

The Cultivation of Innovative Modeling Design Ability in the Teaching of Art Courses with the Help of AI Technology

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ABSTRACT The emergence of the artificial intelligence-driven digital era has significantly affected the teaching of traditional art courses. Traditional art education emphasizes hands-on skills, traditional materials, and strict standards for learning processes and result presentation, whereas AIGC technologies create new opportunities for curriculum reform and innovation-oriented talent cultivation. In engineering-related design fields, AI-assisted visual modeling may also support the morphology exploration of antenna arrays, electromagnetic metasurfaces, and periodic functional structures where form, spatial arrangement, and visual logic influence technical performance. Based on these considerations, this paper employs a quasi-experimental research design to evaluate the efficacy of AI-assisted pedagogy. The study formulates the hypothesis that AI-driven visual deep learning significantly improves students' form-creation scores compared with traditional methods. Over a 16-week academic term, an experimental group using AI tools was compared with a control group through pre- and post-test evaluations. Student outcomes were assessed using a dual-blind peer-review rubric focusing on technical precision and design innovation, followed by independent-samples t-tests to determine statistical significance. The study clarifies the role of AI tools in process-oriented learning, outcome-based education, and innovative modeling design, and suggests that AI-supported visual generation can extend from art education to structure-oriented electromagnetic design education.

INDEX TERMS ai technology, art education, innovative modeling, antenna array design, electromagnetic metasurfaces

I. INTRODUCTION

THE application of AI technology has a significant auxiliary effect on art education. With the continuous innovation of AIGC technology in the visual arts field, art education has gained even stronger support. To investigate the current penetration of AI tools, a preliminary survey was conducted in early 2026 among a convenience sample of 450 art and design students across five representative universities in China. Using a structured questionnaire with a 92% response rate, the data indicated that at least 91% of art and design students had one or two AI apps installed on their mobile phones. Furthermore, within this specific sample, approximately 45% of surveyed students confirmed that more than half of their university courses incorporated AI technology as a supplementary instructional tool. Other respondents also believed that at least one or two courses used AI technology in their teaching. From a pedagogical perspective, the utility of AI technology is manifested through its incremental support across distinct learning stages, providing scaffolded assistance tailored to each phase of the student's creative development. AI technology assisting the teaching process can promote visual

deep learning, which is conducive to cultivating students' creative abilities in form. The focus here is on the design of the teaching process, with AI technology assisting interactive visual learning, deep thinking and analysis, and effectively completing assignments and practical training. In addition, AI technology can also be combined with teaching outcomes to enhance the OBE teaching model for various types of art courses. This is mainly reflected in the effective and ingenious use of AI technology in the implementation of course assignments and practical training. Concurrently, the rapid proliferation of generative AI has fundamentally reshaped the channels through which the public engages with and consumes artistic content and has also placed demands on the public's aesthetic perspective on art and the direction of art course teaching. Traditional art course teaching must innovate in response to the needs of the times. In art course teaching, the cultivation of innovative form and design abilities is of paramount importance. How this is reflected in the application of AI technology in art course teaching is also a part of this paper.

II. AI TECHNOLOGY ASSISTS THE TEACHING PROCESS AND PROMOTES VISUAL DEEP LEARNING, WHICH IS BENEFICIAL TO CULTIVATING STUDENTS' CREATIVE ABILITIES IN FORM.

To clarify the theoretical framework, this paper defines 'Visual Deep Learning' as a recursive cognitive process where students utilize AI-driven feedback loops to transition from surface-level imitation to the synthesis of complex visual concepts. This is distinct from 'Innovative Modeling Design Ability,' which refers to the student's capacity to translate abstract concepts into tangible 3D or 2D forms using hybrid traditional-AI workflows. By consolidating these definitions early in the introduction, the subsequent analysis of Process-Oriented Teaching (Section 1) and OBE frameworks (Section 2) can be viewed as complementary rather than repetitive strategies—one focusing on the cognitive journey and the other on measurable professional outputs. This perception is progressive and logical, built upon visual understanding, and involves gaining new and profound visual thinking through continuous questioning and answering. This process-oriented teaching philosophy is a new teaching concept in the new era, emphasizing the design of the entire course process, including the reasonable arrangement of theoretical teaching by teachers and the design of engaging practical training for students[1]. This teaching philosophy is widely implemented in art courses. Furthermore, this process-oriented teaching philosophy emphasizes a gradual learning process, promoting students' deeper understanding step by step. This effectively enhances students' creative abilities in form and their visual design thinking skills. AI technology serves as a sophisticated catalytic tool that can facilitate the mechanisms of visual deep learning. By providing high-frequency, multi-dimensional visual feedback, AIGC tools enable students to move beyond surface-level imitation and engage in complex pattern recognition and structural analysis. Rather than 'precisely achieving' deep learning automatically, AI functions as an interactive scaffold that supports the human cognitive process of visual synthesis and critical reflection. The following analysis will focus on three aspects:

