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THE SIGNIFICANCE OF INTRODUCING DESIGN THINKING INTO CHILDREN'S CREATIVE AESTHETIC ACTIVITIES IS EXPLORED

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Abstract

This study investigates the application and value of design thinking in creative aesthetic education for preschoolers, with three primary objectives: 1) exploring pedagogical models integrating design thinking theory into children's creative aesthetic activities; 2) analyzing how design thinking influences children's creativity and aesthetic abilities; 3) examining the educational significance of design thinking in early childhood education. The research involved 60 preschoolers and 3 teachers from two creative aesthetic training institutions in Dalian City, Liaoning Province, using a mixed-methods approach. Through teacher workshops and classroom case studies, the five-stage design thinking process— "empathy, problem definition, creative generation, prototype development, and reflective improvement" —was incorporated into art and aesthetic activities (Yalcın, 2022). Data collection involved classroom observations, semi-structured interviews, artwork analysis, and Likert five-point rating scales, with comprehensive evaluations combining thematic analysis and expert quantitative scoring. **The research findings** demonstrate that design

thinking effectively enhances children's development in creativity and aesthetic abilities. Children in the experimental group scored significantly higher than the control group in dimensions such as novelty, flexibility, and iterative improvement capabilities, while exhibiting superior aesthetic judgment in color coordination, form composition, and spatial arrangement. Additionally, during group collaboration and project-sharing activities, children demonstrated stronger communication skills and empathy. Teacher feedback also indicated a more open and interactive classroom atmosphere. This study not only constructs a design thinking teaching mode suitable for preschool art education, but also proves its effectiveness in improving children's creativity and aesthetic literacy, and further reveals its significance in promoting preschool education curriculum innovation and children's comprehensive development.

Keywords: Design Thinking; Children; Creative Aesthetic Activities

Introduction

With the continuous evolution of educational philosophies, creativity and aesthetic education have gained increasing attention from both academia and educators regarding their crucial role in early childhood development. Childhood represents a critical phase where children's perceptual abilities, emotional expression, and creative potential develop rapidly, while also serving as the foundation for nurturing aesthetic awareness and artistic interests. Promoting holistic child development through art and aesthetics has become a key objective in preschool education. However, current practices in early childhood art education still exhibit limitations. For instance, some teaching methods remain confined to skill training and imitation reproduction, lacking systematic cultivation of individual creativity. Additionally, organizational formats and management strategies fail to fully reflect interdisciplinary integration and innovative thinking. This situation partially restricts the deepening development of children's creative and aesthetic capabilities. Therefore, exploring new educational approaches to transcend the constraints of traditional art education models has become particularly essential.

Design thinking, as a methodology, provides practical and creative solutions for problems or events seeking future improvements. While most people perceive it as a designer-specific approach, this mindset can actually be applied in daily life and learning. It also proves, effective in designing children's creative aesthetic activities, enabling innovative forms of artistic expression. Research indicates that incorporating design thinking into preschool education helps cultivate children's investigative awareness, critical thinking, and creativity, fostering their growth in open and diverse environments. The emphasis on "experience" and "reflection" in the learning process aligns well with art education's principles of free exploration and creative expression. However, current studies predominantly focus on its application in primary and higher education, with limited exploration of its role in early childhood education—particularly in creative aesthetic activities. Domestic research tends to concentrate on skill training and innovation cultivation in art education, while systematic teaching models and educational management frameworks supporting design thinking remain underdeveloped. This gap between theoretical research and practical implementation provides an entry point for this study.

Against this backdrop, this study explores the theme of "Integrating Design Thinking into Children's Creative Aesthetic Activities" to investigate its theoretical value and practical significance. On one hand, the research combines perspectives from art education, developmental psychology, and educational management strategies to analyze the feasibility and suitability of design thinking for early childhood education, thereby providing new theoretical support for preschool education. On the other hand, it focuses on practical implementation pathways, exploring how to effectively incorporate design thinking into creative aesthetic activities through curriculum design, teaching practices, and institutional management systems in kindergarten education, promoting children's comprehensive development in cognitive, emotional, social, and creative dimensions. The significance of this study lies not only in addressing existing research gaps but also in offering valuable insights for preschool education reform and innovation. By introducing design thinking, early childhood education can transcend the limitations of traditional art instruction while cultivating a new

generation of learners with innovative spirit and aesthetic literacy, thereby responding to society's urgent demand for creative talents in the future.

Research Objectives

1.To explore the teaching mode of design thinking theory in children's creative aesthetic activities.

