, and deterministic forecasts—that privilege singular, authoritative visions of urban futures while marginalizing the knowledge, values, and agency of diverse urban actors. In response, scholars and practitioners have increasingly embraced relational, processual, and participatory frameworks that recognize cities as dynamic, contested, and co-produced spaces. This reorientation has demanded methods and tools capable of embracing uncertainty, facilitating multi-stakeholder deliberation, and supporting iterative exploration rather than fixed prediction. Geogames and other playful, interactive media have emerged as key instruments in this ongoing transformation, enabling participants to engage with urban complexity in ways that are simultaneously rigorous, accessible, and generative of new forms of spatial knowledge and collective agency. Geogames have become a powerful yet still contested medium for operationalizing these more fluid, diverse, and inclusive approaches to urban futures.

Geogames—games that explicitly engage with geographic space, spatial data, and place-based decision-making—have developed since the early 2000s at the intersection of game design, geographic information systems (GIS), and location-based games (Poplin, 2025; Poplin & Schwartz, 2020; Schlieder et al., 2005, 2006). The rise of this dynamic field has been driven by the urban planning domain's response, supported by digital technology advances and participatory demands, to pressing contemporary urban issues. Since the 1970s, serious games have been applied as multiple dialogue communication and training platforms, as well as consensus-reaching simulation tools on urban (re)development impacts (Abt, 1970; Duke, 1974; Sanoff, 1979; Summers, 1979). Initially explored as experimental and situated location-based tools for urban exploration, participatory planning practices, or educational purposes, geogames have been maturing into a consolidated knowledge field with distinct epistemological, methodological, and practical contributions (Ahlqvist & Schlieder, 2018). Rather than merely simulating cities or visualizing data, geogames invite players to inhabit urban systems, negotiate trade-offs, and experience spatial processes through play. This thematic issue asks a deceptively simple question: How can games transform cities? More precisely, it examines how geogames can contribute to urban research, education, and praxis in ways that extend beyond engagement towards knowledge production and action.

The growing relevance of geogames reflects broader shifts in urban scholarship and practice (Tomaszewski & Schwartz, 2017). Planning theory has long emphasized communicative, participatory, and collaborative approaches, yet implementation often struggles to meaningfully integrate diverse perspectives or address power asymmetries. Factors affecting urban and regional planning today may have multifaceted causes in historic, social, economic, political, and environmental realms (Levy, 2017), including overlooked decision-making aspects such as power and interest relations, conflicts, and coalitions related to stakeholders' attitudes and behaviors (Mayer et al., 2005). At the same time, digitalization has transformed how cities are modeled, governed, and experienced, while serious games and gamification have gained traction across policy, education, and governance domains (Tan, 2016). Geogames sit at the confluence of these developments. They are a fusion of geospatial technologies and visualizations, serious gaming

mechanics, and playful public participation, providing architects and urban planners with powerful tools to engage a range of stakeholders, simulate scenarios, and upscale decision-making environments (Ahlqvist & Schlieder, 2018; Andrade, 2020; Brković Dodig & Groat, 2019; Poplin et al., 2020). They may combine spatial data, visualizations, and modeling with rule-based systems, narratives, and embodied interaction, offering a medium through which urban futures can be explored, contested, and co-produced.

Importantly, geogames are not confined to digital environments. While early research focused heavily on computer-based simulations and virtual worlds, recent work has expanded the field to include analog and hybrid formats, such as board games and card-based systems. These formats foreground face-to-face interaction, negotiation, and reflection, challenging assumptions that technological sophistication alone determines the analytical or pedagogical value of games. Digital and analog geogames may form a continuum of practices that support learning, experimentation, and deliberation across varied contexts and audiences.

This thematic issue brings together 10 articles that aim to advance the consolidation of geogames as a knowledge field. The contributions move beyond viewing geogames as auxiliary tools for stakeholder engagement, positioning them instead as epistemological devices capable of generating insights into spatial processes, emotions, behaviors, and decision-making. The issue is organized into two complementary sections with five articles each. Section 1 focuses on geogames as research and educational instruments, examining their theoretical foundations, methodological rigor, and pedagogical potential. Section 2 shifts attention to demonstrating how geogames can be operationalized in real-world planning contexts. Ten published articles demonstrate an international reach providing examples and geographical contexts spanning Europe and North and South America, which underscores the global relevance of geogames in contemporary urban discourse. The collection is characterized by a rigorous balance between localized empirical case studies ranging from campus-scale interventions in Poland and energy-efficiency initiatives in the USA to high-level theoretical syntheses from institutions in Ireland, the UK, and Brazil. While the diversity of geographical contexts and methodologies suggests potential for cross-cultural replicability, these articles also reveal a critical tension between site-specific participatory needs and the universal nature of gamified frameworks. This variety ensures that the editorial scope is not merely descriptive but serves as a versatile toolkit for adapting participatory planning to distinct socio-spatial realities, provided that the inherent limitations of scaling local successes are critically addressed.