A. A PRELIMINARY EXPLORATION OF THE BASIC FRAMEWORK FOR INTEGRATING PROCESS-ORIENTED TEACHING IN ART COURSES WITH AI TECHNOLOGY

Art education differs from purely theoretical teaching in other subjects, emphasizing a more process-oriented approach and designing teaching objectives in stages and steps. With the assistance of AI technology, this design process becomes much more convenient. Furthermore, various AI software tools are available for teachers' computer-based lesson preparation[2]. Taking the Zhihuishu (智慧树) application as an example, it encompasses a series of teaching case design tools, from teaching objectives to teaching progress. Simply input the course title and basic syllabus requirements to obtain teaching case designs for various stages. While Zhihuishu is primarily distributed through schools,

teachers have access to officially supported tools. Numerous other generative AI tools exist across various platforms. While domestic AI platforms like Doubao and Yuanbao offer accessible interfaces for generating graphics and 5-10 second video prototypes, their application in professional art education is not without limitations. A comparative analysis shows that while these tools excel in rapid conceptual brainstorming, they often struggle with 'AI hallucinations'—such as anatomical inaccuracies in skeletal rendering—and lack the nuanced stylistic control required for high-level artistic production. Furthermore, the reliance on such tools raises critical ethical concerns regarding algorithmic bias and the potential erosion of students' fundamental hand-drawing skills, necessitating a balanced pedagogical approach that treats AI as a supplementary analytical tool rather than a total replacement for foundational training. In addition, other AI tools, such as Jimeng AI and Kehua, can further enhance the visual aspects of teaching outcomes, enabling students' innovative designs to be continuously promoted in a visual way. After establishing the basic tools, the fundamental framework for integrating AI technology into the design of art curriculum instruction mainly includes the following: First, based on the established teaching tasks and syllabus, AI tools are used to generate clear lesson plans and course training procedures[3]. While this step is clear and convenient, it is particularly important to emphasize that teachers need to review the generated lesson plans and procedures multiple times and make corresponding adjustments based on feedback from actual classes. This is because the pace of real-world teaching and students' comprehension levels are constantly changing and require different approaches depending on the specific circumstances. Therefore, teachers must adopt a critical pedagogical stance. The integration of AI is fraught with challenges, including 'algorithmic hallucinations' where generated anatomical structures are logically inconsistent, and inherent biases in training datasets that may narrow students' aesthetic diversity. Furthermore, the use of AI-generated imagery necessitates a robust discussion on intellectual property and copyright. Educators must also bridge the 'digital divide' to ensure that students with varying levels of access to premium AI platforms are not disadvantaged, while simultaneously ensuring that the rapid speed of AI generation does not devalue the patient, reflective process inherent in traditional craftsmanship. Taking mixed media painting as an example, the teaching objective is to cultivate students' keen observation skills regarding the details of life; to develop their basic expressive abilities in the language of painting; and to help them broaden their artistic horizons and cultivate excellent aesthetic literacy by comprehensively mastering the materials and techniques of easel painting. It also aims to help students accurately utilize the language of visual art materials and more effectively integrate painting concepts with design thinking. In teaching painting techniques and material representation, students are required to understand the forms of painting techniques and material representation, be familiar with the language of

