

Practical Research on Modern Information Technology Empowering the Quality Enhancement of Early Childhood Art Education

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Abstract: Against the backdrop of the digital transformation of education, modern information technology (IT) has introduced new opportunities for early childhood art education. As a core component of aesthetic education, art education for young children is crucial for developing the observation, imagination, and creativity of children aged 3 to 6. Given that children in this stage possess highly figurative thinking, information technology aligns with their learning characteristics and can effectively reconstruct educational elements. Currently, early childhood art education faces dilemmas such as rigid instructional modes, insufficient resources, a lack of personalized guidance, and singular evaluation methods. Information technology offers solutions through interactive tools and intelligent technologies. This paper explores practical paths—including the construction of immersive teaching scenarios, the application of digital creative tools, the establishment of resource-sharing platforms, and the implementation of personalized guidance and evaluation—and proposes optimization strategies and precautions to provide a reference for enhancing the quality of early childhood art education.

Keywords: Modern information technology; early childhood art education; quality enhancement; practical path

Introduction

The *Guidelines for the Learning and Development of Children Aged 3-6* emphasizes the importance of art in helping young children perceive and create beauty, noting the need to stimulate creative enthusiasm and protect their imagination. Modern information technology, characterized by interactivity, intuitiveness, and engagement, is highly congruent with the figurative thinking of young

children. Traditional models of early childhood art education often struggle to meet the requirements of a child's comprehensive development. Therefore, researching the path through which information technology empowers this field is not only an inevitable requirement of educational digitalization but also a key subject for breaking traditional limitations and promoting holistic growth in the domain of early childhood art. Such research carries significant practical implications.



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1. Theoretical Foundations and Value of Empowering Early Childhood Art Education via Modern Information Technology

1.1 Alignment with the Laws of Physical and Mental Development in Early Childhood Learning

Children aged 3–6 are situated within the Preoperational Stage of Piaget's Cognitive Development Theory. During this period, their thinking is predominantly concrete and characterized by egocentrism; modern information technology (IT) possesses the unique capability to concretize abstract artistic concepts. For instance, in the instruction of color schemes, applications such as "Baby Graffiti" provide a diverse palette of digital brushes, allowing children to intuitively perceive the effects of various color combinations. Similarly, the application of lines can be designed as interactive games, aligning with the "learning by doing" and "learning through play" characteristics of early childhood education. Furthermore, Constructivist Theory emphasizes a "child-centered" approach; the intuitive and interactive environments constructed by IT provide rich sensory materials that support autonomous exploration and creation. Multiple Intelligences Theory also posits that individual differences exist in children's artistic intelligence. Information technology can establish personalized platforms for children of varying proficiencies: those with weaker manual dexterity can utilize the assistive functions of digital painting tools to lower the threshold of creation, while those with vivid imaginations can access unlimited materials on virtual platforms, thereby achieving the differentiated development of artistic intelligence.

1.2 Reconstruction of the Core Elements of Early Childhood Art Education

The core of IT empowerment lies in the reconstruction of the relationship between "teaching" and "learning," facilitating the optimization and upgrading of educational elements. In terms of educational subjects, children have transitioned from passive "imitators" to active "creators," while teachers have evolved into "facilitators" and "collaborators." Regarding instructional content, the focus has expanded from singular painting skill instruction to a comprehensive "Appreciation-Experience-Creation-Evaluation" system. In terms of educational space, learning has

extended from closed classrooms to expansive domains such as virtual museums and natural scenarios. Simultaneously, information technology enables the visualization and traceability of the educational process. By recording children's creative trajectories and modification processes, IT provides a precise basis for teachers to assess development levels and adjust instructional strategies, thereby driving the transition of early childhood art education toward a data-driven paradigm^[1].

2. Current Practical Dilemmas in Early Childhood Art Education and the Problem-Solving Logic of Information Technology

2.1 Existing Problems in Early Childhood Art Education

Research findings indicate that early childhood art education currently faces four major dilemmas. First, teaching models are rigid. Many kindergartens still adopt the traditional approach in which teachers demonstrate drawing outlines and children fill in colors. This model constrains children's imagination and results in highly homogeneous artworks. Second, resource provision is insufficient. High-quality art education resources are concentrated in well-resourced urban kindergartens, while kindergartens in remote areas lack professional art teachers, picture books, and teaching aids. Moreover, existing resources are updated slowly and fail to align with children's evolving interests. Third, individualized guidance is lacking. Due to large class sizes, teachers find it difficult to attend to children's diverse creative ideas and developmental needs, and are often unable to provide timely and precise feedback on children's unique artistic expressions. Fourth, evaluation methods are overly simplistic, with assessments largely based on whether the work "resembles" a given model, thereby neglecting children's emotional expression and cognitive development during the creative process.