The 10 articles assemble cutting-edge insights in research, education, and practice of the ways geogames are being employed to tackle some of the most pressing issues in urban (re)development including, but not limited to, urban degradation and (re)urbanization; built heritage conservation and sustainability; affordable housing and diverse particular housing needs; public transportation, active mobility, and nature-based solutions for healthy and happy cities; circularity and energy efficiency; and the critical issues of adaptation planning towards climate change impacts. They illustrate how geogames can support dialogue, reveal stakeholder conflicts and synergies, and enable collective exploration of alternative urban futures. Rather than offering deterministic solutions, geogames function as spaces for negotiation, experimentation, and reflection within complex planning environments. Across both sections, a shared concern emerges: How to translate the playful, exploratory nature of geogames into tangible planning outcomes without sacrificing theoretical depth or methodological robustness?

2. Theoretical Developments and Practical Challenges

Over the past two decades, geogames have proven effective in engaging people with urban questions, yet defining what constitutes a "geogame" and what claims it can legitimately support remains challenging. This thematic issue positions geogames not as a single genre or platform, but as a knowledge practice that offers conceptual opportunities while exposing practical constraints. The contributions in this issue address these challenges through rigorous, scalable, and theoretically grounded applications in urban planning.

2.1. Conceptual Clarity Without Narrowing the Field

A primary theoretical challenge lies in defining geogames, which are often described through varying traits like GIS integration, location-awareness, or participatory intent that do not always co-occur. This thematic issue advocates for a productive middle ground, framing geogames as designed encounters with geographic knowledge where representation—models, maps, and rules—and experience—play, emotion, and debate—are inseparable. By treating geogames as socio-technical constructions rather than neutral mirrors of the city, the contributions move beyond a real versus virtual split to critically examine whose knowledge becomes dominant and how these structured ways of seeing prioritize specific urban values and power dynamics.

2.2. From "Gaia + Games" to Urban Praxis: Scale, Agency, and Responsibility

A second development concerns the relationality of urban problems, which increasingly unfold across systems like mobility, energy, and climate that interact with planetary processes. The "Gaia + Games" framework to design and assess games treats Earth ecosystems thinking not as an abstraction but as an experiential reality, though this creates a tension between making in-game scenarios become concrete and addressing the inherent complexity of situated urban systems. This is fundamentally a question of agency and accountability; by linking design choices to normative implications, the field can better scrutinize how gameplay loops naturalize assumptions about governance and trade-offs, ultimately determining which urban futures are made imaginable for both human and non-human actors.

2.3. The Practical Challenge of Measurement: Validity, Transfer, and Evaluation

Pragmatically, geogames must overcome challenges in measurement and evaluation to mature as dependable instruments of inquiry. This involves ensuring representational validity (correspondence to real-world phenomena), interpretive validity (distinguishing real-world preferences from game-winning strategies), and transferability (tracking how insights influence actual policy and learning). These concerns are particularly acute in participatory planning, where game-based formats can lower entry barriers but may also introduce new exclusions based on digital literacy or hardware access. Thus, the articles published in this issue emphasize that making geogames genuinely participatory requires transparent framing and explicit attention to equity to ensure they empower rather than merely perform consultation.

2.4. An Agenda of Responsible Innovation

These challenges suggest a current research agenda centered on responsible innovation, characterized by clearer typologies, mixed-method evaluation, and inclusion as a core design requirement. The contributions

assembled here do not resolve all of these tensions but instead demonstrate that geogames are becoming a serious arena for methodological invention and urban praxis. By introducing a public negotiation between evidence, experience, and action, this thematic issue maps a field that is consolidating its conceptual stakes while remaining theoretically unsettled, setting the stage for the operational case studies that follow.

3. Structure of the Thematic Issue

The following sections detail how these works transition from research and educational frameworks to operational tools for real-world planning and policy.

3.1. Section 1: Research and Education

The first five articles establish geogames as rigorous instruments for spatial literacy and methodological innovation. Crilly et al. provide a foundational systematic review, synthesizing how game-based simulations intersect with systems theory and digital planning to facilitate citizen engagement. Building on this theoretical base, Andrade and Brković Dodig introduce a Gaia-inspired framework to bridge the gap between design theory and practical assessment, while Sousa et al. critically expand the field's boundaries by demonstrating that analogue board games function as effective, accessible geogames through their sophisticated spatial representation systems.

This section further explores the empirical application of these geogames in diverse urban contexts. Szot et al. utilize Minecraft to map collective emotions in urban spaces, proving that multiplayer environments can generate coherent affective data for planning. Complementing this, Albornoz del Valle and Núñez Cerda employ a dual-geogame framework using Cities: Skylines to simulate active mobility in Concepción, Chile. Together, these contributions transition geogames from mere entertainment to essential educational and research platforms that capture the complex interplay between technical simulation and human perception.

3.2. Section 2: Planning, Design, and Policy

Section 2 operationalizes geogames as practical instruments for real-world urban governance and stakeholder engagement. Cureton et al. bridge the gap between entertainment and professional practice by using a geodesign framework to translate Cities: Skylines gameplay into actionable land-use data in the UK. Szczepanska et al. introduce PaSyMo, a mobile simulation lab that combines agent-based modeling with tangible interfaces to facilitate consensus-building in Germany. These contributions demonstrate how game-based systems can transform complex socio-spatial data into accessible platforms for communicative planning and decision-making.