2. To investigate the influence of design thinking on children's creativity and aesthetic ability.

3. To explore the significance of design thinking in preschool education.

Literature Reviews

Design Thinking: In recent years, design thinking has been increasingly adopted in educational settings as an innovative methodology emphasizing "human-centered" approaches and "interdisciplinary integration," demonstrating unique advantages in cultivating learners 'ability to solve complex problems. Research indicates that design thinking combines divergent and convergent thinking, achieving creative outcomes through hands-on practice and reflective processes—a philosophy that aligns perfectly with education's goal of fostering innovation (Yalcın, 2022). Further literature reviews reveal that applying design thinking in early childhood education and care can enhance children's cooperative awareness, critical thinking, and practical innovation capabilities, showcasing significant educational potential.

Children: Early childhood represents a critical period of rapid cognitive, emotional, and creative development, with educational research consistently highlighting its vital importance for children's future growth. Developmental psychology theory posits that young children exhibit intense curiosity and exploratory drive during this stage, making it ideal to stimulate their learning interest and creative potential through diversified educational approaches. Researchers emphasize that appropriate educational environments and teaching activities not only help children establish fundamental cognitive frameworks but also promote social and emotional development (National Research Council, 2000). Therefore, integrating design thinking that emphasizes inquiry and

creativity into early childhood education aligns with the developmental stages of children while enhancing the comprehensive value of education.

Creative Aesthetic Activities: Creative aesthetic activities hold a pivotal position in early childhood education, serving not only as vital channels for children to express emotions and ideas but also as core components in developing their aesthetic sensibilities and creative thinking. Research demonstrates that kindergarten art programs effectively enhance children's imagination and individualized expression (Zhang et al., 2024). Moreover, cultivating innovative awareness through art instruction is recognized as a key driver for holistic child development (Nanyang Municipal Education Bureau, 2020). International scholars emphasize that integrating visual culture and interdisciplinary exploration into creative aesthetic education helps broaden children's artistic horizons while fostering social and cultural identity (Freedman, 2003; Duncum, 2002). In conclusion, creative aesthetic activities are not only essential forms of art education practice but also serve as crucial platforms for nurturing young learners' creativity.

Internal: Domestic research indicates that traditional preschool art education predominantly focuses on model painting and technical training, which often restricts children's imaginative expression. To address this, scholars advocate creating flexible and diverse creative aesthetic environments that emphasize inspiration and experiential learning, allowing children to develop aesthetic creativity through free creation (Nanyang Municipal Education Bureau, 2020). For instance, the Shandan County research team proposed a teaching approach centered on "imagination, creation, expression, and communication." By providing timely materials and effective guidance, they encourage children to observe independently and create through various methods (Zhang et al., 2024), aligning with the design thinking philosophy of "respecting user needs and iterative creation."

External: Globally, design thinking has evolved from a cognitive iteration process in design practice to an educational methodology. Recent studies indicate that this approach cultivates 21st-century core competencies such as communication, collaboration, and critical thinking through real-world problem-

solving and interdisciplinary learning. A literature review by Gronman et al. (2025) reveals its widespread application in K-12 education across STEM, arts, and language disciplines, with the primary goal of developing students 'innovative capabilities and metacognitive skills (Gronman, Lindfors, & Ronkko, 2025). However, research in preschool education remains nascent, with existing studies primarily emphasizing early exposure to design thinking to enhance children's creativity, critical thinking, and teamwork. While both domestic and international communities are increasingly recognizing the necessity of integrating design thinking into early childhood education, systematic teaching case studies remain scarce.

Research Methodology

This study combines qualitative and case-based research methods under the framework of action research. It focuses on the pedagogical application and educational value of design thinking in children's creative aesthetic activities, conducting dynamic tracking and analysis through a cyclical process of planning, implementation, observation, and reflection. The research subjects were 60 children aged 4-6 years from two creative aesthetic activity centers in Dalian, Liaoning Province, China. The participants included 31 boys and 29 girls, demonstrating diverse gender and family backgrounds. To ensure scientific rigor and practical feasibility, the study recruited three experienced teachers with over five years of teaching experience as primary implementers. Prior to implementation, the research team conducted two design thinking workshops to equip educators with core processes including empathy building, problem definition, creative generation, prototype development, and testing-reflection. This preparation enabled teachers to effectively guide children in achieving creative expression through art and aesthetic activities.