2.2 Problem-Solving Logic and Application Advantages of Information Technology

Information technology offers clear solutions and distinctive advantages in addressing the above challenges. In response to rigid teaching models, the "free creation" and "material collage" functions of digital drawing software can stimulate children's

autonomous exploration and reduce reliance on imitation. To address resource inequality, cloud platforms integrate high-quality courses and works by renowned artists, enabling kindergartens in remote areas to access these resources online, with timely updates that better match children's interests. To resolve the lack of individualized guidance, AI-assisted drawing tools can recommend materials based on children's creative styles and color preferences, while teachers can monitor creative progress in real time through online platforms and provide targeted suggestions. In terms of overcoming single-dimensional evaluation, information technology makes it possible to construct diversified evaluation systems^[2]. By recording the creative process through images and videos and combining digital approaches such as children's self-assessment, peer evaluation, and parental participation, children's artistic abilities can be assessed in a more comprehensive manner. Compared with traditional education, information technology demonstrates clear advantages in stimulating interest, expanding learning spaces, and improving instructional precision, thereby offering a feasible pathway for enhancing the quality of early childhood art education.

3. Practical Pathways for Enhancing the Quality of Early Childhood Art Education Empowered by Modern Information Technology

3.1 Constructing Immersive Teaching Scenarios to Enrich Aesthetic Experience

Aesthetic perception is the foundation of art education, and information technology can break through the constraints of time and space to create immersive aesthetic experience scenarios for young children. On the one hand, VR/AR technologies can be used to build virtual art spaces. For example, children can be organized to "enter" VR virtual art museums, where they can closely observe the color brushstrokes of Vincent van Gogh's Sunflowers and the lively lines of Qi Baishi's Shrimp. Through AR technology, characters in paintings can even be made to "come alive," such as enabling the Mona Lisa to smile and interact with children or allowing the flying apsaras in Dunhuang murals to emerge from the artwork. These experiences enhance children's interest in aesthetics and strengthen their perceptual abilities. On the other

hand, video technology can be employed to recreate the beauty of nature and everyday life. Through high-definition documentaries and time-lapse photography, children can observe changes in leaf colors across the seasons, ripples formed by raindrops on water surfaces, and the patterns on butterfly wings, transforming everyday beauty into inspiration for art creation. In a thematic activity titled "Colors of Nature," teachers play videos of natural landscapes to guide children in observing the gradual color transitions of sunset clouds, and then encourage them to create artworks depicting "The Sunset in My Eyes." The resulting works display rich and diverse colors, reflecting children's unique perceptual experiences.

3.2 Optimizing Teaching Functions to Address Traditional Instructional Challenges

Due to the immature development of young children's fine motor skills, traditional drawing tools may easily undermine their creative motivation, whereas digital tools lower the threshold for creation by optimizing functions. Child-friendly digital drawing tools, such as BabyBus Drawing Pad, feature simple operations and abundant materials, and support one-click modification and undo functions, effectively addressing the difficulty of correcting mistakes in traditional drawing. To address children's tendency toward general and imprecise observation, information technology can be used to freeze and magnify images, enabling precise focus on instructional key points. In the middle-class activity "Happy Little Flying Elephant," video clips are used to guide children in carefully observing dynamic characteristics, helping them overcome difficulties in depicting complex forms. At the same time, devices such as AI display systems and mobile phones can be used to present the creative process and completed works in real time. Children can visually observe their own performance on the screen and make timely adjustments. After the completion of artworks, AI technology can be employed to "animate" static works, bringing them to life. The classroom is filled with expressions of amazement, allowing children to fully experience the joy of success and enhancing their self-confidence and creative motivation^[3].

3.3 Innovating Teaching Models to Build an Interactive Learning Ecosystem

Based on children's cognitive characteristics and the

distinctive features of art education, an “interactive art learning model supported by information technology” can be constructed. By using multimedia to present audiovisual materials such as natural landscapes and classic artworks, children’s curiosity and exploratory motivation are stimulated. Open-ended topics are then designed in alignment with children’s interests and life experiences, enabling the organic integration of educational content with children’s daily lives. For example, when children observe fallen leaves and ask, “Can leaves be used for painting?”, teachers can employ information technology to collect examples of leaf-based art creation and guide children to explore multiple creative approaches. In terms of cognitive scaffolding, teachers can use digital courseware to provide step-by-step guidance, encouraging children to articulate their creative ideas. In a thematic activity on “Butterflies,” children are guided to observe wing patterns and symmetrical features, and are encouraged to raise questions and explore independently. At the same time, interactive scenarios can be created through the use of hardware facilities. Interactive electronic whiteboards installed in art activity rooms enable both human–computer and peer-to-peer interaction. In an activity titled “Interesting Animals,” children come to the front to draw outlines with their fingers, while others provide verbal suggestions such as “add a beautiful tail.” This not only stimulates creative enthusiasm but also enhances language expression and teamwork skills. Furthermore, AR technology can be used to create immersive experiences. In the “Fantasy Castle” activity, children scan cards to generate three-dimensional models and add decorative elements, making them feel like designers and greatly enhancing the enjoyment and engagement of the activity.

