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Exploring Creative Thinking and Practice through Gestaltung: A Case Study of Spatial Design Learning in Art and Design Departments

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Abstract

This study explores the development of creative thinking and practical ability in spatial design learning through the concept of Gestaltung. Focusing on learners in art and design departments, the research examines how creative ideas are generated, transformed, and realized through hands-on spatial creation processes. Using a qualitative case study approach, this research analyzes students' learning experiences, design processes, and completed works to investigate the relationship between creative thinking, material practice, and spatial formation. The findings indicate that creative thinking in spatial design learning is not a linear process but an iterative interaction between conceptual imagination and practical execution. Through continuous experimentation with materials, forms, and spatial relationships, learners gradually construct personal creative strategies and design logic. The concept of Gestaltung serves as a critical framework that integrates thinking and practice, enabling learners to perceive spatial creation as a dynamic process of formation rather than a fixed outcome. This study contributes to art and design education by highlighting the pedagogical value of process-oriented spatial creation and offers insights into how creative thinking can be effectively cultivated through integrated design practice.

Keywords— Gestaltung, Creative Thinking, Spatial Design Learning, Art and Design Education, Design Practice.

I. INTRODUCTION

The spatial concepts of three-dimensional creation have continuously evolved under the influence of modernism, post-industrial development, and multicultural contexts. Beginning with the structural foundations of sculpture, spatial creation has shifted from fully solid and enclosed forms toward open, relational, and material-based spatial constructions. This transformation not only expanded formal diversity but also redefined how space is perceived, constructed, and experienced in contemporary art and design practice.

Within art and design education, spatial creation is no longer understood merely as the production of objects, but as a process of formation (*Gestaltung*) in which creative thinking, material engagement, and spatial awareness interact dynamically. As urban environments and lived spaces increasingly intersect with artistic practice, learners are required to negotiate conceptual ideas through hands-on experimentation, material decision-making, and site-responsive spatial organization.

Form generation plays a critical role during early conceptual development and is widely regarded as a primary medium through which creative thinking operates [1]. Rather than functioning solely as a representational outcome, form-making serves as a

cognitive and practical process through which ideas are explored, tested, and transformed. Creators rely on visual and spatial forms to externalize internal thinking, enabling communication, reflection, and further conceptual development throughout the creative process.

From the perspective of higher education in art and design, this study emerges from the researcher's long-term engagement in teaching sculpture and three-dimensional creation. While hands-on practice, material awareness, and tool operation are essential components of spatial learning, many learners initially approach creative thinking through imitation or two-dimensional conceptualization. This gap highlights the need to examine how learners experience spatial design learning through practice, and how creative thinking is gradually constructed through iterative interaction with materials and space.

By integrating educational perspectives on creative processes and viewing artworks as products, processes, and socio-cultural practices, this study moves beyond narrow interpretations of creativity as individual inspiration. Instead, it emphasizes creative learning as a process of Gestaltung, where thinking and practice continuously inform each other. Form-making thus becomes not only an aesthetic activity, but a mode of inquiry through which learners interpret, negotiate, and resolve artistic and design-related problems within specific spatial and cultural contexts.

II. LITERATURE REVIEW

This literature review examines the relationship between creative thinking and practice within the context of three-dimensional creation, situating form-making creativity in contemporary art and design education. Rather than treating thinking and making as separate stages, this study approaches three-dimensional creation as a process of formation (*Gestaltung*), in which imagination, cognition, material engagement, and spatial perception continuously interact.

Accordingly, four theoretical foundations structure this review: Imagination Process, Creative Thinking, Form-Making Creativity, and Measurement of Form. Together, these perspectives establish a conceptual framework for understanding spatial design learning as an integrated and iterative process linking thinking and practice.

2.1 Imagination Process — The Aggregation of Form-Making Elements

Imagination is a psychological activity directed toward non-existent objects, involving a series of transformative mental operations that transcend immediate external reality [2]. Through imagination, existing mental images are reorganized and reconstructed, allowing new concepts to emerge from basic sensory perceptions.

When imagination becomes manifest as form, creative thinking plays a crucial mediating role. The question of how ideas are translated into form—and how thinking structures this translation—lies at the core of form-making as a process of Gestaltung. This process typically involves two complementary mechanisms: dissociation and association. Dissociation breaks complex entities into distinct imaginative elements, while association recombines these elements into unified forms of varying quantities, types, and structural relationships.

