

Article

Narrative as a Generative Tool in Architectural Design Education: An Integrative Model Linking Drawing and Physical Model-Making

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Abstract

This article is situated within the field of introductory architectural design education, where the challenge of enabling students to connect abstract ideas with their spatial and material translation remains unresolved. Although a range of active learning methodologies is currently available, the literature suggests that narrative has not yet been systematically integrated as a projective resource in early design education, leaving a gap in the articulation between imagination, representation, and design. In response to this issue, the study explores the value of the short story as a space-generating device and its capacity to structure design thinking. To this end, the Narrative–Analogical Project Model (MNAP) was implemented with first-year Architecture students at the Universidad Técnica Particular de Loja through an iterative process combining narrative reading, sketch production, model-making, and collective critiques within a research-through-design framework. The findings, triangulated through a four-dimension rubric applied retrospectively by external evaluators, indicate that this approach not only activates imagination and promotes multiple interpretations, but is also associated with greater coherence between narrative and space, which, in turn, supports supporting the development of skills such as argumentation, communication, and collaborative work. Overall, the study suggests that incorporating narrative from the outset of the design process may constitute a relevant and replicable pedagogical strategy for integrating visual thinking and material exploration in architectural education.

Keywords: architectural narrative; design thinking; analog representation; design pedagogy; spatial imagination



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1. Introduction

Architectural education faces the challenge of training professionals who can articulate complex ideas, communicate precisely, and respond creatively and critically to changing contexts. This challenge is especially significant in the first year, when students move from conceptual abstraction toward early forms of spatial representation and materialization. Within this context, narrative may operate as a valuable pedagogical resource. The use of literary, visual, or cinematic narratives in architectural education can establish a bridge between imagination, interpretation, and spatial configuration, thereby enriching early design processes [1].

At the initial stages of architectural training, one of the main difficulties lies in the gap between an idea and its translation into representational media. The early and uncritical

use of digital tools may widen this gap, displacing spatial exploration and weakening the iterative processes that characterize studio culture [2,3]. By contrast, research on analog sketching suggests that drawing helps students reason, externalize ideas, and formulate spatial inferences even when technical mastery is still limited [4,5]. From this perspective, the issue is not to oppose the analog and the digital. Rather, it is to reposition each medium within a reflective pedagogical sequence in which technology supports meaningful iterations instead of replacing projective exploration too early [6].

However, narrative is not the only means of activating early-stage design generation processes. Tools such as diagrammatic reasoning, precedent analysis, typological abstraction, and programmatic schemes have proven useful for organizing relationships, identifying recurrent spatial configurations, and structuring design decisions. Yet each of these tools privileges a specific type of operation. Diagrams abstract functional and organizational relationships. Precedents transfer already established strategies. Typology stabilizes formal families. Programmatic schemes distribute requirements and compatibilities of use. In contrast, narrative provides a specific form of mediation in the early stages of design learning because it makes it possible to address experience, temporality, atmosphere, and sequence simultaneously before the project reaches formal stabilization. Its value, therefore, does not lie in replacing other tools, but in offering a generative framework that is especially pertinent when the pedagogical challenge is to move from initial abstraction toward a first situated structuring of space. This specificity is consistent with Psarra's work [7], which links narrative and spatial configuration in the production of architectural meaning, as well as with the contributions of Böhme [8,9] and Griffero [10], for whom atmosphere is not a secondary effect of space, but a sensitive and relational dimension that actively participates in its constitution.

Against this background, the present study explores and substantiates the use of the short story as a generator of space in introductory architectural design education. It is based on the premise that narrative may operate as a generative structure capable of organizing intentions, actions, and temporalities that conventional drawings cannot yet fully capture in the early stages. It may also provide verifiable criteria for graphic and material translation. In this sense, the study is situated within the framework of the "threshold concept" described by Williams [11]. According to this perspective, the passage from abstract instruction to spatial production profoundly transforms the way in which students learn to see, think, and produce architecture.

The general objective of this article is to analyze the value of narrative as a projective resource in introductory architectural education, based on a teaching experience developed in the first-year program at the Universidad Técnica Particular de Loja. More specifically, the study seeks (1) to examine how the reading of highly spatial narratives may activate processes of architectural imagination and interpretation; (2) to identify how this activation is translated into graphic and three-dimensional decisions through sketches and working models; and (3) to evaluate the potential of the methodological device to support early competencies in representation, argumentation, and critical reflection within the design studio.

Methodologically, the study is framed within a research-through-design approach. It also draws on the tradition that recognizes narrative as an original didactic form and as a means of transmitting knowledge and experience [12]. The experience was developed within a studio setting conceived, in line with Schön, as a space of demonstration, iteration, and reflection-in-action. In this setting, design thinking is constructed through practice, review, and collective comparison [13]. At the same time, the study assumes that the educational environment should not be limited to the acquisition of technical skills. It should also promote a critical reading of the social and cultural context of the project [14].

In accordance with this framework, the article is organized around the following working hypotheses.

H1. *The incorporation of the short story as a trigger for the design exercise may facilitate the transition from initial abstraction toward a more structured spatial understanding by organizing sequences, atmospheres, and spatial relationships prior to architectural formalization.*

H2. *Narrative mediation may support coherence between story, graphic representation, and three-dimensional materialization, enabling students to translate intangible content into verifiable design decisions.*

H3. *The articulation of narrative, sketch, model, and public critique may support the development of transversal competencies in the introductory studio, particularly in terms of argumentation, communication, critical reflection, and the construction of a projective language of one's own.*

From a reflexive perspective, this study assumes that the architectural project cannot be understood solely as a matter of formal resolution or as the linear translation of a program. Rather, it is approached as a process of meaning-making mediated by representational and exploratory devices. Accordingly, the authors position themselves within a theoretical framework that brings together research-through-design, the phenomenology of atmosphere, and design cognition. Within this framework, narrative, drawing, and model-making are not treated as neutral media, but as instances that actively shape design thinking. This position explains the central role that categories such as atmosphere, sequence, narrative–spatial coherence, abstraction, and iteration play in the article, as well as the attention given to pedagogical mediation and to the interpretive dimension of design decisions.

Based on these hypotheses, the article presents and discusses a methodological proposal that transforms short narratives into verifiable design decisions, from story to sketch and model. Its aim is to contribute to a teaching model that integrates technique, sensitivity, and spatial thinking in the introductory stages of architectural education [15].

2. Theoretical Overview

2.1. Narrative as a Trigger of the Design Process

Architecture begins before drawing and before material construction. It originates in a prior moment of imagination, interpretation, and projection. In this sense, Munari [16] argues that the act of designing relies on fantasy, invention, and creativity. These are understood as faculties that make it possible to reinterpret accumulated experience and translate it into graphic language through imagination. Designing, then, is not a spontaneous gesture. It is an operation of cultural and perceptual recombination through which experience is transformed into form.

From this perspective, narrative may be understood as a projective resource that is especially relevant in introductory design education, where students must articulate abstraction, sensitivity, and representation.

As argued in the Introduction, narrative offers a distinctive form of mediation in early design learning because it addresses experience, temporality, atmosphere, and sequence simultaneously, before the project reaches formal stabilization. Building on this premise, the following sections examine how this mediating capacity operates, first as a device that organizes intentions and temporalities, and subsequently as a bridge toward graphic and material translation (Sections 2.2 and 2.3).

