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Artificial Intelligence Empowers Art Classrooms: Exploring the Boundaries Between Teaching Assistance and Creative Substitution

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Abstract: This paper focuses on the application of artificial intelligence in art classrooms, delving into its significant advantages in teaching assistance and the controversies arising from its potential creative substitution attribute. By analyzing AI's role in providing art teaching resources and personalized learning support, as well as its impact on the artistic creation process and work styles, this study attempts to clarify the boundary between AI's teaching assistance and creative substitution in art classrooms. Although AI has undeniable value in enriching teaching methods and broadening students' horizons, human artists still dominate in emotional expression and the transmission of ideological connotations, with irreplaceable characteristics. Clarifying these boundaries helps art educators better utilize AI technology to improve teaching quality and cultivate students' artistic literacy and creativity.

Keywords: Artificial intelligence; Art classrooms; Teaching assistance; Creative substitution; Boundaries

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1. Introduction

With the rapid development of science and technology, artificial intelligence is permeating various fields at an unprecedented pace, and art education is no exception. The integration of AI technology has brought new vitality and changes to art classrooms, demonstrating unique advantages from the acquisition and presentation of teaching resources to the assistance of students' creative processes. However, with the rise of AI painting and other technologies, controversies have emerged regarding whether AI will replace humans in artistic creation. Therefore, exploring the boundary between teaching assistance and creative substitution of AI in art classrooms is of great significance for giving full play to the role of AI technology and promoting the healthy development of art education.

2. Current application of artificial intelligence in art classrooms

AI technology has greatly enriched art teaching resources. With the help of the Internet and AI algorithms, teachers can easily access a large number of artworks and high-definition art videos covering various global artistic styles and schools. In addition, through AI dialogue systems, students can interact with characters in the Tang Dynasty painting "Picture of Ladies Preparing Silk" and immerse themselves in historical scenes with the assistance of dynamic image generation technology. This not only broadens students' artistic horizons but also deepens their understanding of artworks. Meanwhile, AI can intelligently screen and recommend relevant teaching resources according to teaching needs. AI systems conduct in-depth analysis of various learning data of students, including not only basic data such as homework completion and classroom performance, but also data on preferences for different artistic styles. The personalized learning model is like building an exclusive artistic growth ladder for each student. It not only accurately meets the learning needs of different students, allowing advanced students to continuously break through in challenges and helping beginners consolidate their foundations step by step, but also fully stimulates students' learning enthusiasm. When students find that the learning content is customized based on their own interests and abilities, they will participate more actively, thereby effectively improving learning outcomes and enabling each student to shine in art education. Innovative technologies such as ChatGPT and Stable Diffusion have broken the traditional norms in the art field, triggering controversies about banning AI art and promoting the development of the Non-Fungible Token (NFT) market. As a creative tool, AI plays a key role in art classrooms, providing support for painting and design.

3. Advantages of artificial intelligence-assisted teaching

The teaching dilemmas in traditional art classrooms often lie in limited teaching resources and a single teaching method. Due to the geographical limitations of physical collections and the static nature of display forms, students find it difficult to conduct in-depth observations and multi-dimensional analyses of art treasures; the one-way knowledge transmission model also leads to insufficient cognitive participation and creative output of students in the learning process. The integration of AI technology is like injecting a clear spring into traditional art classrooms, completely changing this situation with diverse forms of expression and fully stimulating learning interest through immersive experiences. In the virtual exhibition space constructed by AI, students can instantly "be present" in the Louvre exhibition hall by wearing lightweight virtual reality equipment. Touching the virtual screen, the local details of "Mona Lisa" will be infinitely magnified, allowing them to clearly see the texture of paint accumulation on the canvas, and even understand the direction and strength of each brushstroke Da Vinci used during creation through system simulation. Interactive art appreciation has subverted the traditional explanation model, and the intelligent system acts as a "personal art consultant" to accurately capture students' needs. In the classrooms of Xi'an Academy of Fine Arts, students have realized the innovative expression of traditional lantern culture with the help of AI technology. This interesting and innovative learning process allows students to deeply participate in the digital transformation of traditional art, greatly stimulating their enthusiasm for art learning and making them more actively engaged in classroom learning. The powerful data processing and analysis capabilities of AI technology have built an accurate and efficient teaching decision support system in the field of art education, providing scientific basis for teachers to optimize teaching. It has fundamentally changed the extensive management model relying on empirical judgment in traditional teaching and significantly improved the operational efficiency of the entire teaching process. This