Imagination enables invisible ideas to become representable through perceptual and cognitive processes such as mental imagery, memory, and reasoning [3]. In art and design practice, form generation functions as a language of conceptual expression, transforming abstract ideas into visible and spatial configurations through hand–eye coordination on paper or within three-dimensional environments. These imaginative operations are closely connected to early stages of conceptual development, where ideas remain fluid, tentative, and open to transformation.

Previous studies suggest that form generation is intrinsically linked to innovation and creativity, as early ideation is often imprecise and directionally unstable. Spontaneous form-making behaviors, together with emerging visual or spatial structures, provide creators with reference points for evaluation and further development during subsequent design stages. From this perspective, form-making serves not only to materialize mental imagery but also to support reflection, comparison, and decision-making.

Thus, the goal of form-making is to concretize imaginative content through visual and spatial representation. Through iterative engagement with sketches, models, or three-dimensional materials, creators rapidly test and revise ideas, constructing provisional worlds that evolve through practice. Visual forms and symbols become primary media for conceptual thinking, allowing creators to externalize thought, communicate intentions, and address artistic or design-related problems [4]. In this sense, imagination and form generation together constitute the foundational layer of Gestaltung in spatial creation.

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2.2 Creative Thinking — The Relationship Between Concept and Practice

Research on creative cognition in form generation emphasizes that creative thinking emerges through continuous interaction between recognition and transformation. In the recognition phase, creators identify and encode previously encountered images, retaining them in short-term memory. In the transformation phase, they draw upon long-term memory to reinterpret these images and apply underlying principles to generate new forms.

Studies of form-generation processes indicate that imagery develops incrementally rather than holistically [5]. Visual thinking unfolds through partial adjustments and successive reinterpretations, allowing creators to refine ideas through practice. This dynamic process has been described as an oscillation between "seeing as" and "seeing that," in which creators alternately reinterpret forms and confirm emerging structures. Such oscillation enables creative associations to arise through ongoing interaction between perception, cognition, and action.

Within spatial design learning, creative thinking therefore cannot be separated from practice. Instead, it is constructed through repeated cycles of observation, manipulation, and reflection. This reciprocal relationship between concept and action aligns with the notion of Gestaltung as a formative process, in which thinking evolves through engagement with material and spatial conditions rather than preceding them as a fixed plan.

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

Contemporary art informed by visual culture extends beyond the analysis of visual products to encompass the cultural meanings embedded in visual practices. These include perceptual, cognitive, and interpretive processes arising from interactions among ideas, objects, and lived visual experiences [6]. Understanding form-making creativity thus requires attention to broader socio-cultural contexts.

This perspective involves examining multiple cultural dimensions—such as information and codes, sources and receivers, channels of transmission, and meaning or content [7]—through which visual meaning is constructed and communicated. In art and design education, creative activity carries socio-cultural significance that extends beyond formal aesthetics, positioning three-dimensional creation as both a pedagogical and cultural practice [8].

Materials, techniques, and forms play a critical role in stimulating creativity within spatial practice. Learners' cultural awareness, spatial perception, and social environments shape how they engage with objects and spaces. Mastery of material properties enables creators to transform ideas into realizable forms, while tools and techniques mediate this transformation. Three-dimensional creation is also deeply connected to multi-sensory spatial perception, involving touch, sight, and bodily movement. These sensory engagements parallel the creative process itself.

Accordingly, the three-dimensional spatial installations examined in this study integrate conceptual development, material manipulation, and spatial responsiveness. They exemplify how form-making creativity emerges through the interaction of thinking and practice within spatial design learning contexts.

2.4 Measurement of Form — A Practice-Led Research Perspective

Practice-led research is characterized by inquiry that originates in practice itself, identifying questions and challenges that arise through creative activity. Research strategies are implemented through making, drawing upon methodologies familiar to practitioners. Such approaches acknowledge non-linearity, uncertainty, and change, aligning with postmodern and process-oriented research paradigms.

Within artistic, design, and architectural disciplines, research functions as a tool for inquiry, reflection, and evaluation [9]. Practice-led research does not merely incorporate practice as an object of study; rather, it treats practice as a primary mode of knowledge production. Creative activity is understood as continuous and interconnected, requiring holistic engagement rather than fragmented analysis.

Practitioner–researchers therefore do not resolve problems solely through abstract reasoning but through reflective action within practice itself [10]. By documenting and analyzing creative processes as they unfold, practice-led research makes visible the formation of ideas, decisions, and meanings. This perspective is particularly suited to examining spatial design learning, where creative thinking is constructed through material engagement and spatial interaction. As such, the measurement of form in this study is grounded in practice as a process of Gestaltung, linking theory, action, and reflection.