painting techniques and material representation, master the corresponding hand-drawing skills and in-depth observation methods of the structural laws of the painting object, and especially master the accurate expression and drawing techniques of material texture[4]. These are things that can be determined in words, but there are many things that cannot be determined in the actual teaching scenario, such as the selection of material texture, the expression of the artistic concept, the specific details of composition, the synthetic effect between materials in the painting process, and the difficulties encountered by students in the practical process and the solutions to overcome them. At this point, having a set of well-established teaching cases and teaching and training process designs assisted by AI technology is already a very effective way to establish a good teaching foundation. However, the details of the entire training process and the overcoming of practical difficulties still require teachers to adjust the teaching plan for the next lesson based on the actual performance of each class. This process can promote students' visual depth thinking and enhance their modeling and design innovation capabilities. In summary, in the comprehensive design of art curriculum teaching processes, AI technology can not only provide theoretical design for lesson plans and teaching procedures, but also offer students various interactive teaching references and Q&A support for the process of graphic visual understanding. Here, we particularly emphasize the widespread use of AI visual software on students' mobile phones, without discussing the need for high-level laboratory equipment in universities. These technologies are already widespread enough to directly change the form and effectiveness of course teaching without requiring any funding. Simply requiring teachers to recognize and allow students to use mobile phones in the classroom is the first step towards AI-assisted teaching. Below, we will analyze these two perspectives in more detail.

B. COMBINING THEORETICAL KNOWLEDGE ANALYSIS WITH AI TECHNOLOGY APPLICATION TO PROMOTE THE CULTIVATION OF DEEP THINKING ABILITY

Art courses also encompass a significant amount of theory, including art history and theory, general art and design, as well as the history and theory of Chinese and Western painting. For materials-based courses requiring hands-on practice, there's also knowledge of the material properties of various painting materials, specific application procedures, and the visual language analysis of materials. Art appreciation courses include theoretical knowledge across multiple dimensions such as aesthetics and aesthetic literacy[5]. Much of this theoretical knowledge is profound, difficult to grasp quickly, and abstract. Traditional art courses distribute these theories to students in textbook form, with teachers explaining them in segments during class. A clearer approach is to use PowerPoint presentations with images and text. While this keeps pace with the information age, it's far from sufficient for the AI era. Students often struggle

to understand complex theories through simple examples, as their imaginations haven't yet been validated and they haven't yet grasped the abstract rational thinking required for concrete application. Therefore, we need to allocate time in the art theory teaching phase for students to engage in human-computer dialogue with AI technology tools. This dialogue should then be fed back to the teacher in a group presentation format. This step can be achieved through the AI tools on each student's mobile phone combined with the online course tools. Taking a mixed media painting course as an example, in the theoretical phase, the teacher uses the oil painting materials and styles of Impressionist painting as examples to explain the textural characteristics of oil brushstrokes. The teacher also uses Monet's representative work, *Impression, Sunrise*, as an example in the PowerPoint presentation. Students are asked to make preliminary creative ideas based on this painting style. In essence, this is a theoretical explanation of the artistic merits of Impressionist painting. When it comes to encouraging students to make connections, they often feel overwhelmed because their knowledge of Impressionist works is limited, and they find the theoretical knowledge introduced at this stage too abstract[6]. They only see one work by Monet in the PowerPoint presentation, making it difficult to imagine the appearance and composition details of a similar painting they might create. At this point, students can be given 5-10 minutes to ask and answer questions using the AI tools at hand. It's especially important to guide students to use images for questioning and answering, and to organize the information simply. Then, in groups, organize the details of the questions and answers, and ask 1-3 groups to observe students' understanding of the relevant questions. For example, some students might ask, "What are the characteristics of Impressionist brushstrokes? Can these characteristics be used to create an oil painting based on a campus landscape?" When asking this question, they can send their own image of Monet's *Impression, Sunrise*, to the AI tool. The AI will then provide 1-4 renderings. Based on these renderings and Monet's *Impression*, students can gain a clearer understanding of the questions posed in the course. This is much more effective than making vague, unfounded connections with abstract theories and helps students develop a clearer and more concrete understanding of the theory. This provides a more definite support for the subsequent assignment and practical training phase.