Far from serving a merely illustrative function, the short story operates as a device that organizes intentions, actions, and temporalities. It also allows possible worlds to

be projected without being subordinated from the outset to the constraints of technical language [17]. By reading or listening to a story, students become “active spectators” who complete space through their own memories, affections, and experiences. In this way, they activate an atmospheric and sequential understanding of dwelling [18,19]. Narrative therefore provides not only a thematic framework, but also a means of contextualizing and articulating design work from the initial idea to its expression. It also supports the exploration of atmospheres and materialities [20].

This pedagogical potential is not new. Various authors have pointed out that storytelling constitutes an original form of teaching and learning, one that predates writing and remains relevant because of its capacity to integrate phenomenological, critical, and conventional dimensions of educational experience [21,22].

Within contemporary aesthetic theory, Böhme [8,9] has shown that atmosphere is an intermediate spatial quality produced between subjects, objects, and environment. Griffero [10], in turn, understands it as a form of affective spatiality that precedes its full conceptual objectification. Applied to the architectural field, these perspectives support the argument that narrative is pedagogically significant not only because it conveys content, but also because it activates sensitive and relational dispositions of space that other generative tools do not address with the same intensity in the early stages of design learning.

Likewise, the relationship between narrative and architecture is not limited to the evocation of environments. It points to a deeper logic of spatial configuration. Psarra [7] has argued that architecture and narrative share the capacity to organize sequences, construct relationships, and produce meaning through spatial configurations. From this perspective, narrative is not external to the project. Rather, it is a form of structuring that connects experience, movement, and formal organization. This affinity converges with Scavuzzo’s hermeneutic reading [23], which defines both narrative and architecture as a “provisional victory over the ephemeral” insofar as both operations extract meaning from indeterminacy and fix it into shareable forms.

Consequently, incorporating narrative into the studio does not mean telling stories as ornament. Rather, it means deriving verifiable spatial conditions such as sequences, rhythms, thresholds, and densities of use, that can orient subsequent graphic and material decisions. Furthermore, this approach fosters a critical reading of the historical, social, and symbolic context of dwelling, broadening the understanding of the project beyond its formal dimension [24–26]. In this direction, recent literature emphasizes that narrative should not be regarded solely as an expressive resource, but also as a driver of critical thinking, meaning-making, and the articulation of complex learning processes in architecture [27].

Within the studio context, this operative dimension takes shape through guided reviews that invite students to reflect on the subjects and actions inhabiting space, the atmospheres those actions require, the paths and thresholds that sustain experience, and the degree of indeterminacy that should be preserved in early phases. In this way, narrative becomes integrated into a dynamic of constructive dialogue and reflection-in-action. Instructors do not transmit closed solutions, but rather guide the progressive formulation of design thinking [28].

2.2. Drawing as a Bridge Between Narrative and Graphic Representation

In early architectural education, drawing cannot be understood solely as a visual outcome. Rather, it functions above all as a cognitive device that externalizes the idea, subjects it to scrutiny, and transforms it during its own making. Sketching activates cycles of generative reasoning through the well-known “back-and-forth dialogue” with what appears on the page. This process fosters reinterpretation, discovery, and successive adjustment [4,5,29]. Such dynamics are embedded in design thinking, where conjecture,

evaluation, and reformulation are articulated through practice. They also resonate with the logic of reflection-in-action described by Schön [13] and Cross [30].

Within this framework, narrative guides graphic activity by providing an interpretive basis for the selection of spatial parameters. Translating a story into sketches does not mean illustrating it literally. Rather, it involves identifying certain conditions of the narrated space and converting them into visual language. These conditions may include sequences, limits, densities, rhythms, and contrasts. They then inform later decisions regarding scale, proportion, light, materiality, and atmosphere. The literature suggests that this mediation activates conceptual, spatial, and sensory processes that converge in images with greater internal coherence [31,32]. In semiotic terms, drawing operates here as a process of translation between domains, from verbal language to spatial form, grounded in visual thinking [33] and in a phenomenological understanding of atmosphere as a design criterion [34].

This cognitive dimension does not exclude an expressive one. On the contrary, drawing nurtures and stabilizes a language of one's own through the coordinated action of hand, eye, and mind. In this way, it becomes a form of intellectual craftsmanship that sediments tacit knowledge and criteria of quality [34,35]. In the Ibero-American context, Seguí de la Riva [36] has emphasized its formative value as a mediation between imagination and construction, precisely because it enables early decision-making without foreclosing exploration.

Along the same lines, the contribution of Munari [16] allows drawing to be understood as a field in which fantasy, invention, and creativity become operative. Although these capacities cannot be taught directly, they may be cultivated through pedagogical devices that encourage divergent responses and the ability to express ideas with clarity and singularity. Creativity has, in fact, been defined as a form of divergent thinking based on fluency, flexibility, and originality. It is closely linked to the possibility of generating distinctive outcomes and to the capacity to communicate one's own thinking [37,38]. In the context of the present study, however, this dimension is not treated as an end in itself. Rather, it is approached as part of the consolidation of a projective language that connects imagination, representation, and argumentation.

2.3. The Materialization of Imagination Through the Model

The working model marks the moment at which narrative conjecture enters the operational realm. Within it, atmospheres, actions, and rhythms are translated into verifiable spatial conditions that can be observed, compared, and revised. This conception shifts the model away from its traditional role as a final stage of verification. Instead, it is understood as a medium of inquiry, capable of discovering and generating the project as it is being made [39].

This investigative condition of the model can be clarified further by considering its epistemological status. Smith [40] has shown that the architectural model should not be understood merely as a representative miniaturization of the building, but as a machine of thought capable of producing knowledge through operations of reduction, manipulation, and testing. In a convergent line of argument, Yaneva [41,42] has emphasized that models actively participate in the evolution of the project. They do not simply record prior decisions, but intervene in their reformulation by making visible material, structural, and spatial relationships that do not emerge with the same clarity in other media. From this perspective, the model does not merely translate an already resolved idea. Rather, it constitutes a medium through which design thinking becomes discussable, comparable, and transformable.

Understood as a project in itself, the model not only represents a prior idea, but also becomes an object of analysis and a support for thought. Its material and tactile specificity makes it possible to access properties that are difficult to grasp through two-dimensional media or early simulations. These include weight, texture, thickness, the behavior of light, resistance, and the relationship between mass and void. This experience places the student within a reflective practice in which hand, eye, and mind continuously adjust spatial hypotheses in real time.

From a pedagogical perspective, experimental model-making makes it possible to move from the abstract to the figurative by operationalizing the narrative imaginary through design categories such as function, form, site, technique, and signification. These categories facilitate synthesis and decision-making [43,44].

Furthermore, the model makes visible the formal precipitate of iterative processes and acts as a shared space of discussion, since it enables alternatives to be compared and spatial decisions to be collectively negotiated. In this sense, rapid and conceptual study models function as prospective devices. They isolate parameters, allow brief iterations, and encourage three-dimensional exploration without yet depending on exhaustive two-dimensional restitution.

Consequently, the model may be understood as a tactile and visual experience of shaping mass and void that brings the student closer to the lived dimension of built space, supports projective argumentation, and consolidates constructive learning from the earliest stages. Its pedagogical value lies precisely in this dual condition as both an instrument of exploration and an object of critique, which explains its continued centrality in architectural education [45].