In instructional design, the research team collaborated with teachers to develop four case studies centered on "creative aesthetic activities", covering various formats including painting, handicrafts, collage, and spatial construction. 1) In the "Magic Transportation" activity, children were guided to think about solving future transportation challenges through creative expression via painting; 2) The "Eco-Innovation" activity involved group work where children designed eco-friendly tool models using recycled materials, experiencing the process from

concept to prototype; 3) The "Fantasy City" activity encouraged children to collaboratively build ideal cities through collage and assembly, emphasizing spatial awareness and teamwork; 4) The "Future Home" activity required children to design and construct residential models using multiple materials, sharing their achievements through presentations and peer evaluations. All activities followed a "guidance-exploration-expression-sharing-reflection" process that aligns with design thinking principles while closely integrating with kindergarten art education objectives. Throughout the activities, researchers comprehensively documented children's learning progress through classroom observations, semi-structured interviews, and artwork collection, while requiring teachers to complete feedback questionnaires for multidimensional evaluation of teaching effectiveness.

In the data analysis phase, this study adopted a combined qualitative and quantitative approach to enhance the reliability and validity of the results. Classroom observation and interview materials were analyzed using thematic analysis. The research team conducted paragraph-level coding of texts to identify key characteristics and changes in children's creative expression, aesthetic abilities, and collaborative interactions. Children's artwork was independently evaluated by three art education experts using the Likert five-point scale, quantifying creativity and aesthetic dimensions while calculating average scores and consistency coefficients to ensure objectivity and reliability. Teacher questionnaire results corroborated with observational data, forming cross-validated evidence. Additionally, the study strictly adhered to educational research ethics: all participants provided informed consent from parents and schools, data underwent anonymization during collection and use to protect personal information, and activities were scheduled within regular class hours to avoid adverse impacts on children's academic and daily lives.

Results

This study proves the feasibility and positive effect of introducing design thinking into children's creative aesthetic activities. It not only responds to the needs of innovation and aesthetic cultivation in preschool education, but also provides new ideas and practical paths for the development of preschool education in the future.

Findings Related to Research Objective 1: Exploration of Teaching Mode of Design Thinking in Children's Creative Aesthetic Activities

In four case studies conducted at two creative aesthetic institutions in Dalian City, teachers successfully integrated the five core components of design thinking into art education contexts. Classroom observations and teacher interviews revealed that the design thinking framework helps children gradually build a complete learning experience through the learning process of "empathy、problem definition、creative generation、prototype production、reflection and improvement" (Yalcın, 2022; Gronman, Lindfors & Ronkko, 2025). Compared with traditional art activities, this model emphasizes inquiry and collaboration, effectively stimulating children's enthusiasm for autonomous expression and collective creation. For instance, in the "Future Home" theme, children can identify real-life problems through group discussions and propose diverse design solutions. Teachers noted that this approach provides an actionable innovative paradigm for kindergarten curricula, maintaining the fun of art education while enhancing creative thinking training (Robinson, 2011).

Findings Related to Research Objective 2: Influence of Design Thinking on Children's Creativity and Aesthetic ability

Through quantitative evaluation using the Likert 5-point scale and thematic analysis, this study found that design thinking instruction significantly enhances children's creativity and aesthetic abilities. Children demonstrated stronger imagination and originality in activities: In the "Eco-Invention" activity, over 70% of groups proposed innovative designs and conducted multiple iterative

improvements during prototype construction; in the "Fantasy City" activity, children integrated color, form, and composition in spatial design, showcasing more mature aesthetic judgment (Arnheim, 1984). Quantitative results showed that experimental group children scored 4.1/5 on average for creativity and 3.9/5 for aesthetics, both higher than control group students in traditional classes (3.4 and 3.2 respectively), consistent with existing research findings. These results indicate that design thinking effectively promotes children's creative expression and aesthetic development.

Findings Related to Research Objective 3: The Significance of Design Thinking in Preschool Education

The research further demonstrates that the integration of design thinking has not only transformed children's learning experiences but also provided new theoretical foundations and practical pathways for preschool education. Teachers widely acknowledge that design thinking activities enhance peer interaction and collaboration among children, improving their communication styles and emotional expression in group settings. Moreover, during reflection and sharing sessions, children exhibit heightened self-awareness and respect for peers—a crucial factor in social development during early childhood. From an educational perspective, design thinking transcends the limitations of "skill training" in creative aesthetic activities. It offers methodological support for establishing child-centered educational environments while providing practical insights for cultivating future citizens with creative and aesthetic literacy.

In summary, design thinking-based classrooms create interactive and creative aesthetic learning models for young children through the "empathy-definition-idea-making-sharing" process. Teachers transition from being mere instructors to facilitators, while children demonstrate heightened curiosity and collaborative spirit during activities. Design thinking effectively enhances the diversity and originality of children's artwork, enabling them to articulate their understanding of color, shape, and materials more convincingly. This approach significantly elevates creative expression and artistic communication. From an educational perspective, design thinking not only diversifies art education formats

but also fosters synergy between curriculum development, teacher professional growth, and home-school collaboration, demonstrating its enduring value in preschool education reform.