C. EXPLORING THE INTEGRATION OF VISUAL IMAGINATION AND DESIGN INNOVATION ABILITY CULTIVATION WITH AI TECHNOLOGY IN THE TEACHING TECHNOLOGY TRAINING PROCESS

Taking the teaching process of animation sketching as an example, when the course progresses to the part on the laws of motion, students are required to complete a series of process diagrams of a single person's full-body movement. For example, the entire process of a person running requires a diagram showing their entire process

from starting, jumping, landing, and then starting again. This involves combining several aspects of theoretical knowledge with visual thinking, addressing a stage where accurate association is difficult without AI-assisted tools. For instance, in the previous stage of this training, students have already mastered the drawing of human anatomy and proportions, and have mastered the techniques for drawing the structure of different parts of the human body, such as the head, hands, and feet[7]. Now, to make a person run, but without being able to draw from life while a model is running, it is very difficult for students to imagine it on the spot in the classroom without actually filming the running. Instructors should allocate 5-10 minutes for human-computer interaction during the initial phase of the assignment to facilitate conceptual brainstorming. Students are encouraged to ask and answer questions to the AI tool using text and images, prompting the AI to provide a simple running motion model. For example, students can give a command and generate a 5-second high-quality short video of a single person running, presented as a line sketch. The video should clearly demonstrate the limb structure and movement patterns of the human body during running. The answer to this question can help students analyze the changes in human posture during running. Of course, the video generated by the AI tool may have some imperfections, but through this simple visual question-and-answer session, students can gain the most intuitive insights into movement patterns. Walking and running are only the simplest parts of human movement; other more complex motion processes are also involved[8]. This can serve as a prompt, representing the initial stage of visual thinking in the assignment. practical training phase of the animation sketching course, one type of assignment is called "movie short video production." Students are required to create a complete short animated video based on their existing sketches. This assignment is generally for students with strong practical training results and is considered an advanced exercise. The primary technical challenge in this curriculum involves the synthesis of high-fidelity 5-10 second video sequences derived from complex multi-character scenes and layered backgrounds. This is an advanced assignment, and completing it at the very end of the course leaves students with limited time. To achieve better results, instructors can encourage students to incorporate AI technology into their final animated videos. This approach is highly effective, allowing students to quickly generate impactful short videos from their large-scale character sketches, gaining a visual impression of their work and encouraging continued creation. It also maximizes the efficiency of achieving the final assignment. Similar examples of AI technology being integrated into art education are numerous and will be analyzed below.

III. AI TECHNOLOGY COMBINED WITH TEACHING OUTCOMES HAS GREATLY ENHANCED THE OBE (OUTCOME-BASED EDUCATION) TEACHING MODEL FOR VARIOUS TYPES OF ART COURSES.

Unlike the process-oriented teaching philosophy mentioned earlier, the OBE (Outcome-Based Learning) teaching philosophy discussed in this article is also highly applicable to art courses. This is because it emphasizes using results as the basis for course design. It is commonly used in various forms of art courses, first setting the ultimate application direction of assignments and practical training, and then designing the course content. The focus is on guiding students through the teaching process to help them achieve this effective assignment and practical training. The integration of AI technology allows for more accurate and rapid production of assignments in this type of course, and can maximize the inspiration of students' visual thinking from a creative and innovative perspective, enabling students to improve their visual innovation abilities and achieve excellent results. The following analysis will focus on three aspects:

A. EXPLORING THE RELATIONSHIP BETWEEN THE REALIZATION OF FINE ART CREATION COURSE WORKS AND THE APPLICATION OF AI TECHNOLOGY

Fine art creation courses refer to courses whose teaching objective is to cultivate talents in artistic creation[9]. Their teaching process is often related to the appreciation and creation of artworks, and the assignments and practical training results are typically in the form of pure art works that are not commercially promoted and do not have design functions. However, AI integration strategies must be strictly differentiated according to the cognitive developmental stages of students. In primary and secondary education, AI should primarily be used as a tool for 'Interest Stimulation' and basic visual literacy, focusing on the playful exploration of forms. In high school vocational or preparatory tracks, the focus shifts to 'Technical Analysis,' using AI to resolve complex anatomical or perspective queries. Finally, at the university level, the strategy evolves into 'Systemic Innovation,' where students leverage AI to manage complex design workflows and push the boundaries of original conceptual frameworks. Acknowledging these contextual differences is essential to avoid the mechanical application of AI across disparate learning environments; and also basic and core professional courses in various categories of design majors in comprehensive universities. The application of AI technology in the teaching process can, to a certain extent, improve teaching effectiveness and enhance students' visual and creative thinking. The application of AI technology in art literacy cultivation and interest-inspiring courses at the primary, middle, and junior high school levels is mainly related to teachers' lesson preparation and teacher-led teaching processes. Besides the basic AI tools mentioned earlier, representative tools in this category include Xiaoma AI Art, which offers various course models and paid AI