3. Materials and Methods

3.1. Institutional Context and Study Design

The present study was carried out with the participation of instructors and first-year students in the Architecture program at the Universidad Técnica Particular de Loja (UTPL, Loja, Ecuador). From an institutional perspective, it is relevant to note that, following the curricular restructuring implemented in 2020, the program has been oriented toward a stronger integration of theoretical, design, and representational knowledge. Within this framework, the curricular units combine specific and transversal competencies through teaching plans that define learning outcomes, activities, and assessment mechanisms [46].

The experience was implemented in sections A and B of the courses Fundamental Concepts of Architecture and Descriptive Geometry, both of which have a duration of 16 weeks. However, the methodological intervention analyzed in this study was concentrated within a 12-week segment corresponding to the development of the narrative-based compositional exercise. A total of 48 first-year students participated, organized into 24 pairs. This resulted in 24 final proposals, together with a set of intermediate outputs, including sketches, diagrams, study models, and critique records, which constituted the empirical basis for the analysis.

From a methodological standpoint, the study is framed within a research-through-design approach. This approach assumes that knowledge emerges from reflective design practice and from its systematic analysis in real teaching contexts. It is grounded in Schön's [13] notion of reflection-in-action, according to which the studio is conceived as a space where thinking and making are continuously intertwined. Design decisions are therefore developed through successive cycles of action, evaluation, and reformulation. Within this context, the studio is understood as an active learning environment in which the interaction among experimentation, iteration, and collective critique is central to the construction of design knowledge [28].

Ethical Considerations and Academic Validation of the Instrument

The study was approved by the Ethics Committee of the Universidad Técnica Particular de Loja, and its development complied with the institutional criteria applicable to educational research involving student participation. In addition, all participants signed an informed consent form prior to the beginning of the activities analyzed in this article. In order to strengthen the academic consistency of the methodological device, the instrument and the working sequence were also reviewed and validated by an academic board composed of three faculty members in the field: Dra. Cecilia Cempini, Arq. Holger Cuadrado, and Dr. Yasmany García. This dual ethical and institutional–methodological validation helped ensure both the pedagogical relevance of the model and the adequacy of the observation and analysis procedures employed in the study.

3.2. *The Narrative–Analogical Project Model (MNAP)*

Within this context, the Narrative–Analogical Project Model (MNAP) was designed and implemented as a pedagogical structure that integrates narrative, graphic representation, and three-dimensional materialization within a sequential process that includes iterative returns. The model systematizes three fundamental domains of design learning: narrative as a generative structure, drawing as a cognitive device, and model-making as a medium of material inquiry.

Although these components have been widely developed independently in the literature—narrative as a tool for structuring spatial thought [25,32], drawing as a mechanism of cognitive externalization [4,5,29], and model-making as an instrument of design exploration [39]—their integration into a structured pedagogical model specifically oriented toward the early stages of architectural education constitutes the main contribution of this research.

In contrast to previous studies that address these dimensions in a fragmented manner, such as the use of storytelling to foster creativity in the architecture studio [1], or the incorporation of visual media such as film to stimulate spatial representation [47], the MNAP proposes an operational integration of narrative, representation, and materialization within a single design process.

Unlike Lee et al. [1], where narrative operates mainly as an ideation trigger evaluated at a single stage of the process, or Park and Kim [48], where visual stimuli inform spatial representation without a subsequent material verification phase, the MNAP introduces narrative as a structuring input that is carried—and assessed—across all five phases of the design sequence, from extraction to critical reflection. This continuity, rather than the use of narrative per se, constitutes the model’s main point of differentiation.

The model is grounded in three interrelated principles. First, narrative is understood as a generative structure capable of organizing actions, temporalities, and meanings. In this way, it allows spatial conditions to be anticipated before their formalization. The story does not act as an illustrative resource. Rather, it functions as a projective device that guides verifiable spatial decisions, such as sequences, rhythms, and thresholds. This approach converges with studies suggesting that storytelling may support process coherence and students’ ability to articulate complex spatial ideas.

Second, drawing is conceived as a cognitive device that allows thought to be externalized and iterative processes of reinterpretation to be activated. Research in design cognition has shown that sketching facilitates cycles of idea generation, evaluation, and transformation. It therefore constitutes an active medium of thought rather than a final representation. This role of drawing as a mediator between thinking and representation is consistent with approaches that emphasize the importance of visual communication as a support for design thinking in the studio.

Third, model-making is approached as a medium of material inquiry that enables spatial hypotheses to be examined through physical experimentation. The manipulation of mass, void, light, and materiality introduces concrete constraints that enrich spatial understanding and support informed decision-making. From a pedagogical perspective, this approach recognizes materialization as a constitutive part of the creative process rather than merely as a final stage of verification.

The model operates through three complementary cognitive mechanisms: imaginative activation, which enables the generation of mental images not conditioned by pre-existing formal references; the externalization of thought, mediated by drawing; and material validation, achieved through model-making, which introduces physical conditions that prompt the adjustment of spatial hypotheses. This sequence establishes a progressive transition from imagination to materialization and supports coherence between conceptual intention and spatial resolution.

3.3. Operational Structure of the MNAP

The MNAP is organized into five phases: narrative extraction, graphic translation, spatial abstraction, materialization, and critical reflection. These phases do not operate as a closed linear sequence. Rather, they function as an iterative system in which each stage feeds back into the previous ones, allowing continuous adjustments in response to the evolving design process. Figure 1 illustrates the iterative structure of the model and the relationships among its phases.

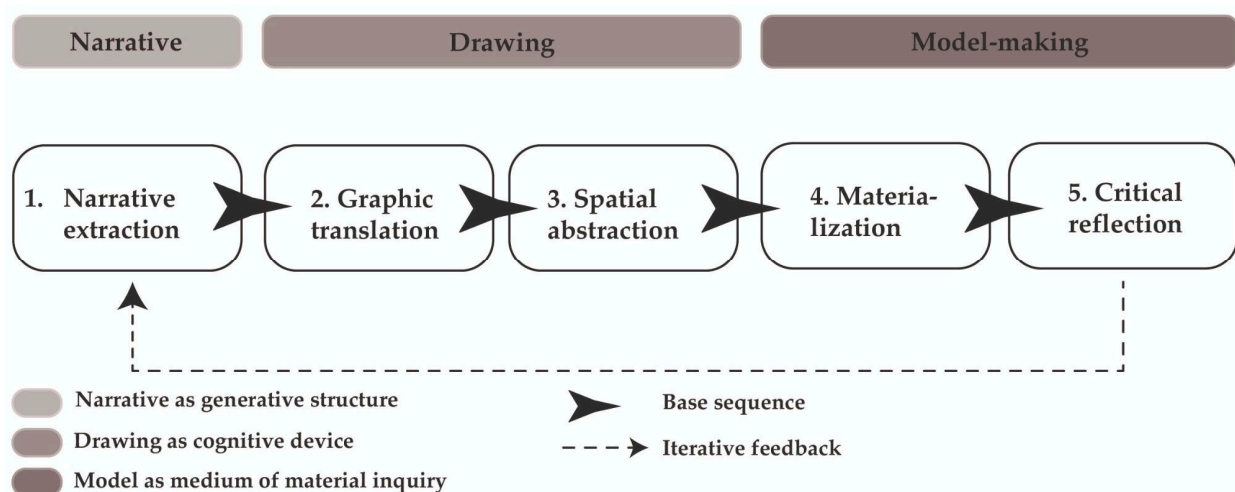


Figure 1. Sequential structure of the MNAP across its five phases, grouped into three cognitive domains—narrative, drawing, and model-making.

