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GESTALTUNG CREATIVITY OF THINKING AND PRACTICE: CASE STUDY SPACE CREATION OF LEARNERS IN DEPARTMENT ART AND DESIGN

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Abstract: This study focused on the state of three-dimensional creations presented in Gestaltung creativity, and analyzed the thinking and practice of the learners in the art and design departments. Spatial installation art is the most accessible art form to people in everyday space, conveying the aesthetics of life. In visual culture, it is assumed that the most integral part of creative learning is not about the knowledge of rational cognition, but the ability to understand, narrate, and create.

This study adopted the case study method to explore the creative practice-oriented perspective and Gestaltung creativity, and to examine the relationship between thoughts and actions. Various means were reflected through creative learning in the case study. Firstly, learners could acquire sensory ability through diverse perspectives within the groups and combine that with group creation. Secondly, spatial installation art could provide creators with the experience of various practical spatial scenarios, which helped create feelings and meanings. Lastly, there were restrictions imposed by the group and the environment, which may provide the creators with the opportunity of developing diverse shape thinking, spatial relationships, and the use of media.

Keywords: Creative thinking, Gestaltung creativity, Spatial installation art, Creative practice research

1 INTRODUCTION

The spatial concepts of three-dimensional creation have gradually transformed and expanded under the influences of modernism and multiculturalism. Beginning with the structural foundation of sculpture itself, the field has shifted from fully solid "closed spaces" toward the construction of "open spaces" through hollow forms and material-based structures. This transformation has increased the diversity of sculptural forms in the modern era, extended spatial concepts, and expanded the possibilities for creative expression. As urban environments continue to evolve, numerous artistic forms that integrate contemporary sculpture with everyday living spaces have emerged.

In the process of art and design creation, form generation is an essential and irreplaceable component during conceptual development [1]. The formal qualities within creative concepts are regarded by most creators as a key medium for creative thinking. Creators frequently use forms and symbols to represent their ideas, considering them primary methods for communicating conceptual designs with others during ideation.

As a university educator in sculpture and three-dimensional creation, the researcher recognizes that hands-on practice, material awareness, and tool operation significantly influence creative development. However, many learners—when engaging in creative thinking—still begin from imitation or two-dimensional conceptualization. Therefore, examining learners' subjective experiences and the diversity of their creative thought processes becomes a crucial foundation for investigating form-making creativity.

Integrating educational perspectives regarding "creative processes (self-expression and creativity)" and "thinking about artworks as products, processes, and social dynamics" enables a shift away from narrow notions of self-expression that focus solely on personal inspiration. Instead, it promotes richer conceptual expression, visual communication, and broader reflection on social, historical, and cultural contexts throughout the creative process. Form-making not only reflects the aesthetic and conceptual intentions of creators but also serves as a means through which they interpret, understand, and resolve issues related to artistic and design communication.

2 LITERATURE REVIEW

This literature review examines the relationship between thinking and practice, situating three-dimensional creation within contemporary contexts and its involvement in the development of form-making creativity. Accordingly, four theoretical foundations structure this review: "Imagination Process," "Creative Thinking," "Form-Making Creativity," and "Measurement of Form."

2.1 Imagination Process — The Aggregation of Form-Making Elements

Imagination is a psychological activity directed toward non-existent objects, involving a series of fantasy-like transformations that form mental structures transcending external reality [2]. It involves reorganizing existing mental images into new ones, reconstructing concepts by drawing on basic sensory perceptions.

When imagination becomes manifest as form, creative thinking plays a crucial role. How forms are produced—and how thinking constructs them—raises important questions.
This process involves dissociation and association :

- *Dissociation* breaks apart complex entities into different imaginative elements.
- *Association* integrates elements into unified forms of varying quantities, types, and structures.

