Cultivation Pathways of Narrative Spatial Thinking in Short Video Set Design: A Design Thinking Framework-Based Approach

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Abstract

The rise of the micro-drama industry has imposed new competency demands on set design professionals, the core of which lies in a specific design cognition—"narrative spatial thinking," the ability to translate script texts into spatial solutions. At present, interior design pedagogy still predominantly focuses on static functional space training, and the systematic cultivation of this ability remains insufficient. Drawing on the five-stage model of design thinking, this study deconstructs narrative spatial thinking into three teachable sub-competencies—text translation, emotional spatialization, and sequence organization—and develops three corresponding pedagogical tools. Through an 8-week quasi-experiment, the experimental group significantly outperformed the control group in three dimensions—narrative clarity, emotional expressiveness, and creative novelty—and exhibited more systematic and reflective design thinking characteristics. This path provides an operable and scalable practical framework for teaching narrative spatial design.

Keywords

Narrative Spatial Thinking; Short-video Set Design; Pedagogical Path.

1. Introduction

1.1. Research Background and Problem Statement

The explosive growth of the micro-drama industry requires set design to integrate narrative atmosphere, character emotion, and cinematic language within limited space, the core of which is narrative spatial thinking [1]. However, interior design education concentrates on static spaces such as residential and commercial typologies, emphasizing formal aesthetics and drafting standards while lacking training in narrative translation from script to space [2]. Although design thinking can cultivate complex problem-solving abilities, its application in spatial pedagogy often remains at the level of process imitation without deep coupling with narrative tasks [3]. Embedding design thinking into set design education to establish narrative thinking from text to space has thus become key for interior design education to respond to industry demands. Focusing on the narrative spatial thinking required for short-video set design, this study explores a cultivation path through the design thinking framework, offering a teaching solution for the integration of design and new media industries.

1.2. Research Purpose and Significance

In response to the absence of narrative translation training, this study employs the five-stage model of design thinking as a framework to construct a cultivation path for narrative spatial thinking in short-video set design. It deconstructs this thinking into sub-competencies such as text translation and emotional spatialization, maps them onto the stages of design thinking, develops supporting tools and processes, and tests their effectiveness through a quasi-experiment. Theoretically, the study breaks through the positioning of design thinking merely as a generic procedure. For the first time, it deeply couples design thinking with narrative spatial thinking, broadening the theoretical boundaries of spatial design education and

responding to the call for domain knowledge integration [4]. Practically, it closely targets the industry's talent gap, providing replicable and scalable solutions for teaching short-video set design, immersive exhibitions, and similar fields. Distinct from digital-intelligence technology empowerment approaches, it explores competency development from the ontology of thinking, offering a "thinking-centered" alternative paradigm for aligning design education with emerging demands.

1.3. Definition of Core Concepts

This study defines three core concepts. First, short-video set design refers to scene construction for vertical-screen micro-dramas, centered on rapidly narrating, evoking emotions, and adapting to camera shots through spatial form, materials, lighting, and furnishings. It is essentially narrative-driven, constrained spatial design, a definition that inherits digital narrative analysis while focusing on short-video filming [5]. Second, narrative spatial thinking is the designer's ability to extract spatial requirements from texts and translate narrative elements into spatial sequences and atmospheres, decomposable into three sub-competencies: text translation, emotional spatialization, and sequence organization. Inspired by "making thinking visible," it focuses on spatial translation [6]. Third, design thinking pedagogy uses the EDIPT five-stage model as a framework, engaging students in cognitive iterations through a structured process to cultivate complex problem-solving and innovation capabilities. This study precisely maps this model to the aforementioned sub-competencies, forming a specialized cultivation path for short-video set design. These three concepts are interrelated, constituting the terminological foundation of this research.

1.4. Research Content and Methods

The research content consists of three parts: First, competency decomposition and pathway design, which, through theoretical analysis and expert consultation, deconstructs narrative spatial thinking into three sub-competencies and maps them to the five stages of design thinking to form a "five-stage coupling" teaching path. Second, teaching tool development and process design, which involves creating supporting tools and planning an eight-week progressive teaching process. Third, quasi-experimental verification, which employs a design-based research paradigm within a professional course. The experimental group receives narrative thinking-oriented instruction, while the control group receives traditional function-oriented instruction, with effectiveness examined through pre- and post-tests, work analysis, journal coding, and interviews. Methodologically, the study is anchored by design-based research for iterative optimization, supplemented by the quasi-experimental method for comparing effectiveness, utilizes content analysis to process design journals, and captures in-depth feedback through semi-structured interviews. This system connects competency decomposition, pathway construction, and empirical verification, addressing the shortcoming of emphasizing theory while neglecting rigorous validation. Digital tools serve only an auxiliary role.