1. Narrative extraction consists of reading and interpreting narratives with a strong spatial and atmospheric charge. In this phase, each group selected one story from *Invisible Cities* by Italo Calvino [48] and identified actions, atmospheres, thresholds, rhythms, and implicit spatial relationships. The aim was to construct an initial interpretive framework capable of guiding the subsequent work.
2. Graphic translation consisted of the production of sketches, diagrams, and analog drawings. The aim was not to illustrate the text literally, but rather to externalize spatial ideas derived from the story and begin organizing relationships, sequences, limits, and hierarchies.
3. The spatial abstraction made it possible to synthesize narrative and graphic information into clearer compositional principles. At this stage, students worked on spatial

- organization, contrasts, rhythm, proportion, and the relationship between solid and void in order to transform narrative inputs into more defined spatial structures.
4. Materialization was developed through rapid, modifiable, and low-cost working models. At this stage, spatial hypotheses were tested three-dimensionally by incorporating issues of mass, void, light, thickness, and volumetric articulation. The model was not understood as a final verification tool, but rather as an instrument for exploration and adjustment.
 5. Critical reflection was carried out through collective critique sessions, peer discussion, and instructor feedback. During these sessions, the coherence between story, drawing, and model was examined, and iterative adjustments were made on the basis of explicit arguments.

Figure 2 illustrates the iterative process of narrative exploration and materialization in the studio. The model is used from the early stages as an exploratory instrument, while collective review sessions articulate narrative, graphic representation, and the three-dimensional object through iterative cycles of reflection-in-action. Panels (a–b) show the initial exploration through working models, in which the manipulation of mass and void operates as a cognitive instrument for translating narrative conditions into spatial relationships. Panels (c–d) show collective critique sessions that articulate story, graphic representation, and the three-dimensional object, thereby fostering cycles of adjustment based on reflection-in-action. Taken together, the sequence makes visible the transition from narrative interpretation to verifiable spatial decisions.

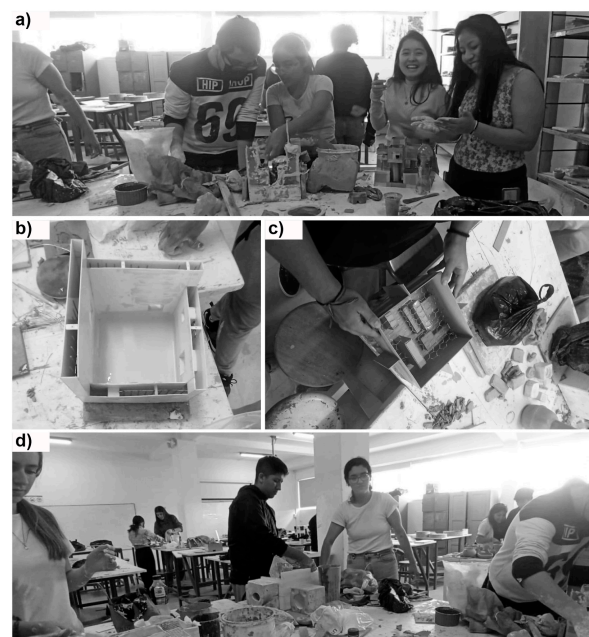
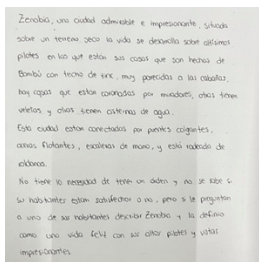
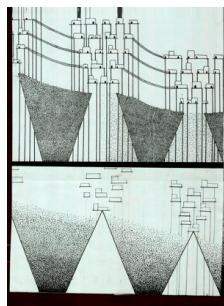
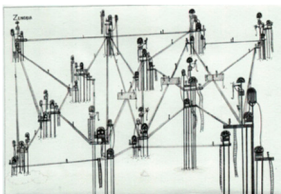
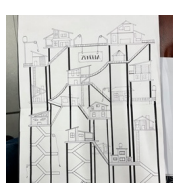
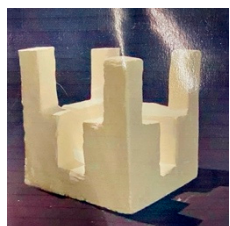
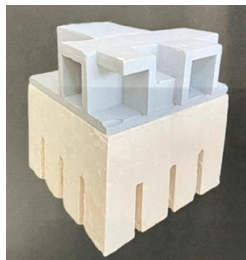


Figure 2. Process of narrative exploration and spatial materialization in Architectural Design Studio I. (a) Collaborative work during material experimentation. (b) Model as a device for spatial inquiry. (c) Design evaluation and adjustment (*reflection-in-action*). (d) Collective critique and narrative comparison session.

To illustrate the operational logic of the model through a concrete example, Table 1 traces the development of a representative case (Pair 13) across the five phases of the MNAP, based on the narrative of Zenobia from *Invisible Cities* by Italo Calvino.

Table 1. Step-by-step development of a representative case (Pair 13) across the five MNAP phases, from initial reading to the final proposal.

Phase	Student Action	Week 1 Initial Stage	Week 2 Intermediate Stage	Week 3 Final Proposal
1. Narrative Extraction	Student selects and expands the narrative source; identifies key spatial qualities (atmosphere, sequence, threshold).	 Pilotis/Reservoirs/ Water/Galleries		
2. Graphic Translation	First drawings translating narrative qualities into spatial diagrams, section concepts, or compositional sketches.			
3. Spatial Abstraction	Student extracts compositional principles (rhythm, hierarchy, void/mass); abstract spatial logic from the narrative.			
4. Materialization	Three-dimensional model or spatial prototype; material experiments exploring atmosphere (light, texture, scale).			
5. Reflection and Critique	Oral and written articulation of design decisions; peer critique and self-assessment of the narrative-spatial coherence achieved.	Early notes frame Zenobia's contradiction as the project's generative core: a city with no fixed order, whose pilotis, water cisterns and suspended galleries nonetheless sustain, in the inhabitants' own account, a coherent and contented way of living. The student questions how this tension between disorder and inhabited logic might be read spatially, rather than illustrated literally.	Peer and tutor critique at this stage notes that the totemic, figure-like translations still read as literal huts on stilts rather than as an abstracted spatial principle. The student is pushed to extract the underlying rhythm of solid and void implied by the pilotis structure, a shift already visible in the move from the additive block model toward the tower-like volumetric study.	In the final presentation, the student articulates the perforated cube and its fin-cut base as a single device: the base translates the rhythm of pilotis into alternating solid and void, while the porous upper volume reinterprets Zenobia's suspended galleries and dwellings. The narrative's productive contradiction—disorder that nonetheless sustains a contented collective life—is read as resolved in the coexistence of a dense, grounded base and an open, inhabitable upper structure.

As can be seen, these phases do not constitute a rigid progression. Rather, they form a dynamic system. In particular, the transition from graphic translation to materialization introduces a shift in cognitive regime: ideas cease to operate exclusively as abstract constructions and begin to be tested against physical conditions. This iterative behavior is consistent with contemporary approaches that emphasize the interaction among different representational media as a central mechanism of design learning, insofar as each medium not only communicates thought, but also transforms the thought that produces it.

