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Uncovering Concepts as A Conceptual Model of Architects' Preferences in The Design Process

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ABSTRACT

Architects' preferences in the design process are often interpreted as matters of personal taste or intuitive creativity, which makes them difficult to analyze systematically within an academic framework. This paper revisits William M. Peña's Problem Seeking *theory, with a specific focus on the* Uncover Concepts *stage, and proposes it as a conceptual model for understanding how architects' preferences are formed during the design process. Using a qualitative–conceptual research approach based on critical literature review and theoretical synthesis, the study positions* Uncover Concepts *as a cognitive–reflective mechanism that mediates between design inputs and architectural decision-making. The analysis integrates Peña's framework with theories of problem framing (Lawson), reflective practice (Schön), and architectural cognition, in order to explain preference formation as a structured conceptual process rather than a subjective outcome. The findings suggest that* Uncover Concepts *functions as a conceptual filter through which goals, facts, needs, and constraints are interpreted according to architects' values, experiences, and professional orientations. This process results in a specific conceptual orientation that subsequently guides design decisions. The paper contributes theoretically by reframing* Uncover Concepts *from a programming tool into a core cognitive mechanism for preference formation in architectural design. The proposed model offers a clearer theoretical foundation for future empirical studies on architects' design thinking and provides insights for*

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1. INTRODUCTION

Architects' preferences in the design process are often understood as subjective expressions related to taste, intuition, or personal style. This approach makes design preferences difficult to analyse systematically and often detaches them from the theoretical framework of the design process. In fact, research in the field of design cognition shows that architectural decisions are the result of a structured, reflective, and conceptually traceable thought process(Lawson, 2006; Schön, 1983)

Various studies have discussed architects' preferences through professional practice orientation, design style, or aesthetic tendencies. However, these studies generally do not link preferences to specific stages in the design process. On the other hand, the Problem Seeking theory proposed by Peña & Parshall (2012) has long been used as a systematic framework for design programming, but its use is still limited to the function of problem formulation and has not been directed at reading the formation of architects' preferences.

A conceptual gap arises when design programming theory and studies of architects' preferences run parallel without a clear meeting point. To date, few studies have explicitly positioned one of the stages in Problem Seeking as a cognitive mechanism for the formation of design preferences. The Uncover Concepts stage, which is interpretative and reflective in nature, has the potential to be the main space where architects' professional preferences are formed.

Based on this gap, this article proposes a reinterpretation of the Uncover Concepts stage in William Peña's theory as a conceptual model for the formation of architects' preferences. The novelty of this research lies in the shift in the position of Uncover Concepts from merely a stage in design programming to an explicit cognitive-reflective mechanism that explains how architects' professional preferences are formed before design decisions are made. Unlike previous studies that view preferences as subjective aspects or personal styles, this article formulates preferences as the result of a conceptual process that can be analysed theoretically.

The understanding of the design process as a complex cognitive activity has long been developed. Alexander (1964) views design as a process of systematically arranging the relationship between form and its context. In their subsequent work, A Pattern Language, Alexander, Ishikawa, and Silverstein (Alexander et al., 1977) emphasised that design decisions always stem from the designer's value structure, experience, and thought patterns. Thus, architects' preferences can be understood not only as aesthetic tastes but as configurations of thought patterns that influence how design problems are defined from the outset.

2. LITERATURE REVIEW

2.1 Problem Seeking in the Architectural Design Process

(Peña & Parshall, 2012)introduced *Problem Seeking* as a systematic framework for architectural programming that places problem formulation as the foundational stage of the design process. This approach emphasises that the quality of architectural outcomes is strongly influenced by the clarity and depth with which design problems are defined. The five stages—establishing goals, collecting facts, uncovering concepts, determining needs, and stating the problem—represent a progressive transition from objective information toward conceptual synthesis.

