DOI: 10.53469/jerp.2024.06(10).11

Thoughts on the Construction of Art Curriculum Using Generative AI

Rongrong Qiao*, Yanan Zhao, Zhiqiang Han

School of Fine Arts, Shanxi University, Taiyuan 030006, Shanxi, China
**Correspondence Author*

Abstract: ***Curriculum construction is an important part of improving the quality of higher education. With the rapid development of artificial intelligence technology, generative AI is having a profound impact on the construction of first-class courses in art majors in colleges and universities. This study aims to explore how generative AI can enable the construction of first-class courses in art majors, and analyze its specific application and effect in curriculum construction through practical cases.***

Keywords: Generative AI, Art majors, Curriculum construction, Text to image**.**

1. Introduction

The era of the fourth industrial revolution, led by digital convergence technologies such as robotic engineering, bioengineering, nanotechnology, and quantum computing, led by artificial intelligence (AI), is driving changes in the working methods and lifestyles of all walks of life. Similarly, The application of artificial intelligence in the field of education is gradually showing its huge potential. Since the advent of ChatGPT in November 2022, research related to generative AI has been in the exploratory stage in the field of art education [1]. For the construction of art curriculum, the empowerment of generative AI is of obvious necessity. It can not only innovate teaching models and improve teaching quality, but also promote interdisciplinary learning and integration, realize personalized teaching and accurate assessment, and promote education. Equity and resource sharing as well as improving teachers' professionalism and teaching efficiency. Therefore, we should actively explore and apply generative AI technology to contribute more to the construction of art curriculum.

2. Necessity and Purpose of the Study

Since the emergence of chatGPT, the necessity of artificial intelligence education and application has become even stronger. AI before ChatGPT required understanding of basic principles and algorithms before it could be used, so education also focused on understanding AI principles. However, after the launch of ChatGPT, the use of AI began to become popular. Even if they do not know the technical principles, anyone can use it as long as they can enter prompts. For the construction of first-class courses for art majors, the empowerment of generative AI is obviously necessary, mainly reflected in the following aspects:

2.1 Innovate Teaching Mode and Improve Teaching Quality

Generative AI can dynamically generate new learning content, including text, pictures, audio, video, etc. These diverse content forms can greatly enrich the teaching resources of art courses. Through mind-linked dialogues with generative AI, teachers and students can jointly explore the infinite possibilities of art, thereby innovating teaching models and improving teaching quality. For example, in art courses, AI can generate paintings of various styles for students to refer to and learn from, and can even provide personalized advice and guidance based on students' creative needs.

2.2 Promoting Interdisciplinary Learning and Integration

In the field of art, art education is particularly focused on cross-genre, complex, and interdisciplinary visual culture [2]. The content of art education itself is based on the understanding of human life and culture, and is actively created and expressed based on senses and experience [3]. Generative AI can help students transcend disciplinary boundaries and achieve interdisciplinary learning and integration. For example, through AI-generated interdisciplinary project learning activities, students can combine scientific knowledge to create art, or transform literary works into visual art works. This interdisciplinary learning method can broaden students' horizons and cultivate their innovative thinking and comprehensive abilities.

2.3 Personalized Teaching and Accurate Assessment

Generative AI can provide personalized teaching content and evaluation methods based on students' individual differences and learning needs. In art curriculum, each student's artistic style and creative ability are unique. AI can provide personalized learning suggestions and creative guidance for students by analyzing their works and creative processes. At the same time, AI can also accurately evaluate students' works, helping teachers better understand students' learning situation and progress, so as to adjust teaching strategies and provide more targeted help.

2.4 Promote Educational Equity and Resource Sharing

The application of generative AI can break the limitations of geography and time, so that high-quality educational resources can be widely disseminated and shared. For art majors, some high-quality works of art and teaching resources are often difficult to obtain. AI can provide more students with opportunities to learn and refer to by generating similar or related works of art and teaching resources. This helps promote educational equity and narrow the educational gap between different regions and schools.

2.5 Improve Teachers' Professional Literacy and Teaching Efficiency

The application of generative AI can also improve teachers' professional literacy and teaching efficiency. Teachers can continuously learn and master new teaching techniques and methods through interaction and communication with AI. At the same time, AI can also provide teachers with rich teaching resources and cases to help them better design and implement teaching plans. This helps to reduce the workload of teachers and improve their teaching efficiency and quality.