The remaining articles focus on the performative and behavioral impact of geogames within specific institutional and community contexts. Srivastava and Meza present a pervasive model that scales individual energy-saving actions into collective urban policy by leveraging the principle of nested urban scales, which aligns player identities across the home, block, and city. Förster et al. explore the co-creation of mobility hubs through the New European Bauhaus, emphasizing principles of situated play—such as bodily movement, material making, and open-ended storytelling—to foster corporeal and performative engagement. Finally, Wendland et al. apply these principles to institutional planning with *Campus Changer*, a

serious geogame that utilizes principles of social activation and volunteered geographic information within a 3D virtual environment to gather stakeholder input for the redesign of Warsaw University of Technology. Collectively, this research demonstrates that geogames are no longer merely speculative but are active tools for democratizing urban design and informing sustainable policy.

3.3. Cross-Cutting Insights

A defining insight across this collection of articles in the thematic issue is that geogames can function as socio-technical ecosystems, mediating the complex relationships between players, spatial data, and urban decision-making. The work of Szot et al. on multiplayer emotional dynamics, Szczepanska et al.'s integration of tangible interfaces with agent-based modeling, and Cureton et al.'s feedback loops between gameplay and professional planning illustrate how geogames can foster new forms of spatial agency. This shifts the research frontier toward understanding the novel capacities geogames can create within urban processes, moving beyond the technology itself to the relational shifts it enables.

While these contributions demonstrate significant success in stakeholder engagement, they also identify vital areas for future growth and longitudinal exploration. Förster et al. and Wendland et al. provide a foundation for understanding how playful interventions may influence planning, opening the door for systematic studies that track these impacts from design to policy implementation. The success in engaging youth and motivated citizens highlights an opportunity to further expand accessibility. Sousa et al.'s inclusion of analogue games provides a strategic pathway for bridging digital divide in order to foster the commitment to inclusive participation. Furthermore, Andrade and Brković Dodig's Gaia-inspired framework points toward a promising horizon where geogames can cultivate planetary consciousness, aligning urban planning with ecological limits and intergenerational justice. Ultimately, this thematic issue affirms that the transformative potential of geogames lies in their ability to bridge gaming abstractions with real-world change through collaborative and reflective practice.

4. Conclusion: Beyond Geogame Play

This thematic issue demonstrates that geogames have evolved into essential urban epistemic infrastructure—systems through which cities can be explored, sensed, narrated, and redesigned. Contributions assembled here demonstrate that geogames can reorganize urban knowledge production by generating evidence-based data, such as collective emotion maps, and may translate gameplay into actionable design propositions and model-mediated negotiations. By bridging the gap between simulation and material intervention, these articles showcase geogames as powerful tools that may authorize specific urban imaginaries and problem-solving frameworks.

The research agenda on geogames moving forward must address the critical questions of governance, ethics, and long-term impact. As geogames transition from research settings into formal planning, the field might explore who controls the underlying models and how to ensure that playful participation translates into accountable policy change. Future exploration could focus on developing robust frameworks for longitudinal evaluation—meaning ongoing, systematic assessment of geogame impacts over extended periods—centering equity to bridge the digital divide, and exploring Gaia-inspired designs that treat cities as living ecological systems characterized by feedback mechanisms, co-evolutionary dynamics, multispecies interactions, and

planetary thresholds. Ultimately, this thematic issue aims to shift the focus from the validity of geogames to their transformative praxis, challenging researchers and planners to bridge gaming abstractions with the urgent requirements of urban sovereignty and collective survival.

Conflict of Interests

The authors declare no conflict of interests.

LLMs Disclosure

ChatLLM Teams (Claude Sonnet 4.5) was used to assist with English language editing and reference list formatting in APA 7th edition style for papers cited in this editorial. All substantive content, analysis, and argumentation were developed by the authors.

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Bruno Andrade is an architect and urbanist with a PhD in geodesign with expertise in the intersection of cultural heritage, community planning, and geogames. He leverages digital and analog technologies and games for participatory heritage management, drawing from extensive international experience across Brazil, Italy, Austria, Ireland, the Netherlands, and Portugal. He is currently assistant professor at the Architecture and Urbanism Bachelor program at Salvador University – UNIFACS, and visiting researcher at the School of Architecture, Federal University of Bahia (UFBA), Brazil, where he co-coordinates the Preserving Legacies: A Future to Our Past project, and leads the "PatrIA" project funded by CNPq, both in Salvador, focusing on the climate adaptation of Candomblé cultural heritage sites.

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David Schwartz, PhD, has worked in the academic field of game design and development since 2001, when he founded the Game Design Initiative at Cornell University. In 2007, Schwartz moved to the Rochester Institute of Technology as a game design and development faculty member who formed the School of Interactive Games and Media (IGM) in 2011. After receiving tenure in 2011, he became IGM's Director in 2015. His current research focuses on cybersecurity gamification, critical infrastructure, geogames, digital twins, and physically-based animation.