Imagination makes invisible things representable through structured perceptual and cognitive processes such as mental representation, memory, and reasoning [3].
In artistic and design creation, form generation is a language of conceptual expression—transforming ideas into visible imagery through hand–eye interaction on paper or within spatial environments. Imagination, based on images derived from memory, produces new conceptual forms and is tightly connected to early conceptual development.
Creators assert that form generation is linked to innovation and creativity, as early ideation is inherently imprecise and directionally fluid further observed that spontaneous form-making behaviors, together with stable visual or spatial structures, serve as evaluative references during subsequent design stages.
Thus, the goal of form-making is to concretize the mental imagery emerging in the creator's mind, using visual representation to communicate ideas—a process known as the concrete act of form generation.
Through form generation, creators rapidly test various ideas on paper or using three-dimensional materials, constructing unexpected virtual worlds. Most creators consider visual forms a primary medium for conceptual thinking, using forms and symbols to represent ideas and communicate design concepts. Form-making is therefore essential in conceptual development [4], serving both as a reflective record of aesthetic intention and as a process through which creators interpret and solve artistic or design-related problems.

2.2 Creative Thinking — The Relationship Between Concept and Practice

Integrating related research, proposed that cognitive processes in form generation include recognition and transformation. In recognition, creators search and identify previously seen images, encode these observations, and retain them in short-term memory. In transformation, creators search long-term memory for principles that allow them to transform the recognized forms into new ones.
Research on cognitive processes in form generation highlights that imagery develops part by part [5].
Emphasized that visual thinking during form generation involves oscillation between "seeing as" and "seeing that," enabling creators to reinterpret existing shapes, identify features, and stimulate creative associations.

2.3 Form-Making Creativity — The Contemporary Significance of Three-Dimensional Creation

Contemporary art with a visual-culture orientation not only discusses artistic forms of visual products but also the cultural expressions embedded in visual methods. These include the perceptual, cognitive, and analytical issues resulting from the interaction between ideas, objects, and visual experience [6].
This involves examining six cultural dimensions—information and codes, sources and receivers, channels of transmission, and meaning/content [7]—and understanding how meaning emerges through interactions within specific socio-historical contexts.
Art becomes part of education because creative activity carries profound socio-cultural significance beyond its formal qualities [8]. Materials, techniques, and forms are essential to stimulating creativity in three-dimensional practice, as creators' cultural awareness, spatial perception, and social environments shape their understanding of objects and lived spaces.
Mastery of material properties fosters the ability to apply them effectively. Three-dimensional creation reflects human industrial development; although ideas determine form, materials, tools, and techniques are interdependent factors affecting the realization of those ideas. Three-dimensional creation is also closely linked to multi-sensory spatial perception—comprising touch, sight, and bodily experience—which parallels the creative process. The works examined in this study—three-dimensional spatial installations—thus integrate conceptual development, material manipulation, and the evolving expressions of art and design learners.

2.4 Measurement of Form — A Practice-Led Research Perspective

Practice-led research can be defined as research that begins from practice, identifying problems, challenges, or questions arising from practice itself. Research strategies are implemented through practice, using methodologies familiar to practitioners. Such research is associated with postmodern orientations that acknowledge non-linearity, dynamic systems, change, and uncertainty—principles aligned with structuralist paradigms.
Within artistic, design, and architectural professions, research acts as a tool for inquiry and evaluation [9].
Practice-led research not only incorporates practice into the research process—it uses practice to guide research. This approach emphasizes holistic engagement because creative practice is continuous, connected, and non-fragmented. Practitioners–researchers do not merely think through problems; they resolve them through their practice [10]. Practice-led research thus values investigations grounded in real-world contexts and reflective engagement, producing meaningful outcomes for both practitioners and researchers.

3 RESEARCH METHODS

This study adopts a qualitative case study approach to investigate a specific phenomenon. Qualitative research typically involves the examination or exploration of a plan, event, process, or social group. Its purpose is to seek holistic description and interpretation, and it is particularly suitable for situations in which the variables of a phenomenon cannot be separated from their contextual environment. Qualitative case studies are concerned with insight, discovery, and interpretation rather than hypothesis testing. Data collection and analysis are primarily based on qualitative techniques, although numerical processing may also be used as a supplementary tool [11]. Qualitative research is fundamentally descriptive; the researcher is concerned with process and meaning, and the goal is to approach and restore the essence of the phenomenon as closely as possible.

3.1 Research Participants

The cases examined in this study consist of students enrolled in the “Three-Dimensional Creation Practice” course in the Department of Fine Arts (48 students) and the “Advanced Design Practice” course in the Department of Design (43 students) at T University. The research participants were those involved in a shared course unit titled “Environmental Installation Creation.” The study observed and recorded the learning and creative processes of these students, and reflected upon them to understand and analyze the creative conditions of 10 group projects (a total of 91 participants) from the two departments who took part in this joint unit.

