Teaching Strategies for "Design and Application" Art Practice in Junior High School Art Based on IDEO Design Thinking Model

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ABSTRACT
The curriculum content of junior high school art subject is "Design and Application" art practice teaching, emphasizing the development of students' creative practice literacy and focusing on cultivating artistic creative thinking and creative practice ability. The IDEO design thinking model and the cultivation of students' innovative thinking share common ground, and the methods and paths for cultivating innovative thinking are manifested in the practical process of IDEO design thinking. Based on thematic teaching design examples, this article proposes teaching concepts and implementation strategies for junior high school art courses based on the IDEO design thinking model. Teaching practice has confirmed that the application of IDEO design thinking model in the "Design and Application" course of junior high school art can effectively cultivate students' imagination and observation ability, enhance their innovative thinking and design practice ability, and promote the development of students' innovative thinking.

Keywords: *Design thinking, Junior high school art, Design teaching, Art practice, Teaching strategies.*

1. INTRODUCTION

The teaching of art courses in compulsory education is an important way to cultivate the imagination and innovative thinking of primary and secondary school students. With the continuous deepening of basic education teaching reform, creative practice activities with "design" as the theme content have become an effective means to improve the artistic literacy and creative ability of primary and secondary school students. The "Compulsory Education Art Curriculum Standards (2022 Edition)" emphasizes "adhering to innovation orientation", guided by core competencies such as "creative practice", to carry out artistic innovation and practical application, help students form innovative consciousness, and improve their artistic practice and creative abilities.[1][6] Design thinking, as a widely adopted and influential means of efficient innovation, is an effective method for cultivating innovative thinking, which is in line with the core literacy training objectives of current primary and secondary school art courses.[2] Applying the mature IDEO design thinking model to the art practice stage of junior high school art teaching, scientifically guiding students to develop and internalize creative thinking, promoting the formation of design awareness, and has positive significance for cultivating and enhancing students' innovative thinking and practical abilities.

2. THEORETICAL BASIS OF IDEO DESIGN THINKING MODEL

2.1 IDEO Design Thinking Model

The "Design Thinking for Educators" manual describes the IDEO design thinking model, which includes five stages: discovery, interpretation, ideation, experimentation, and improvement: discovery, is to understand learning content, prepare exploration preparation, and collect ideas; interpretation is to transform the collected information into knowledge for problem-solving;

ideation is to collect viewpoints and ideas, and form possible solutions; experimentation is to concrete implementation of practical plans, including prototyping and obtaining feedback; improvement is to continuously improve every learning stage. This model is committed to achieving a teaching shift centered on learning and personalized development, providing a solution process and method for problems in real situations, emphasizing the visual presentation of knowledge, experience, and information, repeatedly iterating in the feedback and correction process, realizing knowledge reuse and reinforcement, advocating group cooperation and teamwork, knowledge sharing, and the application of various technical tools, and focusing on developing learners' advanced thinking abilities.[3] Based on these characteristics, design thinking has also been widely applied in the field of education. Therefore, introducing the IDEO design thinking model as a guiding method for teaching practice in the "Design and Application" art practice teaching of junior high school art is scientific and feasible.

2.2 The Educational Application of IDEO Design Thinking

The intervention of design thinking in teaching can be roughly divided into three modes: the first is to take it as a teaching theory and method; the second is to take it as a practical path to cultivate students' problem-solving and creative abilities; the third is to take it as an implementation tool to improve the efficiency and quality of teaching. Design thinking, as an innovative approach and effective method for problem-solving, is mainly applied in education through an integrated teaching model. By leveraging its advantages in innovative training and integrating with the curriculum, it provides support for curriculum structure and process reconstruction in subject teaching[4]. On the premise of grasping the essential characteristics of design thinking, drawing on the IDEO design thinking model and integrating it with the "Design and Application" art practice teaching in junior high school art can creatively address complex problems in curriculum teaching, cultivate students' ability to analyze and solve problems, creative thinking, and reduce the difficulty of course learning.