3.4. Methodological Strategy and Analysis

The analysis of the process was developed through a qualitative approach aimed at understanding the evolution of design thinking within a real studio context. To this end, four main analytical dimensions were defined:

1. Narrative–spatial coherence: the correspondence between the attributes of the story and their translation into graphic and three-dimensional decisions.
2. Capacity for abstraction: the ability to synthesize narrative elements into spatial and compositional structures.
3. Representational clarity: the effectiveness of the graphic and material communication of the proposal.
4. Depth of iteration: the degree of reformulation observable across successive versions of sketches and models.

Data collection was carried out through direct observation of the process, analysis of outputs (sketches, diagrams, and models), collective critiques, and comparison among results developed from similar or identical stories. The procedure unfolded throughout the semester through iterative cycles of reading, interpretation, representation, materialization, and review. This made it possible to analyze not only the final products, but also the design trajectories and the mechanisms through which narrative, drawing, and model-making were articulated in the construction of spatial thinking.

In addition to direct observation of the process and the analysis of sketches, diagrams, and models, discursive evidence drawn from collective critiques and brief reflective statements produced by students during the exercise was also incorporated. These materials were used as complementary qualitative input for understanding how participants experienced the translation of the narrative into spatial and material decisions.

Like any situated investigation, the present study has limitations that should be made explicit. First, the selection of *Invisible Cities* by Italo Calvino introduces a reference belonging to the Western literary canon. However, the device was not oriented toward the reproduction of a predefined formal imaginary, but toward the activation of open interpretive processes centered on the construction of atmospheres and spatial imaginaries through reading. In this sense, the methodological interest of the exercise lay less in adherence to a specific cultural canon than in the possibility for each student to materialize a personal interpretation of the story.

Second, the study was conducted entirely in Spanish, the participants' native language and the working language of the studio, whereas the final article was written in English for the purposes of international academic dissemination. Accordingly, the analysis of the process and the outputs was carried out on materials produced in their original language, so that the translation of the manuscript did not alter the empirical basis of the study. In addition, the presence of a research team with different linguistic and cultural trajectories contributed to a comparative and critical reading of the concepts mobilized throughout the process.

Third, the study did not include a longitudinal follow-up of the effects of the model in subsequent courses. Its findings are therefore limited to the observation of performance

and changes in design thinking within the period under analysis. As a result, no claims are made regarding long-term impacts. These should be addressed in future research through comparative designs and extended cohort follow-up.

In order to mitigate the potential bias derived from the authors' dual role as instructors and researchers, the analysis relied on a triangulation strategy based on multiple sources of evidence: sketches, diagrams, models, photographic records of iterations, and collective critique sessions. This strategy was complemented by the prior validation of the methodological instrument by an academic board and by a retrospective evaluation conducted by two independent external evaluators.

Evaluation Rubric and External Assessment Procedure

In order to increase the traceability and replicability of the analysis, the four analytical dimensions defined in this study were operationalized through a four-level evaluation rubric (1 = incipient, 2 = basic, 3 = competent, 4 = advanced). The rubric was applied retrospectively to the full set of outputs produced by the 24 teams, considering sketches, diagrams, working models, photographic records of iterations, and evidence from collective critiques as a combined body of material.

The assessed dimensions are reported in Table 2.

Table 2. Rubric applied for the evaluation of student work.

Dimension	Level 1	Level 2	Level 3	Level 4
Narrative extraction	Weak or unidentifiable relationship between the story and the proposal	Partial references to the story	Consistent translation of several narrative attributes	Strong and sustained articulation between story, space, and materialization
Capacity for abstraction	Literal or weakly developed association	Partial synthesis	Clear abstraction of spatial relationships	Structured and operationally projective synthesis
Representational clarity	Low legibility	Partial legibility with ambiguities	Clear communication of organization and relationships	Precise, coherent, and integrated representation
Depth of iteration	Single version or minimal changes	Some limited modifications	Several iterations with significant adjustments	Substantive and progressive reformulations

To reinforce the traceability of the qualitative analysis, the rubric was applied retrospectively by two evaluators external to the teaching team to the 24 projects submitted by the student groups. Outputs corresponding to the initial, intermediate, and final stages of the exercise were assessed using a four-level scale for each analytical dimension. The results were used as a mechanism of triangulation and as a point of contrast for the interpretations derived from the analysis of the projects.

4. Results

The implementation of the Narrative–Analogical Project Model (MNAP) made it possible to observe a progressive transformation in first-year students' design thinking. This transformation became visible through the articulation of narrative, graphic representation, and three-dimensional materialization. From a pedagogical perspective, the exercise also highlighted the value of coordinating two courses: Fundamental Concepts of Architecture and Descriptive Geometry, around a shared design problem. This convergence enabled a more detailed reading of the conceptual, graphic, and spatial dimensions of the process. Feedback from complementary disciplinary perspectives appears to have supported a more complex reading of the work and a progressive refinement of the final outcomes. This interpretation is consistent with literature that emphasizes teaching and learning methods

that support design capacity, communication, reflection, and the articulation of thought throughout the design process.

Pair 13 was selected as a guiding case to illustrate the operational logic of the model in greater depth (Section 3.3, Table 1). Figure 3 situates this selection within the distribution of results across the entire cohort ($n = 24$; median = 2.88; IQR = 2.50–3.33). With a mean rubric score slightly above the median, Pair 13 represents neither the highest- nor the lowest-performing trajectory, but a representative case within the central tendency of the cohort.

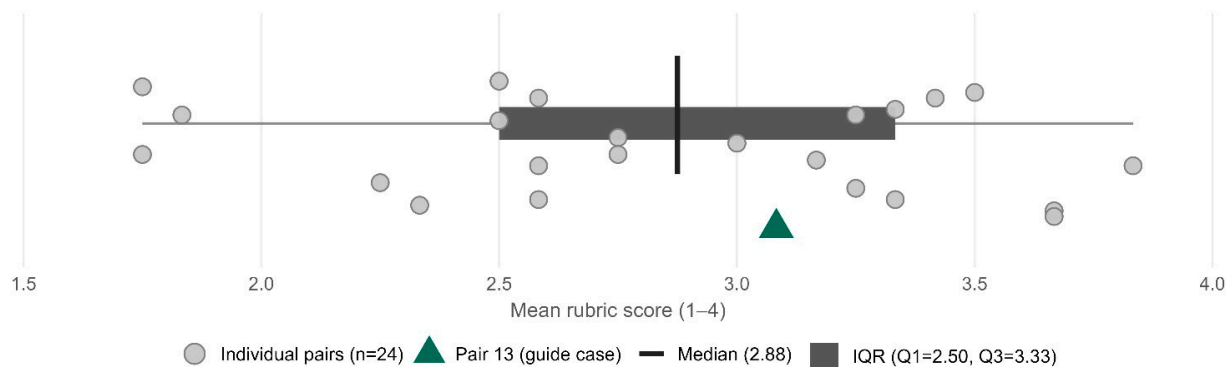


Figure 3. Distribution of rubric average scores across the 24 assessed pairs and selection of the guiding case.

4.1. Imaginative Activation and Interpretive Diversity

During the narrative extraction phase, the reading of spatially dense narratives appeared to activate imagination and to shift the starting point of the project from typological form toward lived spatial experience. Rather than beginning from prefigured solutions, students developed conceptual frameworks based on actions, atmospheres, sequences, and spatial relations. This initial openness was associated with a marked diversity of responses. The same story gave rise to substantially different spatial configurations. This suggests that narrative did not determine form directly but opened a field of projective possibilities.