3.2 Participating Observers

Given the importance of accurately analyzing students’ works, and in order to avoid potential bias arising from the dual role of the researcher as both instructor and analyst (such as expectation effects), this study invited three university teachers with teaching and creative experience in related fields to participate in the observation and discussion of student works.

Giorgi suggests that at least three participants should be involved in phenomenological analysis, as the diversity among them helps distinguish individual experiences from more common or ordinary experiences of the phenomenon. To reach the essential structure of a phenomenon, a sufficient degree of variability is necessary; thus participation by at least three analysts is recommended, and in some cases, a single case may be enough to reflect a more general phenomenon.

Through collaborative assessment and subsequent discussion, all observers applied the same evaluation criteria, while maintaining independent interpretations and analyses. When convergent results are obtained across independent raters regarding students’ learning performance, inter-rater reliability is achieved, thereby significantly enhancing the overall trustworthiness of the study [12].

3.3 Research Setting

The research was conducted primarily in the classrooms, exhibition halls, and outdoor spaces on the campus of T University. In addition to regular class hours, students also made use of an intensive creative workshop to carry out practical work. Throughout the course, emphasis was placed on communication and interaction among group members, as well as on guidance, assistance, and consultation between instructors and learners during the creative process.

Digital teaching platforms and social media were used to facilitate close, multi-directional communication between group members and instructors, including message exchanges and the sharing of reference materials and documentation.

In summary, “conceptual thinking,” “creative process,” and “textual/visual documentation” are all closely related to practice. Practice-related research is guided by theory, in which theoretical inquiry precedes practice. In contrast, practice-led research emphasizes narrating the creative process, making it transparent, and thus “restoring” the thinking and creative processes of art or design practitioners. All decisions in creative thinking and problem-solving—along with the methods used—are carefully recorded and reflected upon. This is the practical meaning of “seeking essences.”

In this view, the creative process is the research process. Research begins with practice, uses practice to solve problems, and takes creation itself as the core of knowledge production. For art and design practitioners, understanding the distinctions among these types of research can help them carefully consider the characteristics of their own work and develop appropriate research plans before embarking on practice-led inquiry.

4 OBSERVATION RESULTS AND ANALYSIS

Practice-based research emphasizes generating new knowledge through practice, with such knowledge made manifest through practical outcomes. While written descriptions help clarify the work, the artwork itself remains indispensable—text alone cannot fully convey meaning without being examined in relation to the work.

Practice-related research, grounded in theoretical perspectives, can take two forms.The first is concept-driven research, which prepares theoretical content relevant to practical work, developing concepts prior to initiating practice—thus content-driven.The second is reflection-driven research, which begins by examining material forms in preparation for conceptual development; this is known as medium-driven research [13]. In medium-driven reflective research, different artistic expressions may be compared—for example, how artists working with similar materials or genres develop common themes, or how the particularities of materials and styles influence expression. The goal is to cultivate the researcher’s individual thematic direction, enabling them to begin their own artistic practice.

In this study, both content-driven thinking and medium-driven material/style perspectives are used to evaluate and trace learners' creative thinking, material–space expressions, and their behavioral patterns in creative learning. The analysis comprises two levels: (1) cognitive and operational processes and (2) presentation of works (outputs).

To restore the creative process, three types of documentation—conceptual thinking, creative process, and textual/visual records—were used as contextual research samples, including written notes, sketches, video recordings, and final works.

This analysis proceeds as follows:

1. Observing tendencies of horizontal and vertical thinking, describing creators' flexibility in shifting between these modes during idea transformation.
2. Identifying search patterns in creative ideation to understand conceptual strategies.
3. Analyzing transitions between "seeing" and "doing" to understand the interactive process between observation and action.

Finally, the developmental trajectory of form-making is analyzed based on the overall cognitive–operational patterns.

The presentation of works is analyzed using descriptive and interpretive phenomenology, focusing on:

(1) the development of creative thinking,

(2) material application, including operational fluency and responsiveness, and

(3) spatial relationships, examining how creators' conceptualization interacts with space.