In order to achieve the goals and content of "Design and Application" art practice teaching, a step-by-step hierarchical teaching approach can be carried out based on the IDEO design thinking model: the first is to discover "challenges", understand learning content and project tasks, think and collect inspiration; the second is to explain the concept of "idea", describe the process of generating creative thinking, and propose design solutions; the third is to imagine a "plan" and collect ideas for problem-solving and optimization; the forth is to achieve the "goal", carry out practical activities (or experiments) to create prototypes and collect feedback; the fifth is to improve the 'results' by continuously tracking learning outcomes, evolution, and development. The entire teaching process is no longer a single linear process, but a dynamic development process that forms an iterative cycle. Teachers should not only design learning activity content and participate in guidance, but also consider students' absorption and transformation of knowledge acquisition, achieving a systematic construction from teaching design to learning design.

Teaching cannot be separated from the support of methods and technical tools, and the use of IDEO design thinking in teaching also requires the integration of effective methods and tools. By sorting out the content elements of each stage of "Design and Application" teaching implementation (as shown in “Table 1”), teachers should not only use design thinking to carry out art practice teaching activities, but also help students master the application methods and operational skills of various information technology tools. The application of IDEO design thinking model in junior high school art curriculum teaching provides an operational process and systematic method for solving problems in real situations, enabling students to flexibly switch between convergent thinking and divergent thinking in the learning process, thereby stimulating and emerging creative inspiration, and comprehensively developing students' problem-solving ability, teamwork ability, and innovative thinking ability.

Table 1. Representation of IDEO design thinking in different teaching stages of "Design and Application"

Stage	Task	Method	Technology and tools
Discovery	Understand the task, clarify the design purpose, collect and summarize information	Participatory observation, market research, in-depth interviews, focus groups, etc.	Image and video shooting and display equipment, text and image processing software, teaching multimedia display terminals, etc.
Interpretation	Analyze information, focus on design issues, think critically, clarify cognition, and establish connections	Quantitative analysis, qualitative analysis, information visualization, rapid association, etc.	Data statistical analysis tools, mind mapping tools, online databases, digital demonstration terminals, etc.
Imagination	Integrating thinking, generating creative thinking, inspiring inspiration, and forming feasible problem-solving solutions	Brainstorming, mind mapping, quick association, etc.	Mind mapping tools, concept mapping tools, digital display terminals, etc.
Experimentation	Carry out project design practice based on the solution, design and produce prototypes	Design concept expression, sketch drawing, project development, prototype construction	Tablet hand drawing software (Procreate), drawing software (SAI, Corel Painter), design software (Photoshop, Illustrator), image printing equipment, 3D printing equipment, etc.
Improvement	Achievement evaluation, feedback collection, reflection and internalization, continuous updating, iteration and optimization of plans	Program evaluation, audience evaluation, content and questionnaire survey, effect observation	Image display and digital demonstration terminal, hand drawn demonstration diagram, digital demonstration media equipment

3. TEACHING CONCEPTION OF "DESIGN AND APPLICATION" GUIDED BY IDEO DESIGN THINKING

Both Chinese and international education fields highly recognize the value of design thinking in cultivating students' problem-solving abilities and creativity. Design thinking teaching is also facing a transformation from theoretical design teaching to practical, applied, and composite design teaching.[5] The deep integration of IDEO design thinking into middle school art design teaching is also a systematic project, which requires effective learning design from the perspective of students, as well as providing learning content and participating in guidance. Combining the teaching of the "Design and Application" art practice course in junior high school art with the innovative design teaching model of IDEO design thinking, it is the reconstruction and optimization of the teaching philosophy, objectives, content, process, and evaluation of the "Design and Application" art practice course by applying the concepts, processes, tools, and methods provided by the IDEO design thinking model to the course design and teaching implementation process.