technological empowerment is reflected not only in the speed of data processing but also in the in-depth insight into teaching details, making teaching adjustments more targeted and forward-looking. Through the AI teaching platform, teachers can real-time grasp students' learning progress and knowledge mastery, and timely adjust teaching content and methods; AI automatically generates teaching reports to help teachers summarize teaching experience and optimize teaching strategies. AI technology is reshaping the cognitive landscape of art education with revolutionary power, building an art learning ecosystem that breaks through physical time and space constraints. In traditional art education, geographical barriers and lack of resources have always been the core bottlenecks restricting the expansion of students' horizons. Students in inland cities may never have the opportunity to see the treasures of the Louvre during their studies, and learners in remote areas also find it difficult to access the precious cultural relics of the Forbidden City. However, the digital art resource network driven by AI has completely broken this time and space barrier, allowing global art treasures to enter classrooms in the form of interactive digital content and become accessible learning materials. The in-depth integration of art and AI is essentially cultivating students' interdisciplinary thinking abilities and endowing artistic cognition with a broader methodological dimension. With the help of AI technology, students can break through time and space constraints to contact excellent artworks from around the world. Combining art with AI to cultivate students' interdisciplinary abilities enables students to view artistic creation and development from a more macro perspective.

4. Impact of artificial intelligence on artistic creation

In recent years, AI-generated texts have surged online, and this trend has become more obvious with the rapid development of generative AI algorithms. For example, the GPT-3 model released by OpenAI in 2020, based on the Generative Pre-trained Transformer architecture, contains 175 billion parameters, more than the number of neurons in the human brain. With just a few "prompts", GPT-3 can generate coherent, logically consistent content that is difficult for humans to distinguish [1]. At the end of 2022, OpenAI launched the more powerful ChatGPT model, triggering a generative AI revolution and bringing AI-generated content into public view. The quality of content generated by ChatGPT is significantly better than that of GPT-3, and in many cases, humans cannot accurately judge whether it is created by AI [2]. The emergence of AI painting has brought significant changes to the artistic creation process, constructing a new type of collaborative creation mechanism of human-machine platform interaction: users only need to provide creation needs, style preferences, thematic connotations, and other information in text or language form on the AI painting platform, and the rest of the work is independently completed by AI. After AI undertakes the basic visual construction work, human creators can focus on deepening thematic significance and strengthening emotional tension by making local adjustments to the AI-generated works, realizing the sublimation from "qualified works" to "touching works." In the visual ecology of AI painting, artistic styles have broken through the limitations of human creators' individual experiences, showing unprecedented diversity. The centrality of this is seeing it in terms of the development it brings to the school environment [3]. On mainstream platforms, there are not only surrealist works that digitally translate Dali's style through algorithmic random elements and integrate contemporary metaphors but also works with strong subjective colors and amazing tension: some works push Van Gogh's yellow-blue contrast to the extreme, containing more than 200 color gradients; other works adopt Fauvist flat colors but optimize color transitions through algorithms to form a unique rhythm. Children's style creation subverts the evaluation

standard of “mature techniques”, capturing children’s pure perspective with seemingly random lines and exaggerated proportions, but hiding precise algorithms in details to balance “innocence” and “exquisiteness.” The mainstream aesthetic tendency of AI-generated works is popularization and popularization. Since most users of AI painting platforms are non-professional artists who create out of a hobby and lack systematic art training, their works reflect public aesthetics.