A limitations analysis concludes the section, integrating observations, textual data, and image-based documentation to identify creators' perceptions, subtle behavioral phenomena, and emerging themes for future research.

4.1 Cognitive and Operational Processes

4.1.1 Tendencies in vertical and horizontal thinking

According to definitions of horizontal and vertical thinking, each group's tendency was identified by analyzing the proportion and frequency of these two modes during form-making. A strong correlation was found between horizontal–vertical thinking shifts and the search patterns used for idea generation.

When a group relied solely on vertical thinking, their ideation followed a linear search pattern.

- Design groups tended to focus on a single theme and direction, moving directly from "thought → concept," emphasizing specific details such as forms and colors.
- Art groups, in contrast, moved from "images → concepts," exploring a wider range of themes and showing a more balanced combination of horizontal and vertical thinking.

Notably, as the number of forms produced increased, creators increasingly relied on horizontal thinking.

4.1.2 Creative search analysis

Using classification of three idea-generation types, the study examined search patterns during conceptual development. These correspond with the optimal search strategies proposed.

- Art groups tended to use expanding–contracting search during the ideation stage, then shifted to oscillating-parallel search during production. They struggled to narrow the conceptual scope but maintained both divergent and convergent cycles.
- Design groups used oscillating-parallel search during ideation but shifted to linear search during production, refining a single concept. However, linear search inhibited horizontal exploration and led to early conceptual rigidity.

Thus, each group's chosen strategy and search space greatly influenced their creative flexibility.

4.1.3 Transitions between "seeing" and "doing"

See–Move–See model and related creative-behavior research, observations revealed significant differences in creators' transitions between "seeing" and "doing."

Across all groups, the frequency of "doing" exceeded that of "seeing," especially actions involving building or adjusting forms.

Differences in "seeing":

- Design groups
  - During 2D composition: frequent "seeing" actions focused on fine-tuning spatial arrangements.
  - During 3D production: minimal "seeing," emphasizing efficient execution of pre-planned structures.
- Art groups
  - During 2D composition: fewer "seeing" actions, reflecting abstract and uncertain conceptual development.
  - During 3D production: extensive "seeing," focusing on confirming forms and adjusting materials in relation to space.

Differences in "see–do cycles":

- Design groups: many cycles during 2D planning; few during 3D execution (efficiency-focused).
- Art groups: few cycles during 2D planning; many cycles during 3D production (material–space exploration).

4.2 Presentation of Works

Ten group cases were coded:

- Art groups → A1–A5
- Design groups → D1–D5

Three creativity dimensions were analyzed: creative thinking, material application, and topology (spatial relationships).

4.2.1 Creative thinking

From final works, creators' clarity in defining design problems and seeking solutions was assessed.

- Art groups
  - Intuition-driven, long divergent-thinking phases
  - Many sketches, abstract and less detailed
  - Techniques remained experimental before production
  - Creativity centered on divergence
- Design groups
  - Rationality-driven, short divergent phases
  - Fewer sketches, but highly detailed
  - Defined concrete final forms before production
  - Creativity centered on convergence

Three observed correlations:

1. Sketch quantity and sketch complexity → negative correlation
2. Sketch quantity and horizontal thinking → positive correlation
3. Sketch complexity and horizontal thinking → negative correlation

4.2.2 Material application

- Art groups explored materials, with long experimental phases and frequent changes to initial plans. Their works showed high complexity and diversity of details.
- Design groups had predetermined materials and methods, used efficient division of labor, and rarely altered plans. Their works had lower complexity and more representational forms.

Reason:

- Art groups → horizontal thinking, organic abstract forms, high experimentation
- Design groups → efficiency-driven, conservative experimentation, strong completeness but low diversity

4.2.3 Spatial relationships (topology)

- Art groups
  - Materials acted as the expressive core
  - Themes and materials were integrated
  - Works were strongly dependent on environmental space
- Design groups
  - Materials played a supporting role
  - Themes dominated material expression
  - Works were spatially independent, with environment serving as backdrop

Art groups demonstrated stronger material–space linkage; design groups showed higher completeness and efficiency but weaker spatial integration. Art groups often achieved completeness later but exhibited richer experimentation due to longer "seeing" phases.

