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CONCEPTUAL PAPER

# Architecture and Artificial Intelligence: Defining the Architectural Project and the Architectural Profession in the Age of AI

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ABSTRACT

**Research aims:** This article examines the architectural project and the architect's role when algorithms undertake part of the design process.

**Design/Methodology/Approach:** It adopts a qualitative, retrospective and interpretive approach, bringing literature on architectural design and digital tools into dialogue with professional discussion of AI. Publicly circulated AI-generated architectural proposals from 2022 to 2025 provide context for the discussion.

**Research findings:** The analysis suggests that architects can use AI to explore design alternatives while retaining responsibility for the brief, the site and the evaluation of proposals. Generated images alone provide no evidence of constructability or environmental performance.

**Theoretical contribution:** The article interprets AI-assisted architectural design as a process that requires human judgement, explicit constraints and critical evaluation.

**Practical implications:** Architects and educators should distinguish visual exploration from technical validation and assess the environmental, cultural and ethical implications of the tools they use.

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## 1. Introduction

This article examines how artificial intelligence (AI) affects architectural design and the professional responsibilities of architects. It considers what changes when designers use algorithms to generate or evaluate proposals, and which decisions still require contextual knowledge and professional judgement.

Architecture combines artistic expression with construction, social uses and economic constraints. Architects must consider form, function and technical feasibility together (Fernandez, 2002). A proposal that succeeds in one of these dimensions may still require substantial revision in the others.

Debates about architectural form and artistic meaning have long shaped the discipline (Le Corbusier, 1926; Minguet, 1992). Contemporary practice also requires attention to user comfort, energy performance and the urban context. Architects therefore need tools that support both design exploration and communication among participants. Research on mediated collective design shows

the importance of examining how teams use these tools within their working process (Calixte, 2021).

Architects have developed their ideas through sketches, geometric drawing, stereotomy and, later, computer-aided design (CAD) and building information modelling (BIM). These methods influence how designers formulate and communicate an intention. The relationship between tools and architectural judgement remains central to current professional debate about AI (Ficat & Mohamed, 2025; Lescop, 2025). Design draws on experience, knowledge, dialogue and repeated evaluation as well as intuition.

Generative AI has extended the range of tools available for visual exploration. Designers can use text or image prompts to request alternative compositions and architectural appearances. The resulting images may resemble plans, elevations or sections, but that resemblance does not establish dimensional consistency, structural feasibility or compliance with a brief. A review of AI in conceptual architectural design also identifies approaches to generating and evaluating alternatives that extend beyond image production (Castro Pena et al., 2021).

The value of computational speed depends on the task and the reliability of the output. Designers may use AI within modelling, optimisation or environmental analysis, but each application requires appropriate inputs and checks. An attractive image and a validated technical model answer different questions. Architectural education consequently needs to address how students select tools, test their outputs and explain the decisions they retain.

The central question is therefore: what becomes of the architect's role and of the architectural project when algorithms undertake part of the design process, within a discipline that combines artistic, technical, social, environmental and economic concerns?

## 2. Methodology and scope

This study uses a qualitative, retrospective and interpretive approach. It relates literature on architectural conception, drawing and computational design to professional discussion of AI. Publicly circulated AI-generated architectural proposals from online platforms, specialised magazines and social networks between 2022 and 2025 provide contextual material. The discussion addresses how designers frame problems, represent proposals and assess the division of work between people and tools. The article does not report an item-level catalogue, a coding scheme or comparative results for those proposals. Its conclusions therefore concern conceptual and professional implications; they do not establish the frequency of particular practices, the performance of AI systems or the environmental benefits of the designs shown in public media. The literature discussion is selective rather than a systematic review.

## 3. Discussion

### 3.1. *Architectural design*

Architects develop a project by relating intentions to a possible built outcome. Mestelan (2005) treats the project as a central concept in architectural theory. The brief gives designers an initial account of intended uses, resources and constraints, which they refine as they explore alternatives (Tric, 1999; Safin, 2011). Architectural conception thus involves both imagining a future situation and assessing how it could take material form.

Designers work with requirements that can conflict. They must reconcile spatial and aesthetic intentions with construction, cost and the expectations of users. Clients, contractors, public authorities and residents also influence the choices available to the architect (Tric, 1999). Computational assistance has long included approaches in which designers describe desired properties and explore possible forms, as illustrated by declarative modelling and research on sunlight in architectural design (Hégron, 2003; Siret, 1997).

Architects revise both their proposals and their understanding of a problem as design proceeds. They use guiding ideas and architectural references to organise this work, returning to earlier decisions when a proposal fails to satisfy a requirement (Boudon et al., 1994; Fernandez, 2002). This iterative character matters when assessing AI: the designer must be able to question an output and reconsider the assumptions behind it.

Designers draw on experience, cultural knowledge and earlier architectural examples when interpreting a brief. Graphic representations help them develop and communicate possible responses (Fernandez, 2002; Halin, 2004). A reference can inform a spatial relationship, a construction principle or an aesthetic choice, without prescribing the final form. The architect must assess its relevance to the project at hand.