This condition is particularly visible in Figures 4 and 5, where the first graphic translations show a clear interpretive divergence. In some cases, spatiality is constructed through fragmentation and verticality. In others, it is organized through horizontal stratifications, volumetric superpositions, or more compact and autonomous configurations. These graphic variations suggest that notions such as lightness, topographic rootedness, isolation, community, or expansion can be translated into very different spatial languages without losing coherence with the original narrative. This pattern is consistent with theoretical frameworks that understand creativity as a situated and non-linear process, shaped by each student's prior experience and cultural frame of reference [49,50]. From a semiotic perspective, the multiplicity of results may also be read as an expression of the interpretive openness of the text, here channeled into projective diversity [51].

4.2. Drawing as a Reorganization of Spatial Thinking

During the graphic translation phase, drawing appeared to function as a mechanism for the externalization and reorganization of thought. The sketches did not operate as literal illustrations of the narrative. Rather, they served as exploratory instruments through which students established preliminary spatial relationships and tested different ways of articulating atmosphere, sequence, materiality, and territory. The variability observed in Figures 4 and 5 suggests that the graphic process supported a form of controlled divergence. Starting from similar narrative conditions, students developed distinct spatial languages while maintaining a recognizable internal coherence in each case. In this sense, draw-

ing acted not only as a representational support, but also as a cognitive mediator that accompanied cycles of interpretation, selection, and synthesis.

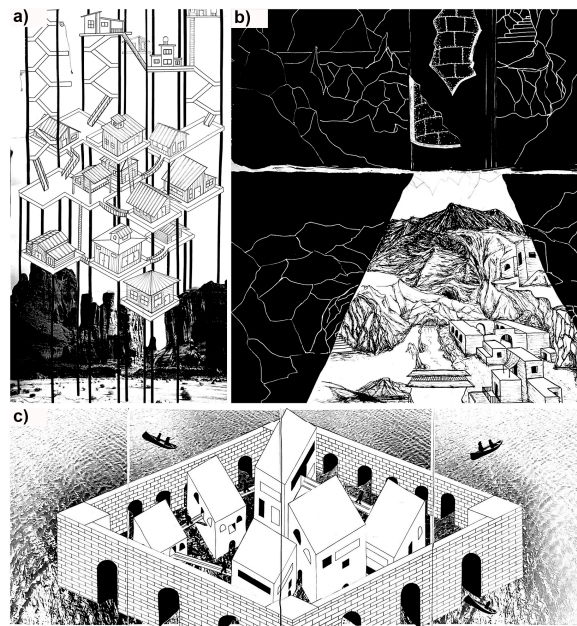


Figure 4. Narrative translations into architectural sketches I. Early sketch-based interpretations of atmospheric narratives. (a) Vertical assemblage of elevated dwellings supported by a dense system of pilotis, exploring suspension, layering, and precarious balance. (b) Topographic and sectional composition that contrasts excavation, elevation, and fragmented settlement across a dramatic landscape. (c) Enclosed spatial configuration organized around an inner cluster of houses, emphasizing containment, collective life, and the relation between architecture and surrounding water.

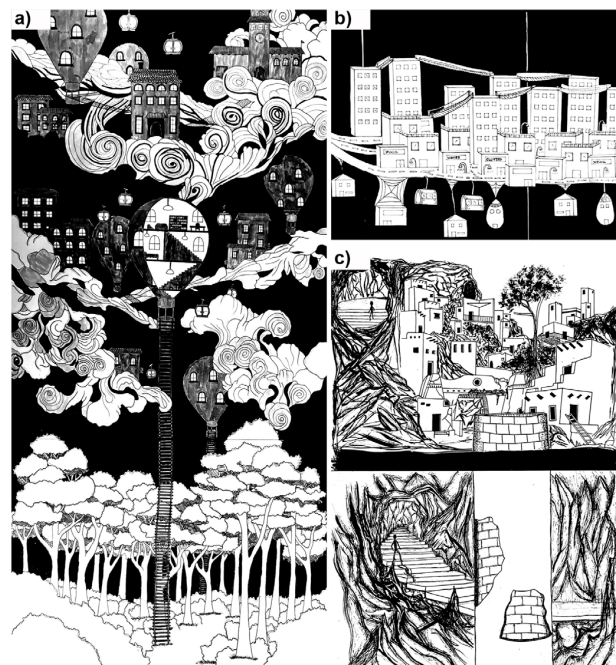


Figure 5. Narrative translations into architectural sketches II. Graphic variations that further explore the relationship between atmosphere, materiality, and territory. (a) Imaginary vertical city suspended among clouds and vegetation, highlighting ascent, elevation, and spatial fantasy. (b) Linear and stratified urban composition organized through suspended connections, emphasizing sequence, infrastructure, and layered occupation. (c) Topographic settlement embedded in the landscape, exploring the interaction between architecture, terrain, paths, and spatial depth.

The analysis of the collective critiques nevertheless revealed an asymmetry in the transferability of narrative components. More concrete descriptive elements such as light, relative scale, sequence, and thresholds, were translated more readily into drawing and, later, into model-making. By contrast, affects, emotional tonalities, and certain atmospheric nuances required more iterations before reaching a convincing formal expression. A progressive change was also observed in students' graphic expressiveness, particularly in their handling of contrasts, densities, and representational resources associated with different atmospheres. This pattern suggests that narrative may have functioned as a generative framework for early decisions without closing the field of exploration.

4.3. *The Model as a Turning Point and a Medium of Inquiry*

The phase of three-dimensional materialization appeared to mark a turning point in the design process. Rapid, modifiable working models made from simple materials enabled short make–look–adjust cycles. They also operated as instruments of formal inquiry rather than mere supports for verification. At this stage, students translated narrative atmospheres into abstract volumes in which mass, void, light, and matter began to define habitable space. Figure 6 shows the first volumetric translations, in which form emerges through the direct manipulation of material and the exploration of basic relationships between solid and void. These plaster models, preceded by cardboard studies, suggest a double temporality of the model. On the one hand, they record an immediate formal search. On the other, they condense a progressive reflection built through manual work.

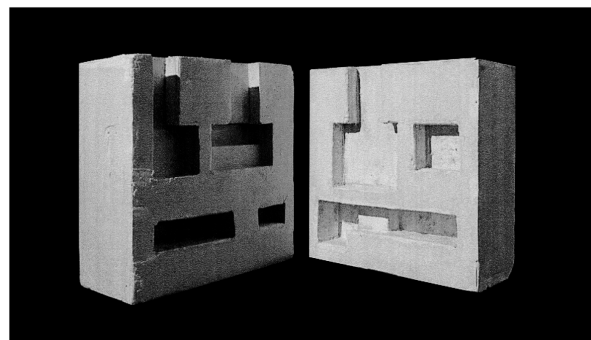


Figure 6. Initial volumetric translation of the narratives into mass-and-void models.

In the subsequent iterations, represented in Figures 7 and 8, the proposals evolved toward more complex configurations. These included structural relationships, excavations, aggregations, and more refined internal articulations. This development suggests a progressive understanding of the material and organizational implications of space. Design decisions appeared to respond not only to the original narrative intention, but also to concrete physical conditions. In this sense, the model no longer functioned as a passive translation of the drawing. Instead, it became a stage in which thinking and making were closely intertwined, in line with the logic of reflection-in-action. Taken together, Figures 6–8 suggest a process of design maturation in which the physical model operated as an engine of discovery rather than merely as a product.