3.1 Focusing on Core Literacy and Clarifying Course Objectives

The curriculum objectives in the "Compulsory Education Art Curriculum Standards" (2022 edition) are divided into core literacy connotation, overall objectives, and stage objectives. Among them, the connotation of core literacy emphasizes creative practice and cultivates students' innovative consciousness; The overall goal is to develop innovative thinking, learn to identify and solve problems, and enhance creative practical abilities. In the learning objectives, the design principle of "design meets practical functions and aesthetic values, and conveys social responsibility" is proposed for grades 8-9, which also puts forward a higher goal for "design and application" art practice teaching: to cultivate students' higher-order thinking ability with innovation as the core. The goal of IDEO design thinking is highly aligned with the goal of middle school art practice teaching, both emphasizing the value of imagination and creativity,

and creatively solving problems through insight and analysis. Starting from the nature of art practice courses, the implementation of "Design and Application" teaching can be carried out around two specific levels.

The first is to comprehensively utilize various media and technologies to cultivate students' imagination. Teachers use the IDEO design thinking model and teaching tools to propose open and challenging design problems, carry out diverse artistic creation activities, explore the integration of art and technology, encourage students to think about problems from different perspectives, and stimulate their imagination and creativity. Through continuous iteration and optimization in design creation and project practice, students' learning transfer ability is gradually cultivated. The second is to cultivate students' innovative thinking through interdisciplinary integration. In the process of information collection, practical production, optimization and improvement of design projects, diversified design teaching resources are provided. Through observation, cognition, conceptual sketches, brainstorming and other forms, students' artistic potential is fully explored, and their innovative and practical abilities are comprehensively cultivated.

3.2 Optimizing Teaching Content and Promoting Practice Diversion

The cultivation of innovative consciousness, creativity, and innovative thinking is an important component of quality education. The thinking development of junior high school students has initially taken shape, and their perceptual ability and imagination are in a continuous and gradually improving process. They possess the ability to judge truth, goodness, and beauty, as well as the ability to make assumptions and deductions. Their physical and mental states meet the prerequisites for cultivating innovative thinking. To further achieve students' core competencies, it is necessary to organize course teaching content around artistic practice. By using the IDEO design thinking model to guide students through observation, thinking, practice, and innovation, the process and methods of thinking about problems are integrated into the teaching of art practice courses, improving students' creativity and problem-solving abilities, and ultimately enhancing their innovative thinking.

The design of teaching content mainly revolves around the "Design and Application" art practice activity, which includes four learning contents: visual information communication, life and design, craft inheritance, and environmental creation. Through "Design and Application", “students combine their knowledge, skills, and ways of thinking in design and craftsmanship with real-life and social contexts, engage in problem-based learning and project-based learning, and carry out inheritance and creation.”[1][48] In learning activities, it is emphasized to closely link teaching content with social life, while highlighting aesthetic and practical aspects. Teachers can integrate the IDEO design thinking model into the teaching content of each stage, enable students to understand the basic knowledge related to design and technology, create learning situations based on reality, and analyze and solve problems in real-life situations. Teachers can also set open-ended questions in the teaching process and encourage students to engage in association and imagination. Teachers utilize rich multimodal teaching resources to provide diverse structural levels for teaching. Students go through the process of thinking and creation, constantly strengthening their depth of thinking and gradually forming design literacy.

3.3 Implementing the Concept of Educating People and Strengthening Teaching Evaluation

Teacher-led teaching evaluation, due to personal preferences or limited knowledge level, can lead to a lack of effectiveness, integrity, and comprehensiveness in teaching evaluation. Junior high school art classroom teaching advocates the comprehensive application of multiple evaluation methods to evaluate students' art learning, highlighting the process and individual differences of evaluation. At the same time, accurate information feedback can be obtained through evaluation, which can help teachers continuously improve and optimize teaching effectiveness.[6] The diversified evaluation method covers the professional guidance and detailed evaluation of teachers, and also emphasizes the importance of student self-evaluation and peer evaluation. Implementing diversified teaching evaluation in junior high school art teaching is of great significance. Through self-evaluation, students can gain a deeper understanding of their learning progress and existing problems; Through mutual evaluation, students can learn from each other, make progress together, and cultivate teamwork skills and critical thinking. The "Compulsory Education Art Curriculum Standards (2022 Edition)" mentions that students' learning outcomes