Within the broader discourse of design theory, Peña's framework aligns with (Simon, 1996) view of design as a cognitive process that transforms existing conditions into preferred states. Recent studies in architectural cognition reaffirm this perspective by highlighting that

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early conceptual decisions significantly shape later design outcomes (Proietti, 2025;Hoelscher et al., 2025). Accordingly, *Problem Seeking* can be understood not only as a technical programming method but also as a conceptual structure that frames architectural thinking at the earliest stages of design.

2.2 Uncover Concepts as an Interpretative and Cognitive Stage

Among the stages of *Problem Seeking*, *Uncover Concepts* exhibits the most interpretative character. Peña emphasises that concepts should not be confused with forms, styles, or visual solutions, but rather understood as guiding principles that provide meaning and direction to design decisions (Peña & Parshall, 2012). This stage marks a critical cognitive shift from factual data to conceptual interpretation.

The interpretative nature of *Uncover Concepts* can be further explained through (Lawson, 2006) theory of *problem framing*, which suggests that designers actively frame design problems based on their perspectives, experiences, and priorities. This framing process is inherently cognitive and reflective. Contemporary design research supports this view by demonstrating that designers continuously reinterpret constraints through internal cognitive filters rather than responding to them objectively (Hettithanthri, 2023)

(Schön, 1983) concept of *reflection-in-action* also reinforces the role of *Uncover Concepts* as an early reflective space. At this stage, architects engage in a mental dialogue with the design situation, testing and negotiating conceptual ideas before they are materialised. Recent studies on reflective design thinking suggest that such early conceptual reflections are decisive in shaping design orientations and preferences (Hamilton, 2022).

2.3 Architects' Preferences, Cognition, and Professional Orientation

Architects' preferences have traditionally been examined through stylistic tendencies, professional orientations, or decision-making behaviours. (Coxe, 1987) classifies architectural practice into service-based, idea-based, and delivery-oriented orientations, highlighting how professional priorities influence design approaches. More recent studies suggest that these orientations function as cognitive schemas that shape how architects interpret design problems (Visser, 2007;Cross, 2011).

Design cognition research further demonstrates that preferences emerge dynamically during the conceptual process. (Suwa et al., 1999) show that creative design often involves unexpected discoveries that reshape both design problems and conceptual directions. Contemporary studies confirm that design decisions are neither linear nor purely rational, but are shaped by a combination of intuition, internalised knowledge, and situational context (Hamilton, 2022;Wang et al., 2025). These findings suggest that architects' preferences should be understood as cognitive structures that evolve through reflective engagement with design situations.

2.4 Theoretical Gap and Research Position

Although existing studies have extensively examined design cognition, professional orientation, and decision-making in architecture, few have explicitly connected these discussions to the *Uncover Concepts* stage within *Problem Seeking*. In particular, recent research has not sufficiently addressed how *Uncover Concepts* functions as a mechanism through which architects' preferences are formed prior to formal design decisions.

This study positions itself at the intersection of *Problem Seeking* theory, architectural cognition, and preference formation research. By conceptualising *Uncover Concepts* as a cognitive–reflective mechanism, this research proposes a model that systematically explains how architects' preferences emerge within the design process. In doing so, it contributes to

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contemporary design theory by bridging architectural programming and cognitive perspectives on design thinking.

3. RESEARCH METHODS

This research method falls under the category of conceptual research, which is research that develops theoretical models through critical analysis of literature without empirical testing. Cross (2011)) states that design research does not always aim to produce predictive models, but can also map the thinking patterns of designers as a basis for understanding design practices. With this approach, the research focuses on the conceptual processes that underlie the formation of architects' preferences. This research uses a qualitative-conceptual approach with the aim of developing a theoretical model, not empirical testing. The research methodology was developed through the following stages:

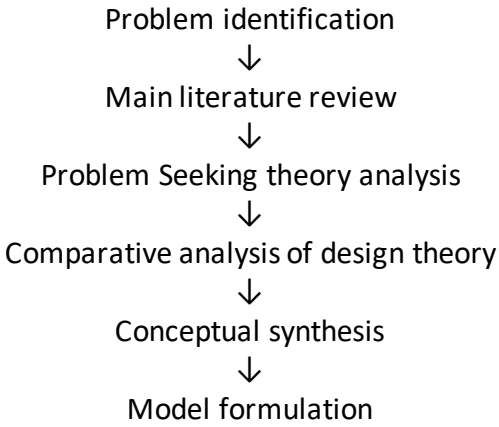

Figure 1. Research Methodology Diagram
Source: Author, 2025

The research methodology diagram illustrates the systematic stages taken in developing a conceptual model of architects' preferences. The process begins with problem identification, namely the limitation of studies that still view architects' preferences as a subjective aspect without a clear theoretical framework. This stage forms the basis for determining the focus of the research.

The next stage is a primary literature review, which includes William M. Peña's Problem Seeking theory as the core framework, as well as supporting theories in the fields of design cognition, problem framing, and reflective practice. This stage involved a review of literature related to design process theory and designer cognition, including: problem framing (Lawson, 2006), reflective practice (Schön, 1983), design cognition and representation (Simon, 1996,Visser, 2007) and the orientation of professional architectural practice (Coxe, 1987). The literature was analysed to understand the position of Uncover Concepts in the overall design process.

Next, a theoretical analysis of the Uncover Concepts stage was conducted to identify its cognitive and interpretative characteristics. This analysis was then deepened through conceptual comparison with other design theories, such as the thinking of Lawson and Schön, to find its theoretical suitability and contribution.

The conceptual synthesis stage was carried out by integrating theoretical findings from various sources to establish relationships between concepts. This process resulted in the understanding that Uncover Concepts acts as a cognitive-reflective mechanism in the formation of architects' preferences.

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The final stage is the formulation of a conceptual model, which is visualised in the form of a diagram as a theoretical representation of the process of forming architects' preferences in design. This model is not intended as an operational procedure, but rather as a conceptual framework that can be used as a basis for further research

4. RESULTS AND DISCUSSION

4.1 Uncover Concepts as a Cognitive-Reflective Mechanism for Preference Formation

The Uncover Concepts stage has a unique position in the Problem Seeking framework because it serves as a transition point between objective data and conceptual meaning construction. At this stage, architects no longer merely manage facts, needs, and project constraints, but begin to interpret and filter them through their values, experiences, and professional orientation. This process makes Uncover Concepts a cognitive space where design preferences begin to form.

The preferences that emerge at this stage cannot be understood as arbitrary personal tastes. Rather, preferences are the result of a structured reflective process, in which architects consciously or unconsciously emphasise certain aspects of the design problem and ignore others. Thus, design preferences can be understood as the product of cognitive mechanisms that can be traced and analysed theoretically.

This interpretation expands the function of Uncover Concepts from merely a programming stage to an epistemological instrument in understanding how architects' design orientations are formed before being realised in spatial decisions.

This is in line with Simon's (Simon, 1996) view that design is a cognitive activity to transform existing conditions into desired conditions through the construction of mental representations. Architectural preferences play a role in determining the form of this transformation from the initial conceptual stage.

4.2 The Relationship between Uncover Concepts and Problem Framing and Design Reflection

The interpretation of Uncover Concepts as a mechanism for forming preferences is in line with the problem framing theory proposed by Lawson (Lawson, 2006). In this perspective, design is seen not merely as a problem-solving activity, but as a process of framing the problem itself. Architectural preferences play an important role in determining how problems are understood, defined, and prioritised from the early stages.

Furthermore, Schön's concept of reflection-in-action (Schön, 1983) provides a basis for understanding that design reflection does not only occur at the solution exploration stage, but begins as early as the conceptual phase. Uncover Concepts can be understood as an arena for initial reflection, where architects engage in a mental dialogue with the design situation before producing more concrete design decisions.

By linking Uncover Concepts to these two theories, this article shows that architects' preferences are formed through a reflective process that takes place before and during concept formulation, rather than as aesthetic decisions that arise spontaneously.