4.4. *Public Critique, Argumentation, and the Collective Construction of Criteria*

The phase of reflection and critique further articulated narrative, drawing, and model-making. Public critique sessions appeared to support the development of argumentation, communication, and collaborative work. Each student was required to make explicit the transition between story, graphic decisions, and material choices, and to submit this process to review by peers and instructors. During these sessions, the models functioned

as cognitive mediators. Their materiality facilitated discussion regarding scale, proportion, atmosphere, and spatial coherence, while the original narrative re-emerged as a criterion for evaluating the project's underlying meaning. These practices are consistent with constructivist approaches that identify problem framing, iteration, and reflection as core dimensions of design learning [52]. They also resonate with the interdisciplinary tradition of the Taller de Arquitectura, where dialogue across media and domains expands the range of possible design decisions [53].

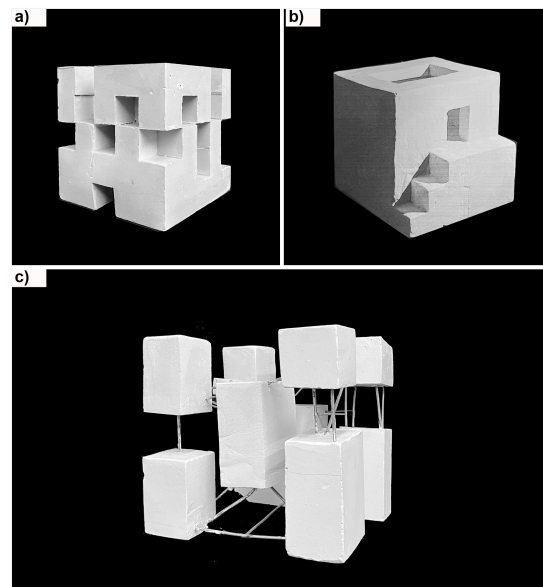


Figure 7. (a–c) Intermediate three-dimensional explorations: from the excavated block to the suspended structure.

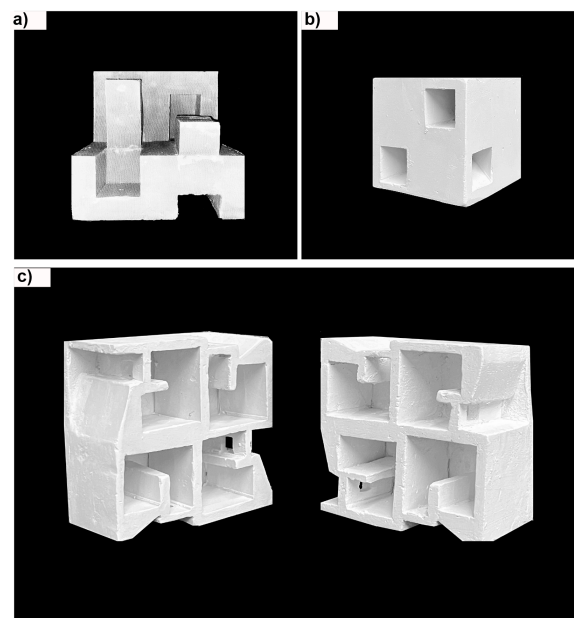


Figure 8. (a–c) Advanced spatial synthesis: operations of excavation, aggregation, and internal articulation.

More broadly, the comparison among proposals suggests that learning did not reside only in the production of a formal outcome. It also involved the progressive construction of criteria through the interaction among different representational media. Narrative activated imagination and organized the project's initial meaning. Drawing structured and

reformulated thought. The model introduced conditions of material validation. Public critique articulated these three dimensions within a reflective process of consolidation. Taken together, the results suggest that the MNAP not only supported the production of diverse solutions but also offered a framework for approaching design as a progressive construction of meaning rather than as the immediate search for a predetermined form.

4.5. Student Perceptions of the Process

The discursive evidence collected during critiques and in students' written comments made it possible to complement the reading of the design outputs with the experience expressed by the participants themselves. In general terms, these reflections suggest that the exercise was not perceived as a simple sequence of formal production. Rather, it was understood as a progressive process of interpretation, selection, and decision-making.

Three main perceptions emerged recurrently from the critique notes and the short texts produced during the studio. First, several students associated narrative with a way of entering the project through atmosphere and experience rather than through a preconceived form. As one participant stated, "starting from the story helped me think first about the atmosphere and not about the form." This observation suggests that narrative acted as a trigger for the construction of spatial imaginaries before the formal definition of the project.

Second, the comments indicate that the transition from sketch to model was perceived as a moment of spatial clarification. Certain relationships that remained ambiguous in the drawing became understandable once they were materialized. In the words of another student, "the model clarified spatially what was still confusing in the drawing." This perception is consistent with the process analysis, where materialization made it possible to verify proportions, paths, and spatial relationships that had previously been explored in more abstract terms.

Third, collective critiques were valued as instances that allowed students to make explicit and justify decisions that had initially emerged in an intuitive way. Some participants noted that the need to explain their proposals to the group helped them recognize connections between the original story and the design decisions they had adopted. This appears to have supported the argumentative dimension of their projects.

Taken together, these student reflections support the interpretation that the MNAP not only encouraged the production of diverse solutions but also made visible to participants themselves the transition between reading, representation, and materialization. From this perspective, design learning did not end with the attainment of an outcome. It also involved a gradual awareness of the relationship between story, space, and projective decision-making.

These materials were subjected to an inductive thematic analysis, with coding kept close to participants' own wording to minimize interpretive distance, aimed at identifying recurring themes related to atmosphere, spatial clarity, transitions between representational media, and the value of collective critique. The convergence between these perceptions and the findings derived from the analysis of sketches, diagrams, and models provides a form of qualitative triangulation that supports the interpretation of the results presented.

5. Discussion

The results suggest that narrative can play a structuring role in introductory architectural design education, not as an auxiliary or merely expressive resource, but as a generative device that helps organize the design process from its earliest stages. In this sense, the Narrative–Analogical Project Model (MNAP) offers evidence consistent with the first hypothesis, according to which the short story facilitates the transition from initial abstraction toward a more structured spatial understanding by activating sequences, atmospheres,

and relationships that precede architectural formalization. Rather than producing forms directly, narrative appears to establish a framework of meaning from which students begin to construct projective criteria.

This interpretation extends previous studies that have addressed storytelling in the architecture studio mainly as a strategy for stimulating ideation or communication. In particular, Lee et al. [1] showed that narrative can support the development of coherent spatial ideas and communicative competencies. However, such approaches tend to concentrate on the conceptual phase of the process. By contrast, the MNAP proposes an operational integration of narrative, representation, and materialization. This suggests that the pedagogical value of the story may increase when it is inserted into a sequence of projective mediations rather than being restricted to the initial moment of ideation.

Comparison with other approaches further clarifies the specificity of the model. Studies such as those by Park and Kim [47] have explored the use of visual media, such as film or image-based stimuli, to activate spatial thinking. Other works have examined the role of storytelling in the generation of initial concepts. The MNAP differs from these precedents in that it does not treat narrative as an isolated trigger, but rather as the first link in an iterative system in which each medium transforms the thinking set in motion by the previous one. Thus, narrative does not replace drawing or model-making but appears to orient them. Drawing does not merely represent but seems to reorganize. The model does not simply verify but introduces material conditions that prompt reformulation. The principal originality of the model therefore lies in the structured articulation among these three domains.