2. Theoretical Foundation and Analytical Framework

2.1. The Five-Stage Design Thinking Model and Its Educational Applicability

Design thinking, as a human-centered innovation methodology, features the EDIPT five-stage model—Empathize, Define, Ideate, Prototype, and Test—developed by the Hasso Plattner Institute of Design at Stanford as its most influential process model. This model guides users from fuzzy problems through iterative cycles of divergent exploration and convergent focusing to produce innovative solutions. Its essence lies in externalizing designers' implicit cognitive activities into teachable, operable steps, thereby reducing the cognitive load of complex problem-solving and enabling creative thinking to be trained within a standardized

framework. Its validation in education has been quite extensive: In the K-12 stage, it serves as a scaffold for project-based learning to cultivate students' empathy and collaboration skills, while in higher education, it is embedded in interdisciplinary curricula such as engineering, business, and medicine to enhance complex problem-solving abilities. However, most existing applications remain at the level of imitating the generic process, lacking deep coupling with domain-specific knowledge systems. For interior design pedagogy, the real value of design thinking lies in the precise mapping of its stages to spatial design tasks—Empathize corresponds to understanding users' spatial needs, Define to refining core design goals, Ideate to the divergent exploration of solutions, Prototype to visualization through sketches and models, and Test to driving solution evaluation and iteration. It is precisely this compatibility that provides the methodological basis for introducing design thinking into the cultivation of narrative spatial thinking for short-video set design in this study.

2.2. Theoretical Sources and Competence Deconstruction of Narrative Spatial Thinking

The theoretical roots of narrative spatial thinking lie at the intersection of spatial narratology and cognitive psychology. Spatial narrative theory posits that space is by no means a passive container for stories but an active narrative medium that carries plot advancement, character shaping, and emotional transmission; cognitive psychology, in turn, provides the theoretical basis for its trainability. Accordingly, narrative spatial thinking can be deconstructed into three teachable and measurable sub-competencies: text translation ability, which involves identifying spatial cues from linguistic texts such as script dialogues and plot synopses and translating them into preliminary design constraints; emotional spatialization ability, which refers to matching abstract emotional elements—such as the story's emotional tone and characters' inner states—to concrete design languages like material, color, lighting, and scale; and sequence organization ability, which involves arranging the narrative flow across multiple scenes, realizing a temporal narrative experience through the cadence and rhythmic transitions of space. These three are interlinked, forming an operationalized framework for narrative spatial thinking and providing clear competency targets for the subsequent construction of the cultivation path.

2.3. The Intrinsic Coupling Logic between Design Thinking and Narrative Spatial Cultivation

An intrinsic cognitive coupling exists between the five stages of design thinking and the three sub-competencies of narrative spatial thinking, which serves as the logical foundation for the "five-stage coupling" cultivation path: The Empathize stage corresponds to text translation training, the Define stage initiates emotional spatialization, the Ideate stage unfolds divergent training for emotional spatialization, the Prototype stage completes the initial integration of sequence organization ability, and the Test stage verifies and refines it. This coupling breaks free from the convention of superficially applying design thinking as a generic methodology, achieving a precise alignment between the process framework and professional competencies.

3. Design and Implementation of the Teaching Path

3.1. Overall Framework and Phased Tasks of the Teaching Path

The overall framework of the teaching path adheres to the principles of spiral progression, task-driven learning, and making thinking visible. It integrates the five stages of design thinking with the three sub-competencies of narrative spatial thinking into three progressive phases, spanning a total of 8 weeks and 16 credit hours. Foundational training takes place in Weeks 1-2, focusing on Empathize and Define, and primarily targeting text translation ability. Students are required to deconstruct spatial cues from the script and utilize a Script-Space

Mapping Table to translate textual information into design constraints. Core training is arranged for Weeks 3-5, concentrating on Ideate and Prototype, and focusing on training emotional spatialization ability. The Emotion-Material Mapping Cards are used to guide students in matching abstract emotions to concrete languages such as materials, colors, and lighting, leading to the completion of a conceptual model for a single narrative scene. Comprehensive training unfolds in Weeks 6-8, centering on prototype refinement and testing, with a key focus on developing sequence organization ability. Through Narrative Flow Sketching, students extend single scenes into continuous spatial sequences, which are then verified through simulated filming. The three phases are interconnected through staged outcome presentations and peer reviews, forming a spiraling upward progression mechanism that promotes the gradual construction of narrative spatial thinking.