Furthermore, recent research in the field of design cognition also shows that architects' decision-making processes occur through situational and reflective reasoning mechanisms. Valkenburg & Dorst (2018) show that designers actively move between action, reflection, and reinterpretation of the design situation so that the meaning of the problem continues to evolve throughout the design process. Thus, reflective thinking is not merely a post-design evaluation activity, but occurs simultaneously during the generative process. These findings reinforce the position of Uncover Concepts as a dynamic conceptual stage, where aesthetic

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preferences, professional experience, and situational interpretations interact to shape the direction of design decisions.

4.3 The Position of Models in Architectural Design Theory Discourse

Compared to other cognitive design approaches, such as Gero & Kannengiesser's Gero & Kannengiesser (2014) function–behaviour–structure framework, the conceptual model proposed in this study does not focus on the direct relationship between function, behaviour, and form. Instead, this model focuses on the internal mechanisms of forming architects' conceptual orientations.

The main contribution of this model lies at the epistemological level, namely explaining how design knowledge and professional preferences are formed before the form synthesis process begins. By focusing on the Uncover Concepts stage, this article fills the gap between design programming theory and the study of architects' preferences, which have tended to be separate.

This conceptual model allows design preferences to be understood as an integral part of the design process, rather than as external factors or independent variables.

This perspective is in line with Heynen (1999) thinking, which asserts that every design decision is always rooted in a particular ideological and epistemological position. Thus, architects' preferences are not only individual-psychological in nature, but are also formed through a dialogue between professional values, architectural discourse, and social context. Through this understanding, the conceptual model proposed in this article does not merely interpret preferences as personal choices, but as a construction of professional knowledge formed in design practice.

Based on theoretical synthesis, this article proposes a conceptual model that places Uncover Concepts as a cognitive-reflective mechanism that mediates between design input and output in the form of architect preferences. Through the process of interpreting and framing problems, architects form conceptual orientations that then influence the direction and decisions of design. This model emphasises that preferences are not understood as individual tastes, but as the result of a structured conceptual process.

4.4 The Concept of Theoretical Framework in Architectural Research

In conceptual research, the theoretical framework serves as a tool for organising key concepts so that the relationships between them can be understood systematically. Jabareen (2009) explains that a conceptual framework is a conceptual system constructed interpretively through a process of categorisation, synthesis, and integration of literature. This type of framework differs from empirical models in that it aims to explain the process of meaning formation rather than measure variable relationships. In the context of this study, a conceptual framework is used to map the position of Uncover Concepts in the formation of architects' preferences.

A similar approach is also found in the theory construction framework according to Walker & Avant (2019), which emphasises the importance of identifying concept attributes, context, and theoretical consequences. Thus, the development of a conceptual model of architect preferences in this study is in line with the tradition of theory development in social sciences and design.

4.5 Theoretical Implications of the Conceptual Model

The conceptual model proposed in this article has theoretical implications for understanding the architectural design process, particularly in interpreting the formation of architects' preferences. By positioning Uncover Concepts as a cognitive-reflective mechanism,

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this article asserts that design preferences do not arise spontaneously, but are formed through a structured conceptual process.

The main theoretical implication of this model is a shift in understanding architects' preferences from individual subjective aspects to the results of professional framing and reflection processes. Preferences are understood as conceptual orientations that are formed before design decisions are realised in spatial form. Thus, preferences become an integral part of the design process, rather than external variables or personal residues.

Furthermore, this model expands the function of Problem Seeking theory by showing that the design programming stage is not only technical in nature but also has an epistemological dimension in the formation of design knowledge. Uncover Concepts acts as a space of synthesis where facts, needs, and constraints are translated into conceptual directions that represent the architect's way of thinking.

These theoretical implications open up opportunities for further research to test and develop conceptual models of architects' preferences through empirical approaches, without diminishing the position of this article as a theoretical foundation in the study of architectural design processes.

Considering these dynamics, the conceptual model offered in this study is in line with the study by Galle & Kovacs (2020), which emphasises that design reasoning is a special form of reasoning because it always operates in a problem space that is not fully defined. Uncover Concepts can be understood as the phase in which architects construct, negotiate, and reorganise the structures of meaning necessary to guide design decisions. It is at this point that architects' preferences function not only as personal inclinations, but also as cognitive mechanisms that structure the way architects read and interpret design situations.