From this perspective, the second hypothesis also finds partial support in the findings. The empirical evidence suggests that narrative mediation was associated with greater narrative–spatial coherence among story, sketch, and model, enabling initially intangible content to be translated into verifiable design decisions. This translation, however, was not homogeneous. As observed in the results, the more explicit variables of the story—such as sequence, threshold, relative scale, and hierarchy—proved more readily transferable than those associated with atmosphere or emotional charge. This asymmetry suggests that narrative does not automatically become architecture but instead requires specific mediations in order to acquire projective operability. For this reason, drawing and model-making appear to be indispensable within the MNAP.

The role of drawing as a cognitive device becomes central here. The results suggest that the sketches did not function as illustrations of the text, but rather as instruments of abstraction, reorganization, and selection of spatial relations. In other words, drawing seems to have supported the transition from narrative content toward a first operative structure of space. This interpretation is consistent with the literature on design cognition, which has defined sketching as an active medium of thought rather than a mere representational support. Within the framework of the present study, this function may be described through two observable categories: capacity for abstraction, understood as the synthesis of narrative elements into spatial structures, and representational clarity, understood as the effectiveness with which relationships, contrasts, and sequences are communicated graphically.

The materialization phase introduced a shift in cognitive regime and offers further support for the second hypothesis. The incorporation of rapid, modifiable working models turned narrative exploration into a process of material validation, in which mass, void, light, balance, and thickness prompted the revision of previous hypotheses. At this point, the model shows affinities with the tradition of the physical model as a medium of inquiry and, more specifically, with the experience of Ricardo Bofill's Taller de Arquitectura, where the physical model ceased to be a presentation device and became an instrument of ideation [53].

The difference is that, within the MNAP, the model is not activated by a strictly formal problem, but by a narrative that has already been filtered and reorganized through drawing. This may help explain why depth of iteration, observable in the succession of versions and adjustments, becomes a key category for understanding projective learning in this study.

The third and final hypothesis is likewise supported, although cautiously, by the findings. The articulation of narrative, sketch, model, and public critique appears to have influenced not only the quality of the proposals, but also the development of transversal competencies, particularly in terms of argumentation, communication, and critical reflection. Collective critique required students to make explicit the relationship between story, graphic decisions, and material decisions, submitting their proposals to the scrutiny of peers and instructors. In this respect, the models functioned as cognitive mediators of discussion, while narrative reappeared as a criterion by which the coherence of the project could be evaluated. This observation is consistent with recent studies on collaborative learning in architecture studios, where instructors identify collaboration as a factor that can support creativity, problem-solving, and professional preparedness, while also warning of barriers related to coordination and pedagogical mediation [54].

From a pedagogical standpoint, the findings suggest the value of incorporating a narrative scaffold based on four operational components: brief readings with strong spatial charge, analog sketching sessions oriented toward deriving verifiable parameters, rapid models understood as tools of inquiry rather than verification, and critiques guided by focal points of reflection. In this respect, the model enters into a dialogue with the literature on project-based learning in architecture, which has suggested that situated projects and applied working dynamics may improve student engagement and support competencies such as critical thinking, collaboration, and communication. In a recent study on architectural curriculum, Latto [55] emphasizes that PBL offers a valuable alternative to methods centered on theoretical transmission by engaging students in authentic and collaborative projects that mobilize complex professional skills. In the case of the MNAP, this project-based learning logic appears to be enriched by an explicit narrative dimension that helps structure the meaning of the process from its outset.

Nevertheless, the implementation of the model also reveals tensions and limits. The principal one concerns the balance between the interpretive freedom offered by narrative and the conceptual rigor demanded by architectural design. The results suggest that, without sustained pedagogical mediation, the initial openness of the story may lead to suggestive but insufficiently structured solutions from a spatial standpoint. In accordance with Choi and Kim [56], the role of the instructor is not to restrict imagination, but to guide its translation through questions, comparisons, and reviews that help consolidate projective coherence. From this perspective, evaluation should not rely on general judgments about “creativity,” but rather on observable categories such as narrative–spatial coherence, capacity for abstraction, representational clarity, and depth of iteration.

Finally, the study’s limitations must be acknowledged. It is based on an experience developed within a specific institutional context, without a control group and drawing primarily on qualitative evidence. This restricts the generalizability of the findings. To this must be added potential effects associated with the course, the instructor, and the novelty of the methodological device. Nevertheless, the internal consistency of the findings, their correspondence with previous literature, and the operational clarity of the model suggest that the MNAP may have a considerable degree of transferability to other contexts of introductory architectural education. Taken together, the discussion suggests that the articulation among narrative, representation, and materialization may constitute a productive pedagogical path for addressing one of the central challenges of early design training: constructing a solid bridge linking imagination, representation, and space.

6. Conclusions

The systematic incorporation of narrative, and particularly of the short story, into introductory architectural design education appears to constitute a relevant pedagogical strategy for activating the early configuration of design thinking and for orienting decision-making from the initial stages. The findings suggest that, when used as a generative structure, the story does not function as a rhetorical embellishment, but rather as a device that helps organize actions, temporalities, and atmospheres. In this way, it shifts the starting point of the design process from typological form toward the lived situation. In formative terms, this displacement appears to support the crossing of a threshold of understanding characteristic of the first year and to be associated with the quality of the explorations and the narrative–spatial coherence of the outcomes.

The principal contribution of this research lies in the formulation of the Narrative–Analogical Project Model (MNAP), which appears to articulate narrative, graphic representation, and materialization within an iterative learning system, based on the evidence gathered in this study. Unlike approaches that address these dimensions in a fragmented way, the model proposes their operational integration. This suggests that design thinking may be constructed through the continuous interaction of imagining, representing, and materializing. Within this framework, narrative activates the process, drawing helps organize and reformulate ideas, and model-making introduces conditions of material validation through which spatial decisions may be adjusted and consolidated.

The working model appeared to function as a medium of inquiry rather than merely as a tool of representation. Its use made it possible to test hypotheses derived from the story, compare alternatives, and refine decisions through brief cycles of making, observing, and correcting. In this transition, the story–sketch–model sequence articulated conceptual thinking and materiality without foreclosing the productive indeterminacy characteristic of the initial phases. At the same time, collective critique sessions seem to have supported the development of transversal competencies such as argumentation, communication, and collaboration. This suggests that design learning is not limited to the production of forms but also involves the construction of meaning and the explicit articulation of criteria.

The study nevertheless points to significant challenges. The main one lies in the difficulty of translating intangible aspects of the story into concrete spatial decisions. This tension suggests that narrative does not automatically become architecture but instead requires deliberate pedagogical mediation to balance interpretive freedom with the conceptual rigor demanded by the project and to avoid arbitrary solutions. In this respect, the role of the instructor appears to be central in guiding the process, sustaining critical reflection, and accompanying the transformation of initial intuition into projective structure.

The limitations of the study, arising from its qualitative character and its application in a specific institutional context, call for caution in the generalization of the findings. Accordingly, future research could advance through comparative studies with control groups, the design of mixed instruments capable of assessing more precisely the evolution of early spatial thinking and narrative–spatial coherence, and the longitudinal tracking of the transferability of this model to more advanced courses.

Taken together, the findings suggest that placing narrative at the origin of the design process may constitute a replicable pedagogical innovation that contributes to the articulation of conceptual thinking, representation, and material exploration in early architectural education. In this sense, the MNAP offers not only a teaching strategy, but also an operational framework for understanding and supporting the development of spatial thinking in contemporary design education contexts. Rather than introducing an additional expressive resource, the MNAP proposes a reorganization of early design learning through the articulation of story, representation, and materialization.

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