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III. RESEARCH METHODS

This study adopts a qualitative case study approach to investigate spatial design learning as a process of Gestaltung, focusing on how creative thinking is constructed and transformed through practice. Qualitative research is particularly suited to exploring processes, experiences, and meanings embedded within specific contexts. It enables holistic description and interpretation when the variables of a phenomenon cannot be separated from their social, material, and spatial environments.

Rather than testing predefined hypotheses, qualitative case studies emphasize insight, discovery, and interpretation. Data collection and analysis in this study are primarily qualitative, supported where appropriate by supplementary numerical information [11]. As a descriptive research approach, the focus is placed on understanding processes and meanings, with the aim of approaching and restoring the essential structure of the phenomenon—namely, the interaction between thinking, practice, and spatial formation in art and design learning.

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. Participants from both departments took part in a shared instructional unit titled *Environmental Installation Creation*, which served as the primary learning context for this research.

This study observed and documented students' learning and creative processes throughout the unit, with particular attention to how ideas were generated, materialized, and spatially configured through practice. A total of ten group projects, involving 91 participants across the two departments, were selected for in-depth analysis. These cases provided comparative insight into how different disciplinary backgrounds shape creative thinking and practice within spatial design learning.

3.2 Participating Observers

To ensure accurate analysis of students' works and to reduce potential bias arising from the researcher's dual role as instructor and analyst, three university teachers with teaching and creative experience in related fields were invited to participate as observing analysts. Their involvement supported multiple perspectives in the interpretation of creative processes and outcomes.

According to Giorgi, phenomenological analysis benefits from the participation of at least three analysts, as variability among observers helps distinguish individual experiences from more general structures of the phenomenon. Such diversity contributes to identifying essential patterns within creative practice. In this study, all observers applied shared evaluation criteria while maintaining independent analytical viewpoints.

Through collaborative discussion and comparison, convergent interpretations across observers were identified. When independent raters reached similar conclusions regarding students' learning performance and creative behavior, inter-rater reliability was established, thereby strengthening the overall trustworthiness of the study [12].

3.3 Research Setting

The research was conducted primarily in classrooms, exhibition halls, and outdoor spaces on the campus of T University, reflecting the spatial and situational diversity of the learning environment. In addition to regular class sessions, students participated in an intensive creative workshop that emphasized hands-on material exploration and site-responsive spatial creation.

Throughout the course, particular emphasis was placed on communication and interaction among group members, as well as ongoing guidance and dialogue between instructors and learners. Digital teaching platforms and social media were used to support multi-directional communication, enabling the exchange of messages, reference materials, process documentation, and reflective records.

In summary, conceptual thinking, creative process, and textual/visual documentation were treated as inseparable components of practice. While practice-related research often begins with theoretical inquiry followed by application, this study adopts a practice-led orientation that emphasizes narrating and making visible the creative process itself. Decisions made during creative thinking and problem-solving—together with the methods employed—were carefully recorded and reflected upon as part of the research process.

From this perspective, the creative process becomes the research process. Research begins with practice, uses practice as a means of inquiry, and treats creation as a core mode of knowledge production. For art and design practitioners, understanding the distinctions between theory-led and practice-led approaches is essential for designing research that accurately reflects the characteristics of their creative work and supports

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meaningful investigation into spatial design learning through Gestaltung.

IV. BSERVATION RESULTS AND ANALYSIS

Practice-based research emphasizes the generation of new knowledge through practice, with such knowledge becoming evident through creative outcomes and material processes. While written descriptions contribute to clarification and interpretation, the artwork itself remains indispensable. Meaning cannot be fully conveyed through text alone without being examined in relation to the work and the process through which it was formed.

Within practice-related research grounded in theoretical perspectives, two complementary orientations can be identified. The first is concept-driven research, which develops theoretical and conceptual frameworks prior to initiating practice, thereby guiding creative activity from a content-oriented perspective. The second is reflection-driven research, which begins with engagement in material and formal experimentation and gradually develops conceptual understanding through reflection on practice; this approach is often described as medium-driven research [13]. In medium-driven inquiry, comparisons among artistic expressions—such as shared materials, genres, or techniques—allow researchers to understand how material conditions and stylistic decisions influence creative outcomes. Through this process, creators cultivate individual thematic directions and reflective awareness within their own practice.