4.3 Limitations of the Study

Because participants were selected by group structure, representativeness and sample size were limited (10 groups, 91 students). Lack of an experimental–control design limited internal validity, making the study susceptible to historical effects [14]. Participation in external courses may have affected outcomes. Nevertheless, pre–post repeated assessment still offers meaningful and representative insight [15].

4.3.1 Group variables in the creative process

The 18-week time constraint required instructors to offer guidance during early presentations, which may have influenced outcomes. Both art and design groups agreed that form-making behaviors effectively supported divergent thinking.

Differences between groups reflected disciplinary orientations:

- Design → clear goals, concrete forms, problem-solving efficiency
- Art → abstract/organic forms, exploratory thinking, conceptual expansion

Vertical thinking tended to produce single ideas and early rigidity; group discussion dynamics may have also obscured less vocal members' contributions.

4.3.2 Tacit and implicit creative knowledge

Tacit knowledge refers to things we know but cannot fully articulate. Creation relies heavily on tacit knowledge, tied to "knowing through doing" [16]. Some groups displayed inconsistent patterns that could not be clearly categorized—these reflect implicit or tacit processes. While difficult to generalize, such knowledge is significant for innovation and should not be overlooked [17]. Subtle behaviors, perceptions, and responses revealed through documentation point to valuable directions for future inquiry.

5 CONCLUSIONS AND RECOMMENDATIONS

Reviewing the overall research process, the discussion is organized into three major conclusions, four recommendations, and reflections for future research.

5.1 Conclusions

5.1.1 Three dimensions of form-making creativity identified through the 3D creation process

Analysis of the three-dimensional creative process indicates that form-making creativity can be articulated through three interrelated dimensions:

1. Creative Thinking

– The observation of and entry points into the creative theme reveal the trajectory and transformation of creative reasoning.

2. Material Application

– Understanding the properties and characteristics of materials allows creators to consider how to transform them into appropriate techniques and methods for production.

3. Spatial Relationships

– By responding to spatial layout and environment, creators evaluate how the work is presented in situ and adjust differences in expressive form.

Among these three, the understanding and scope of the creative theme within creative thinking exert the most critical influence on the final depth and breadth of the work, indicating a close relationship between conceptual meaning and the quantity/complexity of forms produced.

5.1.2 Cycles of "horizontal–vertical thinking," creative search patterns, and the see–move–see model

Analysis of the creative processes and creative search patterns of art and design student groups reveals that they employ different modes of creative thinking. Whether leaning toward divergence or convergence, or toward horizontal or vertical thinking, these modes are perceived by creators as unavoidable in the process of ideation. The findings include:

1. Idea-generation modes influence creativity and early conceptual development.

When a group's idea-generation pattern leads to early formation of a relatively complete creative plan, yet yields only a small number of formal variations, the process tends to favor vertical thinking and linear search. This significantly constrains creative performance in later production stages.

2. The ratio of horizontal to vertical thinking reflects the breadth and clarity of thematic exploration.

Indicators of conceptual complexity can be used to assess creators' understanding of the theme and their use of materials. The degree of production complexity reflects the depth of their comprehension of the theme.

3. Each of the three creative search perspectives is suitable for different creative stages and requires flexible switching.

Reliance on a single search mode easily leads to cognitive rigidity, making it difficult for creativity to unfold.

4. Temporal records of the creative process highlight the importance of switching between horizontal/vertical thinking, search patterns, and See–Move–See cycles.

The relationships among creative thinking, material application, and spatial relationships form a continuous process of iteration and adjustment, demonstrating that creation itself is a constant movement from ambiguity toward clarity through ongoing evaluation and correction.

5. The thematic boundaries defined within creative thinking largely determine material application and spatial relationships.

Since material use and spatial configuration occur at the level of execution under the guidance of creative thinking, most adjustments—once the basic framework is set—are limited to details and localized modifications.

6. The quantity of ideas or forms does not by itself guarantee fluency in conceptualization.

In some cases, ideas arise before conscious deliberation; they are formed prior to careful reflection. Therefore, the amount of creative output cannot be taken as a direct indicator of fluency. Instead, analyses must trace the interaction between thought processes and observable outcomes in individual cases.