Architectural expertise also depends on the particular circumstances of a commission. Buildings have a strong relationship to their location, and designers must respond to site conditions rather than assume that a form can transfer unchanged between contexts (Raynaud, 2001; Halin, 2004). Standardised components and repeated building types do not remove this need for adaptation.

### 3.2. *Architecture and digital tools*

Architectural practice has expanded from hand drawing and physical models to CAD, digital modelling and BIM. These methods coexist, and architects combine them according to the stage and requirements of a project. AI adds further possibilities for generating or assessing alternatives. To understand its contribution, it is useful to distinguish drawing, information management and the evaluation of design proposals.

#### *3.2.1. Hand drawing*

Estevez (2001) distinguishes descriptive, prescriptive and speculative functions of architectural drawing. Designers use descriptive drawing to represent the appearance and

form of a proposal. Prescriptive drawings communicate information needed for construction, including dimensions and details. Speculative drawing supports the exploration of ideas. These functions can overlap during a project, but they serve different purposes.

In early design, architects can sketch a spatial arrangement, compare alternatives and revise relationships before committing to detailed documentation. This use of drawing as a means of thinking remains relevant when designers move between paper and digital environments (Estevez, 2001; Safin, 2011).

Sketches allow designers to record an intention with a selective level of detail. Orthographic drawings, including plans, sections and elevations, describe different aspects of the same proposal. Designers must check that these views agree. Perspectives and physical or digital models provide further ways to examine spatial relationships; they complement the information in technical drawings (Estevez, 2001).

*3.2.2. Computer tools in architectural design*

Computer graphics and digital drawing developed during the second half of the twentieth century and changed how architects produced and revised representations. CAD and three-dimensional modelling expanded the means available for visualisation and documentation. Their adoption did not eliminate hand drawing, and their role in design extends beyond replacing drawing instruments (Estevez, 2001; Halin, 2004).

Hégron (2003) distinguishes imperative modelling, in which a designer represents an object whose form is already envisaged, from declarative modelling, in which the designer specifies properties from which possible forms can be explored. This distinction shows why computational tools cannot all be described as mere drafting aids. Their contribution depends on how the designer represents the problem and which operations the software supports.

Architects use digital models to inspect geometry, prepare visualisations and coordinate information. They can also connect models to analytical tools for studies of daylight, energy use or other aspects of building performance. The reliability of these studies depends on the model, the input data and the assumptions used; visual realism alone does not establish accuracy.

BIM supports the organisation and exchange of building information across a project. Teams can derive drawings from a coordinated model and use model information in technical assessments. Energy consumption and constructability still require appropriate calculations, specialist review and checks against project requirements. A BIM model does not by itself confirm that a building is feasible or environmentally efficient (De Maestri, 2017).

The main organisational value of BIM lies in how participants share and manage information. Teams need to define responsibilities, maintain consistent data and coordinate revisions (De Maestri, 2017). Its use in architectural education also raises questions about how software instruction relates to the development of a project (Samb, 2018). Learning a tool therefore needs to be connected to design reasoning and collaborative work.

*3.2.3. Artificial intelligence in architecture*

Architectural applications of AI include methods for generating design alternatives, searching possible configurations and evaluating selected criteria. The review by Castro Pena et al. (2021) examines AI in conceptual design, including approaches developed before current prompt-based image generators. Chaillou (2021) also considers AI in architectural practice. These contributions support a discussion of changes in design methods, but they do not justify treating all AI systems as equivalent or assuming that they reproduce human understanding.

At the 2025 conference organised by the Société française des architectes, Ficat and Mohamed discussed changes in professional practice, while Lescop considered the architectural value chain (Ficat & Mohamed, 2025; Lescop, 2025). Their contributions document professional perspectives on a changing field. The published programme abstracts do not provide experimental benchmarks for speed, accuracy or risk reduction. Claims about such outcomes require evidence for the specific task, system and comparison involved.

A prompt may leave important intentions unstated, and a generated proposal may satisfy its visible wording while failing other requirements. Architects must examine the output in relation to the brief and the site. Ficat and Mohamed (2025) emphasise the continuing importance of professional judgement and coordination. In practice, designers need to explain why they selected, altered or rejected a proposal rather than rely on its visual persuasiveness.

## 4. Conclusion

AI can expand the alternatives that architects consider during design. Architects still need to define the brief, interpret site conditions and judge whether proposals meet technical and social requirements. The conceptual discussion developed here supports this division of responsibility; it does not demonstrate that AI-generated designs have a smaller ecological footprint. Environmental claims require assessments of building operation, materials and the assumptions used in analysis. A rendered image cannot supply that evidence.

We therefore understand the architectural project in the age of AI as an iterative process in which architects use computational proposals while retaining responsibility for their interpretation and evaluation. This position requires attention to the limits of the tools, the possibility of repetitive forms and the difficulty of explaining some outputs. For architectural education, the practical task is to connect technical competence with the ability to assess cultural context, justify design choices and check performance claims.

## Declarations

**Author Contributions.** Conceptualisation, B.R., C.N. and S.O.; methodology, B.R.; validation, C.N. and S.O.; formal analysis, investigation and data curation, B.R., C.N. and S.O.; writing of the original draft, B.R.; supervision, S.O. and C.N.; review and editing, B.R., C.N. and S.O.

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