In the present study, both concept-driven and medium-driven perspectives are employed to examine spatial design learning as a process of Gestaltung. Analysis focuses on how learners' creative thinking, material–space expressions, and behavioral patterns emerge and transform through practice. Accordingly, the analysis is structured on two interrelated levels:
(1) cognitive and operational processes, and
(2) presentation of works as creative outcomes.

To restore the creative process, three types of documentation were used as contextual research materials: records of conceptual thinking, documentation of creative processes, and textual/visual materials, including written notes, sketches, video recordings, and final works. These materials allow creative learning to be examined as a formative process rather than as a sequence of isolated results. The analysis proceeds through the following steps:

1. Observing tendencies in horizontal and vertical thinking, focusing on learners' flexibility in shifting between these modes during idea transformation.
2. Identifying creative search patterns to understand conceptual strategies during ideation and production.
3. Analyzing transitions between "seeing" and "doing" to examine the interactive dynamics between observation, decision-making, and action.

Through these steps, the developmental trajectory of form-making is reconstructed based on overall cognitive–operational patterns.

The presentation of works is further examined through descriptive and interpretive phenomenological analysis, focusing on:
(1) the development of creative thinking,
(2) material application, including operational fluency and responsiveness, and
(3) spatial relationships, emphasizing how conceptual intentions are negotiated within specific spatial contexts.

A limitations analysis concludes the section, integrating observational data, textual records, and visual documentation to identify learners' perceptions, subtle behavioral phenomena, and emerging themes that inform future research directions.

4.1 Cognitive and Operational Processes

4.1.1 Tendencies in Vertical and Horizontal Thinking

Based on established definitions of horizontal and vertical thinking, each group's dominant tendencies were identified through analysis of the proportion and frequency of these modes during form-making. A clear relationship was observed between shifts in horizontal–vertical thinking and the creative search patterns adopted during idea generation.

When groups relied predominantly on vertical thinking, ideation tended to follow a linear search trajectory.

- Design groups generally focused on a single theme or direction, moving directly from "thought → concept" and emphasizing specific details such as form and color.
- Art groups, by contrast, often moved from "images → concepts," exploring a broader range of thematic possibilities and demonstrating a more balanced interplay between horizontal and vertical thinking.

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Notably, as the number of generated forms increased, learners increasingly relied on horizontal thinking, suggesting that divergent exploration plays a critical role in expanding creative possibilities during spatial formation.

4.1.2 Creative Search Analysis

Using established classifications of idea-generation types, this study examined creative search patterns during conceptual development. These patterns correspond with previously proposed optimal search strategies.

- Art groups tended to adopt an expanding–contracting search strategy during ideation, followed by oscillating-parallel search during production. Although they often struggled to narrow conceptual scope, they sustained iterative cycles of divergence and convergence throughout the creative process.
- Design groups frequently employed oscillating-parallel search during ideation but shifted to linear search during production, refining a single concept into a stable form. While this approach supported efficiency, it often constrained horizontal exploration and led to early conceptual rigidity.

These findings indicate that creative flexibility is strongly influenced by both the selected search strategy and the size of the conceptual search space within which learners operate.

4.1.3 Transitions between "Seeing" and "Doing"

Drawing on the See–Move–See model and related research on creative behavior, this study identified significant differences in how learners transitioned between "seeing" (perception and evaluation) and "doing" (action and manipulation).

Across all groups, instances of "doing" exceeded those of "seeing," particularly in actions involving construction and material adjustment. However, qualitative differences were observed:

- Design groups
    - During two-dimensional composition, frequent "seeing" actions were used to fine-tune spatial arrangements.
    - During three-dimensional production, "seeing" actions decreased markedly, reflecting an emphasis on efficient execution of pre-planned structures.
- Art groups
    - During two-dimensional composition, fewer "seeing" actions were observed, corresponding to abstract and indeterminate conceptual development.
    - During three-dimensional production, extensive "seeing" occurred as learners continuously evaluated forms and adjusted materials in response to spatial conditions.

Differences in see–do cycles further highlight these tendencies:

- Design groups demonstrated many cycles during planning but relatively few during execution.
- Art groups exhibited fewer cycles during planning but numerous cycles during production, indicating intensive material–space exploration.

These patterns reveal how creative thinking is dynamically constructed through interaction between perception and action within spatial practice.