5. Controversies and limitations of artificial intelligence creative substitution

Although AI painting can generate various works with unique styles, there are significant gaps between AI creation and human creation in terms of originality and emotional expression. “The new curriculum standard” points out: “in English teaching, in addition to the rational and effective use of textbooks, educators should also actively use other curriculum resources, especially radio and television programs, audio and video materials, intuitive teaching aids and physical objects, multimedia CD-ROM materials, various forms of network resources, newspapers and magazines, etc” [4]. AI works are generated by learning and imitating existing works, lacking the unique life experience and emotional perception of human artists. Artistic creation is not only a display of skills but also an expression of the creator’s inner world. Each brushstroke carries their emotions, thoughts, and understanding of life [11]. AI works may be perfect in form, but they often lack a soul and are difficult to truly touch people’s hearts. Works with high artistic value and ideological depth usually stem from artists’ in-depth thinking on society, life, and history. The new teaching materials currently used in rural secondary schools possess an innovative form, interesting content, flexible practice design, adequate oral training, and extensive knowledge background [5]. AI painting algorithms have not yet learned to experience human life, nor can they understand the complex connection between human nature and art, leading to the general problems of insufficient artistic value and lack of ideological depth in the works they generate. Although AI can realize various creative ideas technically, these ideas often lack substantial connotations and are difficult to trigger the in-depth thinking that works by human artists can bring. Some AI-generated works may have infringement risks and trigger legal disputes [12]. Therefore, with the development of AI painting technology, there is an urgent need to establish and improve ethical and legal norms to maintain a healthy creative environment. As Romele observes, major image institutions such as Getty Images maintain commercial agreements with leading tech platforms, ensuring their databases are prioritised in default search results [6].

6. Exploration of the boundary between artificial intelligence teaching assistance and creative substitution

In art classrooms, the positioning of AI should be clearly defined as a teaching auxiliary tool. Gîrbacia, in heranalysis of cultural heritage classification practices, shows that most models (such as ResNet, Inception-V3, and PointNet) are designed without modules for interpreting cultural context [7]. It can serve as a powerful support to provide teachers with rich resources, support personalized teaching, improve teaching efficiency, and, at the same time, provide students with creative inspiration and technical support to broaden their artistic horizons and ideas. As Zhou et al. note, systematic bias still persists in the application of VLMs to digital cultural heritage [8]. However, teachers must always occupy a dominant position in teaching, guide students to understand the essence of art, and cultivate their aesthetic ability and artistic literacy. In the creation process, students are the core creators, and AI only serves as an auxiliary tool, unable to replace students’ thinking

and emotional expression. The core of artistic creation lies in human beings' unique emotional expression, ideological connotations, and innovative abilities. Although AI performs well in terms of efficiency and style diversity, human artists are irreplaceable in these core dimensions [10]. Art education should focus on cultivating students' innovative abilities and personalized expression, encouraging them to accumulate creative materials through personal experiences and life observations, and form unique styles. Teachers should guide students to correctly view AI technology: use it to improve creative abilities but not rely on it, while maintaining enthusiasm and awe for artistic creation. Although AI cannot completely replace human creation, human-machine collaborative creation is still an important development direction in the field of art in the future. In art classrooms, students can be guided to collaborate with AI, leveraging its advantages in data processing and rapid creative generation, combined with their own emotions, thoughts, and aesthetic judgments to create more innovative works [12]. Through this collaborative model, creative efficiency can be maximized, human-machine advantages can be complemented, and the development of artistic creation can be promoted. As Naik and Nushi have pointed out, open datasets such as LAION-5B are predominantly built in English-language contexts and rely heavily on sources from North America and Western Europe, with significant underrepresentation of visual content from regions like Africa and Southeast Asia [9].

7. Conclusion

The development of AI technology has brought many opportunities to art classrooms, showing significant advantages in teaching assistance [13]. However, in terms of creative substitution, AI has limitations such as insufficient originality, a lack of emotional expression, and shallow artistic value, and cannot completely replace human artists. Art educators should give full play to the auxiliary role of AI, adhere to the core position of human creation, promote human-machine collaborative creation, and cultivate talents with both innovative abilities and artistic literacy for the new era [14]. With the continuous evolution of AI technology, it is necessary to continuously pay attention to its application in the art field, and constantly explore and adjust this boundary to ensure that AI better serves art education and creation [15].

Disclosure statement

The author declares no conflict of interest.

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