are evaluated through homework, and their learning abilities, attitudes, emotions, and values are evaluated based on their performance during the learning process, highlighting the overall and comprehensive nature of the evaluation. The holistic and diverse evaluation methods are conducive to comprehensively showcasing students' specific learning performance. By providing timely feedback and incentives, students can be encouraged to constantly reflect and improve, and their interest in learning and motivation for continuous exploration can be stimulated, achieving better design teaching effects.

4. DESIGN STRATEGIES "DESIGN AND APPLICATION" ART PRACTICE TEACHING ACTIVITIES

According to the hierarchical goals of the IDEO design thinking model, the "Design and Application" art practice teaching activities in junior high school art can be divided into five stages. “Emphasis is placed on focusing on the relevant parts of the information that have already been presented, and through connecting relevant information, comprehensive conceptualization and experimentation are carried out, ultimately leading to the preservation of established psychological representations and enhancing them into the construction of meaningful combinations of knowledge.”[7] At each stage, corresponding learning objectives and design practice projects are determined, and classroom teaching concepts and modules are constructed through the process of thinking models. Combined with teaching tools supported by design thinking, students' creative practice literacy is enhanced, and the development of design teaching core literacy from knowledge, skills to meaning construction is comprehensively achieved.

4.1 Discovery Stage: Creating Real Design Scenarios and Exploring Task Information

The learning task in the discovery stage is for students to collect information, which is the stage of guiding cognition and acquiring knowledge and experience. The IDEO design thinking model advocates students to think independently and actively discover problems. Teachers create life scenarios to encourage students to transfer knowledge independently, achieving the goal of design inspiration. In the "scenario introduction" stage, teachers can display different information materials based on the learned content to stimulate students' interest and thinking, and guide students to think actively. In the "problem identification" stage, teachers pose open-ended and challenging questions to guide students to think about problems from different perspectives. In the "demand research" stage, teachers can conduct demand solicitation to understand students' interests and expectations for design works, and make adjustments for the implementation of teaching content. In the "preparation task" section, students set up project learning based on their interests and hobbies to prepare for the next step.

In the discovery phase, the main focus is on building connections and establishing goals. Teachers and students can select valuable clues and information for meaningful connections, analyze and process the information, gradually clarify and visualize relatively abstract problems, and organize them into an organic whole with internal connections. The purpose is to establish design goals, build a preliminary design thinking framework, and cultivate students' ability to identify and summarize problems.

4.2 Interpretation Stage: Experience and Cognition, Planning Deduction and Knowledge Deepening

The learning task in the explanation stage is to deeply understand the principles, techniques, and connotations of the learned content. In project design practice, it is necessary to integrate experience and cognition organically, link learned disciplinary knowledge with unresolved design problems, and promote the development of creative thinking. The "knowledge explanation" section helps students master basic knowledge through in-depth explanations, expands their knowledge beyond the learning content, and assists students in integrating knowledge with the questions they are thinking about in their minds. In the "case analysis" section, teachers can select classic and novel works for analysis, with the content driven by practical problems, to help students understand the methods and paths of designing and solving problems, laying the foundation for the next step of transforming their creative ideas into design practice. The "group discussion" session is conducted in an open classroom environment, encouraging students to share their understanding and opinions, plan and deduce the overall design

ideas, promote ideological collision and deepen understanding, and guide students to develop preliminary problem-solving solutions.