Discussions

Research demonstrates that design thinking-based teaching models exhibit strong adaptability in early childhood creative aesthetic education. Through the "empathy-definition-idea-making-production-sharing" process, children actively pose questions, attempt solutions, and continuously refine their creations under teacher guidance. Compared to traditional rote-learning approaches, this methodology better stimulates children's initiative and exploratory curiosity (Yalcın, 2022). These findings validate the effectiveness of child-centered educational philosophies both domestically and internationally, aligning with the Reggio Emilia approach that emphasizes children as active participants in learning communities. Therefore, design thinking serves not only as a methodology but also provides a systematic and interactive classroom framework for early childhood art education.

Research shows that young children demonstrate heightened originality and aesthetic judgment in developing creativity and aesthetic capabilities. This aligns with previous studies showing how open-ended art education enhances children's imagination and critical thinking. Notably, their aesthetic expressions now extend beyond simple "like/dislike" responses to include explanations of underlying reasons and meanings. This indicates that design thinking not only cultivates creative thinking but also improves children's verbal expression and cognitive depth. In other words, the integration of design thinking achieves a tripartite enhancement of "creation-aesthetics-expression," providing theoretical support for implementing interdisciplinary aesthetic education in early childhood programs.

The research further reveals the significant importance of design thinking in preschool education. It not only drives the transformation of curricula from "result-oriented" to "process-oriented", but also facilitates teachers 'transition from being "knowledge transmitters" to "learning facilitators". Additionally,

studies show increased parental and community engagement, enabling educational resources to be shared and integrated across the "kindergarten-family-community" triad. From a macro perspective, design thinking aligns closely with China's current policy goals of "inclusive and high-quality" preschool education development. This demonstrates its value not only in classroom practices but also in providing insights for educational management and policy implementation. Therefore, the integration of design thinking holds long-term significance for both curriculum reform and educational governance in preschool education.

Conclusions

This study employs design thinking theory as its framework, integrating teaching practices from creative aesthetic training institutions in Dalian City, Liaoning Province, China, to explore the application and value of design thinking in children's creative aesthetic activities. Through a combination of qualitative and quantitative methods, the research systematically analyzes three aspects: the construction of teaching models, their effectiveness, and educational significance. The findings demonstrate that design thinking holds significant theoretical innovation and practical feasibility in preschool education.

First, at the instructional model level, this study demonstrates that design thinking can serve as an effective framework for organizing teaching in children's art education and creative aesthetic activities. The research reveals that through the design thinking process of "empathy—problem definition—creative generation—prototype creation—reflective improvement," teachers can systematically guide children through the learning journey from problem discovery to work refinement (Yalcın, 2022; Gronman, Lindfors, & Ronkko, 2025). Compared with traditional art activities, this approach emphasizes not only the completion of works but also the exploration, collaboration, and reflection during the learning process. Within this framework, children actively identify problems, express creativity, and iterate improvements in theme-based activities like "Future Homes" and "Eco-Inventions," thereby forming a more comprehensive learning experience (Robinson, 2011). Therefore, design thinking provides a sustainable teaching paradigm for kindergarten art education, expanding the innovative boundaries of preschool curricula.

Secondly, regarding skill enhancement, research findings demonstrate that design thinking significantly boosts children's creativity and aesthetic abilities. Quantitative analysis using the Likert five-point scale shows experimental group children scored higher than control group children in both creativity and aesthetic dimensions, demonstrating greater novelty, flexibility, and independence. Qualitative observations and artwork analyses further reveal children's more mature aesthetic judgment in color application, form composition, and spatial arrangement (Arnheim, 1984). For instance, during the "Fantasy City" activity, children actively employed collage and construction methods to create idealized spaces, showcasing a fusion of imagination and aesthetics. Meanwhile, children demonstrated enhanced communication and collaboration skills in group work, improving their creations through reflection and sharing. These findings confirm that design thinking not only elevates children's artistic expression but also strengthens their social learning and critical thinking abilities.