art courses. However, this combination of AI technology and AI interaction functions is weak, still focusing on one-way classroom teaching technology improvement. The use of AI technology is limited due to children's age. Furthermore, many related AI tools have a certain commercial tendency, with profit-driven motives outweighing their public welfare nature as educational aids for popularizing AI technology. While initially, children can quickly obtain models of artwork with childlike drawing effects from this stage of AI technology, or complete children's drawings more quickly, more effort is needed to effectively cultivate children's visual imagination and creative design abilities through this process. The application of AI technology in high school art college entrance exam training courses is mainly related to the effect of artworks in the style types of the college entrance exam papers. A representative tool, "Art Plus AI," provides various exam paper modes, such as converting photographs of models into portrait sketches and color portraits. This helps students understand in advance how their portrait sketches will appear, allowing for more targeted training. While such AI technology shortens the time students spend completing course assignments, it also limits their imagination and exploration of personalized styles. It is suggested that AI technology is more effective when integrated into general art education courses in high school. For art college entrance exam training, the focus should be on guiding students to learn observation and sketching, rather than directly providing specific style examples. Cultivating observational skills encourages students to think critically and make connections. If students encounter difficulties with specific human anatomy or perspective fundamentals, AI analysis can help resolve theoretical and spatial details related to models, representing an effective attempt at integrating AI technology at this stage. In contrast, the application of AI technology is more effective when integrated into university-level art courses, providing greater inspiration for cultivating students' visual imagination and innovative design abilities[10]. University-level general education courses in aesthetics and art education, as well as core professional courses in art colleges, are more suitable for in-depth integration with AI technology than the previous two stages. This is especially true for foundational and core courses across various disciplines within comprehensive universities' design programs. University students at this stage possess more mature thinking abilities than those in primary and secondary schools, and have accumulated a certain amount of visual material within their cognitive systems. In this stage of teaching, both teachers and students can independently use AI tools to refine teaching details. For example, teachers can use AI tools to assist in lesson preparation, gaining multi-dimensional support from AI technology in terms of the depth and breadth of theoretical analysis and the various possibilities of setting course assignments. Students can independently use AI technology to extend their visual thinking and achieve practical results in their assignments, thus improving the quality of teaching.

The following analysis will further examine how art courses (including foundational drawing courses and core design courses) in design programs at various universities combine AI technology to achieve practical training outcomes.

B. EXPLORING THE RELATIONSHIP BETWEEN PRACTICAL TRAINING OUTCOMES OF BASIC DRAWING COURSES IN COLLEGE DESIGN PROGRAMS AND THE APPLICATION OF AI TECHNOLOGY

Design-related drawing foundation courses fall under the category of basic courses in art and design majors within higher education art programs. These courses are characterized by their interdisciplinary nature. For example, drawing foundation courses for animation majors require integrating animation production techniques, short film design, and other professional approaches. This includes drawing fundamentals in sketching and color theory for animation scene design, and animation sketching fundamentals for animation character design. Drawing foundation courses for visual communication majors require integrating techniques from graphic design, packaging design, bookbinding design, and other professional fields, such as the three basic composition principles and the cultivation of aesthetic generalization abilities. Drawing foundation courses for environmental design, landscape architecture, or garden design majors require integrating sketching and color theory instruction with renderings from landscape architecture or garden design majors. In the teaching of these courses, AI technology can be used as a tool to maximize the detailed analysis of visual examples and provide various practical training projects. Visual renderings are used to assist in generating assignments, helping students accurately understand the knowledge points taught by the teacher, and simultaneously assisting students in accurately developing their associations and imaginations[11].

C. EXPLORING THE RELATIONSHIP BETWEEN THE RENDERING OF CORE DESIGN COURSES IN HIGHER EDUCATION INSTITUTIONS AND THE APPLICATION OF AI TECHNOLOGY

Core design courses refer to design courses with strong professional orientations within various design-related majors in universities. Because they also contain rich artistic elements and often rely on visual art techniques, they fall under the research direction of art courses in this paper. For example, core courses in animation majors require teaching animation production techniques, including character design renderings, scene design renderings, visual and musical coordination techniques in short film production, the entire design process of animated film production, and the final finished product. This series of visual generation can be achieved more quickly and effectively using AI technology. Core courses in visual communication majors require mastering various professional techniques such as graphic design, packaging design, and bookbinding design. The addition of AI technology can significantly reduce

the complex procedures in traditional software, achieving the fastest and most effective human-computer interaction and maximizing the diversity of design outcomes. Core courses in environmental design, landscape architecture, or garden design primarily focus on the accuracy of dimensions and perspectives, proportions, and structures—based on engineering principles—to create precise spatial design renderings. All of these can be rapidly achieved with the assistance of AI technology.