V. CONCLUSIONS AND RECOMMENDATIONS

Reviewing the overall research process, this section synthesizes the findings into three major conclusions and four pedagogical recommendations, followed by reflections for future research. Rather than treating conclusions as static outcomes, this discussion frames them as insights into how creative thinking and practice are formed through Gestaltung within spatial design learning.

5.1 Conclusions

5.1.1 Three Interrelated Dimensions of Form-Making Creativity in Spatial Design Learning

Analysis of the three-dimensional creative process demonstrates that form-making creativity in spatial design learning can be understood through three interrelated dimensions:

1. Creative Thinking
   The identification of creative themes and points of conceptual entry reveals how creative reasoning develops, shifts, and transforms throughout the process.
2. Material Application
   Understanding material properties enables creators to translate conceptual intentions into appropriate techniques and methods, allowing ideas to be tested and refined through practice.

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3. Spatial Relationships
   By responding to spatial layout and environmental conditions, creators evaluate how works are situated and adjust expressive forms in relation to context.

Among these dimensions, creative thinking plays a guiding role in determining the overall depth and breadth of creative outcomes. The scope and clarity of thematic understanding strongly influence both the quantity and complexity of forms produced, indicating that conceptual formation operates as the central organizing force within the process of Gestaltung.

5.1.2 Iterative Cycles of Thinking, Search Strategies, and See–Move–See Processes

Analysis of the creative processes of art and design student groups reveals that creativity emerges through iterative cycles rather than linear progression. Learners continuously navigate between divergent and convergent modes, as well as between horizontal and vertical thinking. These modes are not optional strategies but inherent components of ideation and formation.

The findings indicate that:

1. Idea-generation modes shape early conceptual formation and later creative flexibility.
   When early ideation rapidly converges into a complete plan with limited formal variation, vertical thinking and linear search dominate, often constraining creative development in subsequent production stages.
2. The balance between horizontal and vertical thinking reflects the breadth and depth of thematic exploration.
   Conceptual complexity and material diversity serve as indicators of learners' understanding of creative themes and their capacity to translate ideas into form.
3. Creative search strategies must shift flexibly across stages of creation.
   Each search mode supports specific phases of the process; reliance on a single strategy tends to produce cognitive rigidity and limits creative emergence.
4. Temporal documentation highlights creation as a continuous process of adjustment.
   The interaction among creative thinking, material application, and spatial relationships reveals creation as an ongoing movement from ambiguity toward clarity, achieved through repeated evaluation and correction.
5. Conceptual boundaries established through creative thinking guide material and spatial decisions.
   Once a conceptual framework is stabilized, subsequent modifications tend to occur at the level of detail, reinforcing the formative influence of early conceptualization.
6. The quantity of ideas alone does not guarantee conceptual fluency.
   Creative output must be understood in relation to underlying thinking processes. Ideas may precede conscious reflection, and therefore fluency should be assessed through the interaction between cognitive activity and observable form-making outcomes.

Together, these findings underscore that creative thinking in spatial design learning is constructed through iterative cycles of perception, action, and reflection, consistent with the notion of Gestaltung as a formative process.

5.1.3 Integrating Material Application and Spatial Relationships as a Holistic Formation

The study further reveals that material use and spatial relationships are deeply shaped by disciplinary training:

- Design groups, accustomed to wood-based boards commonly used in other three-dimensional courses, tended toward direct material appropriation and structurally stable constructions. This facilitated efficiency and completeness but often resulted in weaker site dependency.
- Art groups, informed by mixed-media practice, demonstrated greater openness to material experimentation. The use of flexible or unstable materials—such as strings, cords, and recycled glass—required close engagement with existing architectural structures, producing strong site-responsive relationships.

These differences illustrate how material choice mediates spatial engagement, shaping the degree to which works interact with environmental conditions. In this sense, material application and spatial relationships function together as a unified dimension within the process of Gestaltung, rather than as independent variables.

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5.2 Recommendations

5.2.1 Supporting Balance and Diversity in Group Creation

Creativity emerges through collective interaction among diverse roles and perspectives. A relaxed and open environment supports the free exchange of ideas, which is essential for creative development in group-based learning. Instructors should attend not only to visible progress but also to less visible communicative dynamics within groups.

The goal of collaborative creation should not be limited to producing final outcomes, but should emphasize the integration of diverse ideas throughout the process. Recognizing individual differences and fostering mutual understanding within groups enhances creative formation and supports meaningful participation in spatial design learning.