3.2. Teaching Strategies and Tool Development

To make the training process of narrative spatial thinking visible and tangible, this study designed three teaching strategies with accompanying tools, drawing on the methodology of "Making Thinking Visible and Transformable," which transforms abstract thinking into perceivable and implementable outcomes. The stepwise text-to-space translation strategy relies on the Script-Space Mapping Table, guiding students during the Empathize and Define stages to deconstruct spatial cues from the dialogue item by item into design parameters, thus transforming vague textual feelings into clear design constraints. The emotion-form analogical mapping strategy leverages Emotion-Material Mapping Cards, which compile an association matrix linking common narrative emotions with design variables such as materials and colors, helping students rapidly generate diverse spatial atmosphere proposals to counteract cognitive biases and mindset rigidity. The narrative visualization strategy for spatial sequences utilizes Narrative Flow Sketching as a tool, requiring students to annotate camera angles and spatial transition nodes on sequential sketches, facilitating the testing of narrative effects through simulated filming. All three tools adhere to the principles of low technological barriers and high thinking visibility, with the focus consistently placed on the externalization and calibration of the thinking process.

3.3. Teaching Experiment Design and Data Collection

To verify the cultivation effectiveness of the "five-stage coupling" teaching path, this study conducted a nonequivalent groups quasi-experiment using two intact classes from the Interior Design program at Liaoning Communication University. The experimental group (30 students) received the narrative spatial thinking cultivation path, while the control group (29 students) followed traditional function-oriented set design instruction. Both groups' teaching period lasted 8 weeks with 16 credit hours. The experiment comprised a pre-test, teaching intervention, and post-test. In the pre-test, students were asked to draw a spatial design sketch based on a given micro-drama script, which was blind-reviewed and scored by three industry experts across three dimensions: narrative clarity, spatial emotional expressiveness, and creative novelty. During the teaching intervention, the experimental group sequentially completed three progressive training modules, while the control group conducted functional analysis and rendered effect drawings. For the post-test, a new micro-drama script was used, requiring both groups to submit a complete set design proposal including a conceptual model and a short simulated filming video, which was again blind-reviewed by the same expert panel. Data collection encompassed pre- and post-test work scores, student design journals, semi-structured interviews, and classroom observation notes. Quantitative data were analyzed using independent-samples t-tests for between-group differences, while qualitative data were processed through content analysis to extract themes.

4. Summary

The study demonstrates that narrative spatial thinking can be deconstructed into three teachable and measurable sub-competencies—text translation, emotional spatialization, and sequence organization—providing clear competency targets for narrative spatial design pedagogy. Based on the cognitive coupling between the five-stage design thinking model and the three sub-competencies, the "five-stage coupling" cultivation path constructed in this study genuinely achieves a deep integration of the generic methodological framework with professional competencies. Students in the experimental group scored significantly higher than the control group in the post-test across all three dimensions—narrative clarity, spatial emotional expressiveness, and creative novelty. Moreover, design journals and interviews revealed that their design processes were markedly more systematic and reflective. Simultaneously, the three developed supporting teaching tools facilitate the externalization and visualization of narrative spatial thinking with low technological barriers, effectively alleviating students' cognitive load in ambiguous problem situations and reinforcing the intrinsic consistency between design solutions and narrative intent. Consequently, a transferable teaching framework has been established at the level of thinking ontology. However, the sample was drawn from only a single institution and of a small size, so its external validity awaits testing across multiple contexts; the eight-week teaching intervention period is far from sufficient to assess long-term retention and transfer effects; and evaluation still relies primarily on subjective expert ratings, necessitating the development of objective quantitative tools. Future research can advance in several directions: conducting multi-institutional joint experiments to verify the universality of the cultivation model; extending the tracking cycle to examine the durability and transferability of the effects; developing standardized assessment tools to enhance evaluation objectivity; and cautiously exploring the integration of AI with the teaching path, for instance, using large language models to assist in script analysis, while remaining highly vigilant against the erosion of thinking subjectivity by technology, ensuring that the learner's core cognitive engagement always remains central in human-computer collaboration.

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