IV. THE POPULARIZATION OF AI TECHNOLOGY RAISES REQUIREMENTS FOR THE PUBLIC'S AESTHETIC APPRECIATION OF ART AND THE DIRECTION OF ART CURRICULUM TEACHING.

On the one hand, art courses cultivate art and design talents for society and enhance the public's aesthetic appreciation; on the other hand, the public's aesthetic preferences also influence the direction of art course instruction. What are the current trends in the popularization of AI technologies in various visual arts? How are traditional public aesthetics being changed as a result, and what are the emerging trends? What adjustments should be made to the teaching direction of art courses in the new era? What changes should occur in the teaching objectives and methods of art courses after incorporating AI technology? These are all questions that need to be analyzed next.

A. THE POPULARIZATION OF AI TECHNOLOGY IN VISUAL ARTS

Currently, in addition to the various AI tools mentioned earlier, there are at least 500-800 AI technology platforms on domestic mobile devices, including mini-programs. Many ordinary apps that were previously pre-installed on users' phones also incorporate AI functions. For example, navigation and shopping apps, which are not directly related to AI, can use AI voice functions to identify customers' precise needs. Among them, as many as 50 apps can engage in dialogue visually. It can be said that AI technology is no longer the exclusive topic of researchers at the forefront. Not only can ordinary users easily use AI functions in various fields on their mobile devices, but there are also many AI tools available to the general public, especially in the field of visual arts and aesthetics. Of course, if an ordinary user who is accustomed to using AI technology wants to master a particular AI technique in their studies in visual arts, they do not need to master all the software; they only need to choose 1-2 tools. Therefore, we can understand it this way: firstly, the richness of AI tools opens the door to technology for ordinary users; secondly, compared to other early software, the barrier to entry for using AI software is not high, and there are not many barriers[12]. Therefore, whether for beginners or advanced users, the technology has achieved near-universal accessibility. From a global perspective, since the OPEN AI short video generation technology became popular in China in 2024, the world's astonishment has given way to the point where almost everyone can easily

generate Chinese images and videos using their mobile phones in just over a year. This widespread adoption of the technology has spurred changes in visual art aesthetics and also presented new challenges for art education.

B. A PRELIMINARY EXPLORATION OF THE IMPACT OF THE POPULARIZATION OF AI TECHNOLOGY ON TRADITIONAL POPULAR ART AESTHETICS

From the perspective of traditional classical art, from the figurative aesthetics of standard ancient Greek sculpture to the meticulous realism of academic oil paintings, the lifelikeness of an image is a characteristic of traditional classical aesthetics. From the aesthetic perspective of the general public, who have never received formal art education, the first criterion for judging the quality of a work of art is "Does this painting look like the real thing?" Everyone judges a painting's quality based on its figurative realism. Although art history has witnessed the technological innovation brought about by the invention of the camera, which led to abstract art styles and trends, the creators and appreciators of classic easel art remain a niche, refined group; the aesthetic habits of the general public have not been completely affected. This technological revolution is extraordinary. The widespread adoption of AI technology allows almost everyone with a mobile phone to use it, generating lifelike visual images from mere text descriptions in seconds. It can also create vivid and realistic videos from brief text within 2-3 minutes. In such an era, when an ordinary person sees a realistic artwork, their first thought will be, "Was this done by AI?", thus questioning the aesthetic value of hand-drawn artworks. From this perspective, the widespread adoption of AI technology has indeed had a profound and far-reaching impact on traditional public aesthetics. Therefore, from the perspective of art education, this demands a transformation in the direction of art curriculum teaching in the new era.