5.2.2 Strengthening Feedback between Teaching and Creative Learning

This study indicates that most actions within the creative process—whether explicit or implicit—carry significance. While final works often dominate evaluative attention, internal cognitive and affective processes play a crucial role in sustaining creative development.

Teaching practices should therefore emphasize understanding learners' thoughts, emotions, and modes of expression. Creative capacity cannot be cultivated through a single experience; instead, it develops through repeated cycles of creation, feedback, and reflection across multiple projects. Such iterative engagement supports the formation of creative thinking through practice.

5.2.3 Observing Creative Practice within Contextualized Spatial Learning

Effective evaluation of creative practice requires attention to both process and outcome. Key considerations include:

- Conceptual development and idea generation
- Form-making and visual or textual planning
- Experimental engagement with materials and techniques
- Relationships between three-dimensional works and spatial environments

Theoretical and practical dimensions continuously inform one another throughout the creative process. Objective descriptions of material and spatial conditions intersect with subjective interpretation and decision-making, allowing learners to construct meaning through situated practice.

From a pedagogical perspective, both multi-material and single-material approaches offer complementary value. Diverse material engagement expands expressive possibilities and stimulates reflective thinking about material properties and spatial context. When learners resonate with materials and environments, creative motivation emerges naturally, enabling creative thinking and action to become internalized as lived experience.

Final Reflection

In summary, form-making, conceptual articulation, and reflective documentation collectively reveal the context of creation. Transparent dialogue and shared interpretation clarify intentions and support the emergence of coherent creative strategies. Beyond the production of works, the formative process itself constitutes the core value of spatial design learning. This emphasis on process, interaction, and reflection defines the contribution of practice-based research to art and design education.

REFERENCES

[1] Arts and Humanities Research Council (AHRC). Research review: practice-led research in art, design and architecture. 2007. Retrieved from http://aces.shu.ac.uk/ahrc/.

[2] Chen H H, You M. The comparison between novice and expert designers' sketching in conceptual design. Future ground 2004 international conference (CD ROM). Australia: Monash University, 2004.

[3] Collins R, Stevenson L. Inspiring imagination-education and learning: The university experience in the regional development cocktail. 2004. Retrieved from http://ro.uow.edu.au/asdpapers/13/.

[4] Cross N. Engineering design methods, strategy or product design. UK: John Wiley & Sons, Chichester. 1994.

[5] Dorst K, Dijkhuis J. Comparing paradigms for describing design activity. Design Studies, 1995, 16, 261-274.

[6] Efland A. Art education as imaginative cognition.In E.Eisner & M. Day(Eds.), Handbook of research and policy in art education. Mahwah, Early Childhood Education Journal, 2004, 36, 179-185.

[7] Egan K. An imaginative approach to teaching. San Francisco, CA: Jossey-Bass. 2005.

[8] Freedman K. Teaching visual culture: Curriculum, aesthetics and the social life of art. Teachers College Press. New York, London, 2003.

[9] Freedman K, Stuhr P. Curriculum chang for 21st century: Visual culture in art education. In E.W. Eisner & M. D. Day(Eds.), Handbook of research and policy in art education. Reston, VA: National Art Education

Cross Ref DOI: https://dx.doi.org/10.22161/ijtle.5.1.1

Association. 2004, 823-836. DOI: 10.4324/9781410609939.CH36.
[10] Giorgi A. The theory, practice, and evaluation of the phenomenological method as a qualitative research procedure. Journal of Phenomenological Psychology, 1997, 28(2): 235-260.
[11] Goldschmidt G. Dialectics of sketching. Creative Research Journal, 1991, 4(2): 123-143.
[12] Haseman B. A manifesto for performative research, Media International Australia Incorporating Culture and policy, 2006, 118, 98-106.
[13] Lawson B. Design in mind. Oxford: Butterworth Achitecture. 1994.
[14] Lincoln Y S, Guba E G. Establishing trustworthiness. In A. Bryman & R. G. Burgess(Eds.), Qualitative research (III). London: SAGE. 1999, 397-444.
[15] Malins J, Gray C. Appropriate research methodologies for artists, designers & crafts persons: Research as a learning process. 1995. Retrieved from http://carolegray.net/Papers%20PDFs/cc.pdf.
[16] Purcell T, Gero J S. Drawings and the design process:A review of protocol studies in design and other disciplines and related research in cognitive psychology. Design Studies, 1998, 19(4): 389-430.
[17] Verstijnen I M, Hennesse, J M, Leeuwen C, et al. Sketching and creative discovery. Design Studies, 1998, 19(4): 519-546.