4.3 Ideation Stage: Imagination and Creation, Stimulating Creativity Through Integrating Ideas

The learning task in the ideation stage is to stimulate creativity and form a preliminary design plan. IDEO design thinking emphasizes generating inspiration through the connection between creativity and ideation, and driving creativity with creative thinking. Teachers give students the space to create bold ideas, fully mobilize and integrate life experience and aesthetic experience, and use subject knowledge to deepen understanding during the formation of creative thinking. Brainstorm in problem situations can continuously diverge and aggregate thinking, use tools such as mind maps to combine materials and ideas, achieve the connection between logical and visual thinking, and promote the birth of creative ideas. In the "brainstorming" session, teachers use integrated conceptualization to encourage students to freely express themselves, promote the development and deduction of creative thinking, and use design tools such as mind maps to organize and continuously optimize plans, forming design sketches. Students can continuously revise and improve their design plans through sketching, continuously optimize and improve them, and demonstrate the iterative nature of design thinking. In the "creation sharing" section, teachers organize students to share design sketches, present the designer's ideas, and listen to the opinions and feedback of other students, gradually forming problem-solving abilities under the advice and inspiration of teachers and classmates.

4.4 Experimental Stage: Project Design Practice, Creative Presentation, and Work Display

The learning task in the experimental stage is to transform ideas into practical works, form solutions to problems, and verify expected ideas and creativity through design practice. In the "task design" stage, teachers guide students to think from multiple perspectives, adjust the design process through phased group discussions and idea sharing, verify the feasibility of various design schemes through continuous iteration, and achieve the best results of project design. In the "skill guidance" section, teachers provide students with necessary equipment, supporting materials, and operation guides for designing activities to assist in the development of learning activities. At the same time, teachers should provide guidance on the application skills of design tools and software to students, encourage them to use different materials for creation, and generate more innovative ideas and thoughts. The "design practice" section focuses on cultivating students' collaborative and practical skills, continuously improving and optimizing design solutions. Teachers provide targeted stage evaluations during students' design practice, guiding them to continuously optimize project design outcomes.

4.5 Improvement Stage: Reflection and Evaluation, Scheme Update Iteration and Continuous Optimization

The learning task during the improvement phase is to reflect and evaluate, revise and improve the design plan, and summarize the creative process. In the "achievement display" section, teachers organize students to showcase the results of their design works, and exchange experiences through themed speeches, creative explanations, program introductions, and statement exchanges, promoting the improvement of students' comprehensive abilities such as divergent thinking, systematic thinking, and forward-looking thinking. Teachers should encourage students to share their creative process and insights, evaluate each other's works, and provide clear and effective improvement suggestions. The "iterative revision" stage involves mutual communication and comprehensive evaluation, followed by redesign, revision, improvement, and refinement of the project design scheme based on reference and evaluation opinions. The "evolutionary development" section extracts and summarizes project creation experience based on the complete learning process, providing reference for future art practice and design creation activities. In this teaching process, teachers should promptly provide summary optimization suggestions, guide students to summarize the gains and losses in the creative process, and cultivate students' innovative consciousness and practical ability in creative practice.

After the art practice teaching activities are completed, teachers also need to conduct comprehensive evaluation and teaching reflection on the teaching strategies, practical methods, teaching resources, evaluation and feedback mechanisms adopted, in order to continuously

optimize the teaching effectiveness of the curriculum.

5. CONCLUSION

Teaching practice has confirmed that the application of IDEO design thinking model in junior high school art "Design and Application" art practice teaching has continuously evolved and developed its conceptual connotation and extension, providing new ideas and methods for the reform of basic education teaching. The core elements of IDEO's five stages of design thinking, namely "discovery, explanation, ideation, experimentation, and improvement," are integrated into the teaching design of junior high school art courses, leveraging the practical value of design innovation activities. This enables students to closely associate life scenarios with artistic practice activities, thereby cultivating their creativity, observation, aesthetic ability, knowledge transfer ability, and comprehensive ability to creatively solve problems in learning and life. In the future, the concept, model, and related tools of design thinking can be utilized to carry out more diversified interdisciplinary teaching practices in the junior high school art curriculum system, forming deeper and more systematic innovative ideas and practical strategies for junior high school art design teaching, and further implementing the fundamental task of cultivating morality and talents, achieving the goal of comprehensive education.

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