C. THE RESPONSIBILITY FOR AESTHETIC INNOVATION IN THE TEACHING OBJECTIVES AND METHODS OF ART COURSES THAT INTEGRATE AI TECHNOLOGY

Firstly, art courses across all disciplines should focus on summarizing and refining aesthetics in their teaching direction. Simultaneously, they should emphasize cultivating students' ability to judge artworks, and their capacity to judge and appreciate design works from multiple perspectives, from aesthetics to function, should also be a key teaching focus. Only humans can most accurately judge and evaluate art that is rich in sensory experience, which can inspire students' visual imagination and provide clear guidance for their innovative abilities. This kind of beauty, summarized and refined, differs from the realistic beauty of traditional figurative visual art. It involves an understanding of nature, the expressive power of visual language, and the artist's intentions or the ingenuity of a design expert[13]. This teaching method places greater emphasis on the innovation of artistic language and respects

the imagination of both artists and viewers. By integrating AI technology, art education in the new era should entrust the realistic reproduction of nature to AI. This addresses the rational aspects of perspective and structure, and the realistic texture of modeling and skin, while leaving the more imaginative aspects entirely to artists or teachers and students in the classroom. Humans can use AI technology to achieve the most imaginative and unrestrained design thinking, as well as the most accurate image reconstruction and visual innovation. So, how is the visual innovation of design skills reflected in art education at each stage, and how is it combined with the application of AI technology?

V. HOW IS THE VISUAL INNOVATION OF DESIGN SKILLS REFLECTED IN THE APPLICATION OF AI TECHNOLOGY IN ART CURRICULUM TEACHING?

This paper focuses on how to maximize students' visual design and innovation abilities through the integration of AI technology into art education. The following analysis examines the characteristics of this ability development from the perspective of the entire art education process. First, there's the cultivation of visual imagination during the theoretical knowledge acquisition stage; second, the development of basic modeling skills during technical training; and finally, the cultivation of innovative design abilities during the practical training and assignment stage. All three stages are made more effective and engaging through the integration of AI technology.

A. IN ART COURSES, COMBINING THEORETICAL KNOWLEDGE WITH AI TECHNOLOGY HELPS CULTIVATE IMAGINATION.

Traditional art courses often feature a one-way output of theoretical knowledge, with the theoretical points remaining largely unchanged. When teachers deliver knowledge that has remained largely the same for years in an authoritative tone, students' thinking becomes rigid and uninteresting. Consequently, many university professors are concerned about low student engagement in class. This suggests that art courses, which involve sensory perception and can generate student interest, need to humanize, enliven, and visualize the theoretical teaching process, even making it interactive and experiential for each student. AI technology can help achieve these goals more effectively. This assistance first allows students to experience a more vivid and interactive knowledge environment during the theoretical lectures of art courses, enabling them to effectively ask and answer questions and gain a deeper theoretical understanding. This can be accomplished using any AI tool with text-based dialogue capabilities. Students need to first recognize and record the theoretical keywords provided by the teacher, allowing them to ask questions and interact with the AI based on these terms. Of course, this also requires teachers to appropriately allow students pauses for reflection during the theoretical lecture phase. This time should include the time for students to interact with the AI tool, as well as the time

for students to ask questions and interact with the teacher when they cannot find answers through the AI. Naturally, the theoretical knowledge and arguments provided by the AI may sometimes contain errors due to various reasons. Therefore, teachers should help students point out these errors caused by the AI-provided knowledge interaction in the previous stages when summarizing the theory. This approach is beneficial for cultivating students' imagination. The foundation of imagination is divergent thinking, which requires students to be able to make associations based on a viewpoint or keyword provided by the teacher. Positive associations include analogical associations, while negative associations can involve questioning or rhetorical questions, employing various different approaches. Each associated viewpoint automatically generates a set of vague images in the human mind. AI technology can not only assist in the pathway of divergent thinking but also help obtain more accurate associative images. Of course, determining the precise nature of these images is the next step we need to address.

