



Mindful innovation: the future of architecture in the age of AI. Innovación consciente: el futuro de la arquitectura en tiempos de IA

editorial

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When we compare recent technological advances—such as generative artificial intelligence (AI)—with the ways we design and inhabit our cities, it becomes evident that the discipline of architecture is progressing at a markedly slower pace. This disparity has sparked growing concern regarding the implications of these emerging technologies for the future of architecture—a profession fundamentally rooted in creativity and innovation. In order to remain relevant amidst the rapid integration of new technologies, architecture must critically re-evaluate the foundational principles that underpin its body of knowledge: user needs, spatial quality, solar orientation, climatic responsiveness, material performance, programming, and spatial planning. These principles are deeply contextual and, to a significant degree, shaped by the architect's perceptual and interpretive capacities.

Today, architects are required to assess and prioritize a range of factors to produce designs that enhance human comfort, optimize energy efficiency, promote the rational use of resources, and ensure a high-quality spatial experience. Within this context, the capabilities of artificial intelligence—such as pattern recognition, automation, and optimization—can serve as valuable complements to the architect's contextual and phenomenological understanding, long-term vision, and human-centered approach.

Rather than replacing architects, artificial intelligence should be understood as a tool or collaborative agent that expands their creative and analytical capacities, much like drawing techniques or visualization methods such as renderings have historically done. AI enables the analysis of vast datasets and the generation of design alternatives, which can then be interpreted, assessed, and refined by architects following their professional experience and design sensibility. The future of architecture does not depend on abandoning its core principles, but on fostering a dynamic relationship with technology—one in which the deliberate and reflective pace of architectural development is effectively integrated with the speed and scale of digital innovation, thereby redefining the creative process.

Within this framework, we are pleased to present the twenty-eighth issue of *Estoa*, dedicated to research that explores the intersection of sustainability, pedagogy, heritage, and urban studies through technological approaches. This edition brings together a diverse and rigorous collection of contributions that seek to advance knowledge in architectural



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design, construction, education, energy efficiency, territorial planning, and the conservation of built heritage. The articles in this issue are organized around four interrelated thematic axes:

Sustainability

This section presents innovative approaches to materials, energy performance, and housing solutions in response to ecological, social, and economic challenges. The contributions include the development of bio-based insulation panels (Aza-Medina et al., 2025), the parametric optimization of solar shading systems (Betman et al., 2025), and a comparative review of thermal insulation materials (Terraça et al., 2025). Other studies examine the use of coconut fibre-reinforced concrete (Morales Guzmán and Ceballos Vargas, 2025), the evaluation of housing needs following subsidy programmes (Zambrano-Prado and Chávez-Camarena, 2025), the design of emergency shelters (Miranda Gassull et al., 2025), and consumer perceptions of sustainability in certified housing (Yavuz Pelvan and Oran, 2025). Collectively, these works underscore the central role of sustainability as a driver of innovation in contemporary architectural practice.

Pedagogies

The contributions in this section explore the evolution of architectural pedagogy through technological, territorial, and conceptual lenses. They examine AI-assisted design workflows (Deval et al., 2025), the role of semiotics in AI-mediated image generation (Taşlı Pektaş & Sağlam, 2025), and novel material-based modelling methodologies applied in virtual environments (Cimşit Koş et al., 2025). Other articles address the use of art as a strategy for urban engagement (Mehan & Alikhani, 2025), the teaching of habitat in the Amazon through critical mapping (Astudillo Bravo et al., 2025), and the debate surrounding linguistic ambiguity in design education (Hidalgo-Burneo, 2025). Together, these works offer new perspectives on architectural education grounded in interdisciplinarity, technological integration, and cultural awareness.

Cultural Heritage

The articles in this section address the challenges of preserving built heritage amid evolving social and urban dynamics. Featured studies include the digital documentation of historic architecture in India (Chatterjee & Mohapatra, 2025), the resilience of the historic center of Managua (Suárez Bonilla & De las Rivas-Sanz, 2025), the conservation of earthen heritage in rural Chile (Jorquera-Silva et al., 2025), and procedural tools for improving heritage management in Cuba (Soto-Portillo et al., 2025). Additionally, the mismatch between community values and architectural conservation practices in Cusco is critically examined (Abarca-Ancori & Hayakawa-Casas, 2025). Collectively, these contributions reaffirm that heritage is not merely a physical construct, but also a vital expression of identity and collective memory.

Urban Studies

The final section includes two articles that examine architecture as a mediator of urban life. Ríos-Mantilla et al. (2025) propose spatial activation strategies to enhance intermediate spaces in Quito, while Fuentes Hernández et al. (2025) analyze the architectural standardization promoted by the state in early republican Chile as part of its institutional modernization efforts. Together, these studies illustrate how architecture both shapes and is shaped by political, cultural, and territorial dynamics.

The contributions in this issue underscore the technical, cultural, and ethical dimensions of architecture as a field of research. We hope this edition will inspire inquiry, dialogue, and experimentation among scholars, educators, practitioners, and students alike, with the shared aim of creating more just, inclusive, and resilient environments.

Conflict of Interest. The author declare no conflict of interest.

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