Finally, from an educational perspective, this study further reveals the value of design thinking in preschool education. Teacher feedback indicates that this methodology enhances children's empathy and communication skills through collaborative activities, creating more interactive and open classroom environments. During sharing and evaluation sessions, children demonstrate heightened self-awareness and peer respect, gradually achieving dual growth in aesthetic appreciation and social development. From an educational philosophy standpoint, design thinking transcends the limitations of traditional art education focused on skill training, emphasizing exploratory and creative learning processes. This aligns closely with the current preschool education's "child-centered" curriculum philosophy (Robinson, 2011). Therefore, design thinking serves not only as a teaching tool but also as an educational philosophy, providing crucial pathways and practical experiences for cultivating future citizens with creative and aesthetic literacy.

In conclusion, this study demonstrates the pedagogical feasibility and educational value of design thinking in children's creative aesthetic activities. It not only provides an operational framework for teaching models but also shows positive outcomes in skill development, while offering theoretical support for preschool education reform and innovation. Future research could expand the sample scope to include comparisons across different regions and cultural

contexts, thereby verifying design thinking's applicability and developmental potential in broader preschool education settings.

New Knowledges

This study proposes and validates three new dimensions in creative aesthetic education for young children.

First, at the instructional model level, the research constructs a systematic framework for children's aesthetic education based on the core processes of design thinking, fully integrating the "empathy-problem definition-creative generation-prototype production-reflection improvement" cycle into classroom practice (Gronman, Lindfors, & Ronkko, 2025), breaking through the limitations of traditional art education that overemphasizes skills while neglecting exploration.

Second, in terms of competency development, the study reveals through qualitative and quantitative empirical analysis that design thinking activities significantly enhance children's creativity and aesthetic expression, including novelty, flexibility, imagination, as well as color, form, and spatial composition.

Finally, at the educational significance level, the research demonstrates the value of design thinking in promoting empathy, collaboration, and social development among children (Robinson, 2011), indicating its potential to shift preschool education from "skill-oriented" approaches toward child-centered creative cultivation. Overall, this study not only validates the feasibility of design thinking in early childhood education but also provides new theoretical foundations and practical pathways for nurturing future citizens with both creative abilities and aesthetic literacy.

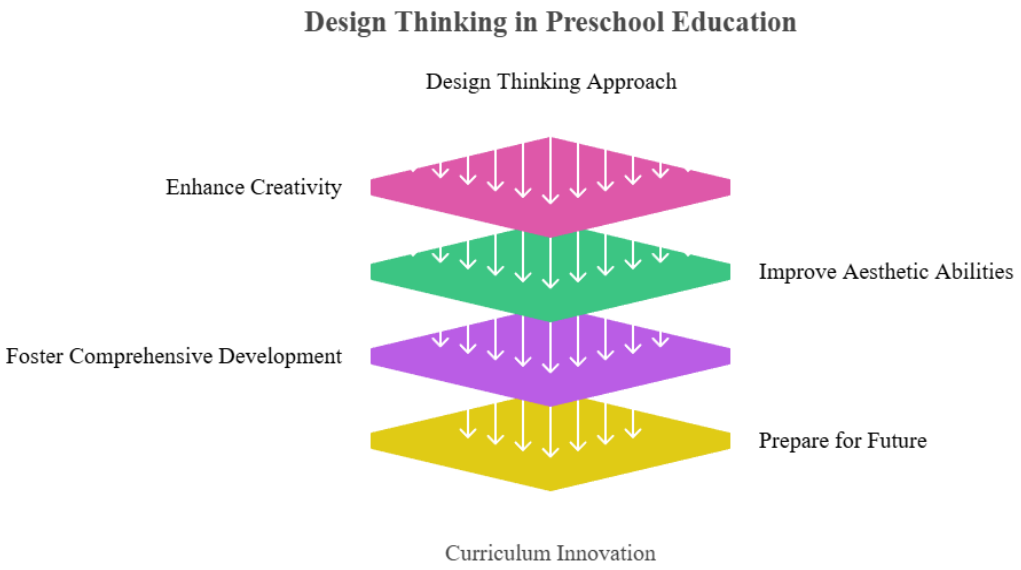


Figure1: Design Thinking in Early Childhood Aesthetic Education
Source: Image Courtesy of the Author.

Suggestions and Recommendations

Based on the findings of this study, the following recommendations are proposed.

First, in practical terms, children's creative aesthetic training institutions should actively integrate design thinking into art and aesthetic education activities. Through systematic instructional design and teacher training, they can

help children achieve deeper learning experiences through exploration and creation.

Second, educational administrators should emphasize the interdisciplinary value of design thinking in curricula, combining it with language, science, social development, and other fields to promote comprehensive innovation and integration in preschool education (Robinson, 2011).

Finally, future research could expand in sample scope, cultural context, and educational stages to verify the applicability and long-term effects of design thinking across different educational contexts, thereby providing more comprehensive empirical support for preschool education reform.

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