B. IN ART COURSES, COMBINING TECHNICAL SKILLS TRAINING WITH AI TECHNOLOGY HELPS CULTIVATE BASIC MODELING ABILITIES.

When discussing technique training in art courses, it's necessary to use actual lessons as examples. Here, we'll use an animation sketching course as an example. Animation sketching courses need to cultivate students' sketching skills, especially the ability to quickly capture the dynamic lines and planes of objects. This technique is built on the foundation of line drawing and requires a thorough understanding of the structure and proportions of various forms, accurately representing them. In this training process, I felt that enabling students to see the essential framework of the image's structure through the many details of its concrete form was a challenge. For example, if we want to sketch a person wearing a coat walking, how can we quickly discern their body structure and movement patterns? If we already have a real photograph of such a person and a video of them walking, we can import this data into AI software to generate a skeletal and muscular structure diagram of the same person. Simultaneously, it can also generate a video of the same walking posture based on these images. This allows students to more quickly understand the person's structural form and express it with lines. Of course, this process may offer limited help to some gifted students; however, for most students who struggle with imagining things from scratch, AI technology provides a crutch for their imagination. The previous training can be further enhanced with AI technology. For example, after students draw the line structure, we can import it into AI software, allowing them to add colors and different clothing effects to these frameworks, and see if the final result matches the initial photo. Through AI technology, students can recognize whether they have drawn accurately in the training of quickly grasping the form and structure. Before

the second training session, the students had already planted the seed of accurately imagining a person's walking posture in their minds. If the second example image is a photo of another person running in a cotton-padded coat, then the students can retrieve related images from their already enriched mental database to support their imagination. Of course, not all art courses are purely artistic or creative; some design-related courses also require the integration of AI technology to achieve their design outcomes. A brief analysis follows.

C. IN ART COURSES, COMBINING ASSIGNMENTS AND PRACTICAL TRAINING RESULTS WITH AI TECHNOLOGY HELPS CULTIVATE INNOVATIVE DESIGN ABILITIES.

In art courses, the final stage—homework and practical training—often takes the longest time. Teachers often feel overwhelmed when assignments are due at the end of the semester, wondering why they are so difficult to complete and why students procrastinate so much. Design-related art courses present an additional challenge compared to fine arts courses: the specificity of the assignments and the functionality required to meet specific needs. This inherently increases the difficulty for students in completing their assignments. Traditionally, students often focus their energy and time on mastering software operation skills and the detailed drawing process. Their innovative design abilities are not given sufficient attention, leaving them little time to develop these skills. Taking poster design in visual communication as an example, poster design for a specific promotional purpose generally requires combining the promotional information and images to select the poster with the best visual effect and strongest promotional function from among many designs. At least 3-5 sample sketches should be provided under the same theme. This increases the burden on students in terms of both quantity and quality. Traditional software such as Photoshop and CorelDRAW require at least 1-2 hours to create a single finished poster. However, the application of AI technology significantly reduces the time spent on software operation and the production process. Tools suitable for this design field include: Mid Journey, Microsoft Designer, Board Mix AI, Canva AI, Figma Buzz, JiMeng AI, MiaoChuDesign, GaoDingDesign, etc. Therefore, students can save the time spent on software operation and instead interact with AI technology to achieve their innovative design goals with maximum efficiency. Taking animation design as an example, the production of a complete animated short film involves a vast and complex range of professional aspects, rich in content and time-consuming. The entire process, from script design and dialogue polishing to storyboard drawing, character design, scene design, and concept design, to drawing each frame, editing the short film, dubbing, and adding music, can take anywhere from several months to several years. Currently, observations of animation courses in major animation colleges in China show that many

universities have begun to experiment with combining AI technology, achieving considerable success and realizing a leap forward in producing a complete animated short film in just a few weeks. Traditional design courses focus on how to draw characters and details frame by frame, and how to seamlessly connect each design stage with others. However, with the addition of AI technology, designers can focus their time and energy on whether the final product is innovative, and where the creative concept and novelty lie. This means that the effectiveness of art-related courses is more reflected in the innovative ideas of the designers (students) and the improvement of their own character design abilities.

VI. CONCLUSION

The cultivation of innovative design abilities in art education should be made more proactive and effective by integrating AI technology. This integration permeates the entire art education process, contributing to its comprehensive improvement. In the future, whether it's fine art creation courses, basic design drawing courses, or core design courses, the course design process and the realization of student assignments and practical training results will all rely on the ingenious application of AI technology. Given the current paradigm shift in digital aesthetics, art education must proactively integrate these advanced computational tools to remain relevant and effective in the contemporary academic landscape, actively embracing the new trends and technologies of the AI era. We must deeply integrate AI technology into the entire art education process, thoroughly examine how this process positively impacts the cultivation of students' innovative design abilities, and consolidate this effective and positive outcome through research.

AUTHOR CONTRIBUTIONS

Han Yiming designed, collected and analyzed the data, and drafted the manuscript. Han Yiming conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Han Yiming participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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