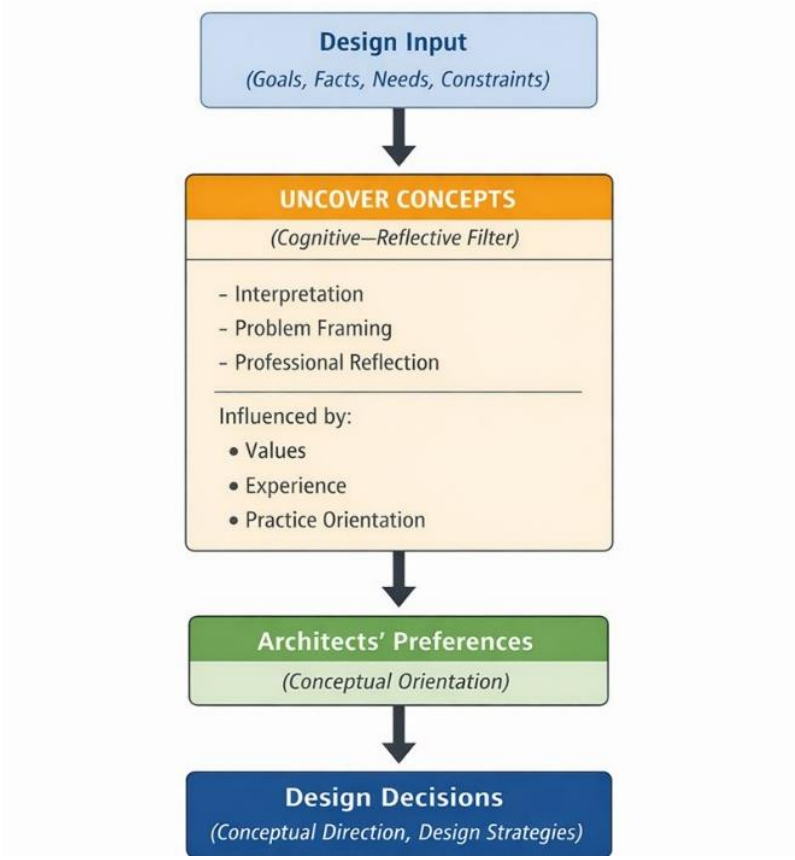

Figure 2. Conceptual Model of Architectural Preference Formation
Source: Author, 2025

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5. CONCLUSION

This study reinterprets the *Uncover Concepts* stage in William M. Peña's *Problem Seeking* theory as a conceptual model for understanding the formation of architects' preferences in the design process. Unlike conventional interpretations that position *Uncover Concepts* primarily as a technical step in architectural programming, this research demonstrates that the stage operates as a **cognitive–reflective mechanism** that shapes architects' conceptual orientations prior to the realisation of design decisions.

The findings of this study indicate that architects' preferences do not emerge as post-design stylistic choices or individual tastes, but are formed during the early conceptual phase through processes of interpretation, problem framing, and professional reflection on design inputs. By synthesising theories of design cognition, reflective practice, and professional orientation, this research clarifies that *Uncover Concepts* functions as a conceptual filter mediating between objective design information and subsequent design decisions.

The main contribution of this research lies in the formulation of a conceptual model that bridges architectural programming theory and studies of architects' preferences. This model extends existing design theory by explicitly positioning preference formation as an integral and analysable component of the architectural design process, rather than as an implicit or subjective outcome.

As a conceptual study, this research does not aim to provide empirical validation. Therefore, further research is recommended to test and refine the proposed model through empirical approaches such as design process analysis, interviews with architects, or comparative case studies. Such studies would allow for a deeper understanding of how the *Uncover Concepts* stage operates across different design contexts and professional orientations, thereby strengthening the theoretical and methodological foundations of architectural design research.

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