3.4 Building Resource-Sharing Platforms to Promote Educational Equity

To address the imbalance in access to high-quality educational resources, multi-dimensional resource-sharing platforms can be established. Kindergartens can collaboratively develop regional art education cloud platforms that integrate teaching videos, creative materials, lesson plans, and children’s artworks, thereby enabling co-construction and sharing. For example, education authorities can establish an “Early Childhood Art Education Cloud Platform,” where

teachers from high-quality kindergartens record micro-lessons that can be downloaded and studied by teachers and students in remote areas. In addition, social media can be leveraged to create “home–kindergarten collaborative education” channels. Through class groups and official accounts, activity guidelines, parent–child project plans, and artwork displays can be shared. Activities such as “Parent–Child Digital Painting Competitions” can be organized, in which parents and children jointly use digital tools to create and upload artworks, enriching creative experiences. Moreover, high-quality domestic and international resources can be introduced, such as the “Children’s Art Public Welfare Courses” offered by the Central Academy of Fine Arts and online repositories from international children’s art foundations. These resources broaden children’s horizons, expose them to diverse art forms and concepts, and contribute to educational equity and quality enhancement.

3.5 Leveraging Intelligent Technologies to Achieve Personalized Guidance and Evaluation

Personalized guidance is a key factor in improving the quality of art education. Through data collection and analysis, information technology provides teachers with precise evidence for instructional decision-making. Teachers can record data such as children’s creative themes, materials used, and time spent via management platforms, and analyze individual preferences and developmental levels. For example, if it is observed that a middle-class child, Duoduo, prefers using blue colors and curved lines to depict vehicles, teachers can provide relevant color cards and reference images, while also guiding the child to experiment with straight lines to draw tracks.

AI technologies further enhance the precision of guidance. After children upload their artworks, intelligent systems use image recognition to generate analytical reports from dimensions such as color matching, composition, and creativity. Teachers then combine these reports with children’s expressed creative intentions to provide targeted feedback. In terms of evaluation, a diversified system integrating both “process and outcome” can be established. The creative process is recorded through video, children introduce their creative ideas, parents provide online comments via platforms, and teachers conduct

comprehensive assessments across dimensions such as “creative interest,” “color perception,” and “imagination.” This approach replaces the single criterion of whether the work “resembles” a model and enables a more holistic focus on children’s artistic development.

4. Optimization Strategies and Key Considerations for Information Technology–Empowered Early Childhood Art Education

4.1 Optimization Strategies: Building an Integrated “Technology + Education” Ecosystem

To achieve deep integration between information technology and early childhood art education, an integrated ecosystem should be constructed across three levels: resources, teachers, and management. At the resource level, dynamically updated resource repositories should be established. In alignment with thematic interests and educational objectives, high-quality materials and thematic tutorials should be regularly supplemented to ensure relevance and timeliness. At the teacher level, information technology application competencies should be incorporated into professional development systems. Through thematic training, observation of exemplary lessons, and skills competitions, teachers’ abilities to use modern equipment and digital tools in teaching can be enhanced. At the management level, kindergartens should formulate clear norms for information technology use, reasonably arranging usage time and methods. For example, regulations may stipulate that digital tools should be used for no more than 20 minutes per art activity session per class, ensuring that technology serves educational objectives and preventing overuse. Meanwhile, regional cooperation and exchange should be strengthened through initiatives such as “online teaching research” and “expert teacher outreach,” sharing best practices and promoting the overall improvement of early childhood art education quality within regions^[4].

4.2 Key Considerations: Adhering to the Essential Needs of Early Childhood Education

When integrating information technology into early childhood art education, it is essential to center on children’s fundamental developmental needs and prevent the alienation of technology. First, screen time should be scientifically regulated. According to the

Guidelines for Learning and Development of Children Aged 3–6, daily screen time for young children should not exceed one hour. In teaching practice, digital tools can be used in combination with traditional tools—for example, using digital tools for virtual conceptualization followed by hands-on creation with traditional materials—to balance virtual and real experiences. Second, children’s creative autonomy should be respected. Information technology should function solely as an auxiliary tool. Teachers should avoid setting uniform creative templates, instead encouraging children to explore tools independently and express unique ideas, while affirming innovative thinking. Third, emotional experience should be emphasized. The core of art education lies in emotional expression. When applying information technology in teaching, teachers should guide children to integrate their own emotions into artistic creation. By encouraging children to select colors and elements based on lived emotional experiences and express inner feelings through their works, educators can avoid excessive focus on technical effects at the expense of emotional communication.

Conclusion

Modern information technology has injected new vitality into early childhood art education. At the theoretical level, it aligns with children’s physical and psychological developmental characteristics and reconstructs core educational elements; at the practical level, it provides effective pathways for lowering creative barriers, enabling personalized guidance and evaluation, and enhancing participatory experiences. However, the application of technology must adhere to the essence of education and avoid technological alienation. Looking ahead, continuous optimization of technology application strategies is required to balance technological rationality with humanistic care. By enabling information technology to better serve early childhood art education, a solid foundation can be laid for cultivating children with creativity and aesthetic literacy in the new era, thereby advancing early childhood art education toward a new stage of high-quality development.

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