5.1.3 Holistic consideration of "material application" and "spatial relationships"

The study found that the two disciplinary groups exhibited material-use habits shaped by their departmental training:

- Design groups frequently used wood-based boards, which are also common in their other 3D courses. This habit influenced their approach in installation projects, leading to direct material appropriation and straightforward structural construction.
- Art groups, through their "mixed-media practice" courses, emphasized the possibilities of materials, which encouraged diverse material choices and experimentation and reduced the likelihood of habitual use of a single medium.

In terms of spatial relationships, a continuous connection with material use was observed:

- Because design groups worked mainly with wooden boards—easy to assemble and structurally stable—they often created relatively independent, self-contained forms that could be placed freely in space, with minimal dependence on site-specific characteristics. Consequently, the relationship between work and environment tended to be more distant.
- Art groups, by contrast, used materials such as strings, cords, and recycled glass fragments, which are soft and structurally unstable on their own. These required attachment to existing architectural structures or objects, using techniques such as weaving, hanging, and adhering. As a result, their works displayed high subordination to site characteristics and a strong, intimate relationship with space.

5.2 Recommendations

5.2.1 Balancing group creation

Creativity is a holistic construction in which different roles contribute to the fullest expression of ideas. Creative processes benefit from a relaxed atmosphere in which learners are free to express and communicate. In group activities, the development of ideas depends on the free exchange of opinions; thus, instructors should encourage open expression and communication to foster creative behavior.

Before initiating creative projects, instructors should be fully aware of both the visible progress of each group and the invisible dynamics of communication. In collaborative creation, the most important goal is not merely the final product, but the integration of various creative ideas into the process. Attention should be paid to each stage and related context rather than overemphasizing competition or unconscious conformity.

Because groups are composed of diverse individuals, it is important not only to cultivate shared creative goals but also to develop the capacity to accept and understand different opinions within the group. Every learner exists as a distinct, real individual, and this diversity should be recognized as a crucial part of the learning process.

5.2.2 Feedback between teaching and learning in creation

With regard to the relationship between creative themes, reflective thinking, and practice, this study found that most actions during the creative process are meaningful, whether explicit or implicit. Observers often interpret the overall value and meaning of creativity based on final outcomes. However, throughout the process, many internal cognitive activities—though not outwardly visible—are essential in supporting the external manifestation of the work. These inner processes, rich in content and potential, are often overshadowed by the final result.

The expression of creativity reveals individual modes of thinking, emotion, and feeling, and requires interaction and guidance to be fully realized. Therefore, when teaching creation, instructors should seek to understand learners' feelings, thoughts, and modes of creative expression, and actively support the development of their creativity. Creative potential cannot be achieved through a single learning experience; rather, it should be cultivated through multiple creative cycles and opportunities for feedback and evaluation across different projects.

5.2.3 Observing creative practice in context

From the perspective of creative practice, this study recommends that both process (thinking and operation) and output (work presentation) be considered.

Key aspects include:

- Idea generation and conceptual development
- Form-making and visual/ textual planning
- Experimental use of materials and techniques
- The relationship and resonance between 3D works and spatial environments

Theoretical and practical dimensions mutually inform each other across all stages of creation—from the development of ideas and recording of forms to discussion and critique. Objective descriptions of material and spatial characteristics intersect with the subjective consolidation of creative cores. Group interpretations of environment, individual perceptions, and technical experimentation in unfamiliar media all contribute to problem-solving and learning.

Theoretically, both multi-material and single-material creative activities have complementary value in the context of learning and teaching. The use of multiple media not only offers learners a wider range of expressive possibilities but also stimulates their thinking about material properties and fosters diverse creative expressions. From the perspective of material–environment integration, learners' creative works engage not only with personal themes but also with environment, social context, and external influences.

Thus, the learning motivation that arises is natural and empathetic; creative thinking and action become an application and internalization of life experiences. When learners cannot resonate with materials or context, it is difficult to stimulate creative expression.

In summary, form-making, textual articulation, and conceptual ideation gradually reveal the context of creation. Transparent exchange of opinions clarifies multiple intentions and leads to the emergence of a coherent creative plan. Beyond producing works, the process is crucial for cultivating creators' self-awareness. This is a defining characteristic of practice-based research in art and design.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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