In the field of art, generative AI is considered to be a new creative tool and has great application value as a learning tool to support art education. In the new technological era of various digital integrations, the application of interdisciplinary and AI has become an essential content for the cultivation of creative and integrated talents required by the times. Therefore, in the construction of art curriculum, it is necessary to use generative AI, a new art creation tool and learning tool. This study explores the way teachers and students generate artificial intelligence through images in art professional courses, creating a new form in education and verifying its effectiveness and possibility.

3. Using Generative AI as an Educational Tool in Art Curriculum

3.1 The Emergence of Generative AI and the Transformation of AI Education: from Manufacturing to Use

The types of AI education can be roughly divided into four types: education for creating AI, education for how to use AI, education for using AI, and education for preparing for an AI society. AI education before the emergence of ChatGPT required proficiency in the basics of computer engineering, such as the concepts and implementation principles of AI. However, after the emergence of ChatGPT in 2022, the situation of AI education changed dramatically. ChatGPT, which is based on chat, allows ordinary people without technical knowledge to easily use large language models. In 2023, ChatGPT equipped with the GPT4 model was launched, and its performance was improved compared to before. Most importantly, the emergence of multimodal AI has further expanded the application field of ChatGPT, which can generate not only text, but also results such as images, sounds, and videos, and can generate the same type of data text by simply inputting text. In recent years, with the development of various platforms, people can choose the corresponding AI platform according to their personal level, educational content, and situation without developing separate applications, thereby increasing the usage rate. Since AI research has a long history, there are many AI-related studies in the field of education, but this study involves generative AI that can be used without professional knowledge since ChatGPT. Therefore, this study will focus on image generation AI after the emergence of ChatGPT and the use of these AIs as learning tools.

3.2 Using Artificial Intelligence as an Art Education Tool

After ChatGPT was commercialized, research on the application of artificial intelligence in various disciplines in the field of education was also very active. Among them, the research focus in the field of art education, which is highly relevant to this study, is on the use of artificial intelligence to generate images. For example, Guoliang Huang, et al. (2024) believed that the emergence of artificial intelligence generated content (AIGC) in the field of education, especially in product design, marks a watershed, which heralds a major improvement in traditional teaching methods and has the potential to catalyze unparalleled innovation [4]. Qianling Jiang, et al. (2024) explored the key factors that affect design students' acceptance of AIGC-assisted design courses, and provided specific strategies for course design to help students better learn this new technology and enhance their competitiveness in the design industry [5]. Sijin Zhu, et al. (2024) studied the potential impact of ChatGPT on artistic creation and collaboration [6]. Based on previous studies, the advantages of using generative AI in artistic activities are: first, it helps imagination and flexible thinking, thereby promoting "creative expression". Second, the use of new tools increases the immersion and fun of the classroom. Third, after simple modification and deformation, a complete result can be created, which helps to improve efficiency. Therefore, the use of generative AI in art curriculum is generally effective, but on the other hand, the effectiveness of AI teaching will be affected by the differences in students' individual abilities or characteristics (such as digital literacy levels) and teaching methods [7]. To find out how effective generative AI is for the growth of creativity in art education requires a professional and complex design and verification process, and the results are difficult to generalize. But what is certain is that generative AI has the function of an auxiliary tool for art education. Art education is an activity based on the aesthetic experience of objects and phenomena to express and appreciate one's own feelings and thoughts, and requires materials and tools to express feelings and thoughts intuitively. Each student has different technical proficiency in materials and tools, so support tools are needed to minimize the difficulty of expression [8]. In generative AI, text-to-image generative AI only needs to write down feelings and ideas to obtain images in the desired form. Therefore, compared with the process of learning and becoming familiar with the use of various art tools, it can be regarded as an easy-to-master tool and it is easier to obtain the corresponding artistic effect. Based on previous research results, this study believes that in the construction of art curriculum, the use of artificial intelligence in the conception stage of creative works will play a positive role as an educational tool to help artistic creation.

4. Generative AI Empowers Art Curriculum Practice

4.1 Design and Construct Curriculum based on the Principles of Art Education

The course of this study takes the visual communication art major as an example, takes "traditional culture" as the theme for creation, uses generative AI as a tool for expression and artistic creation, and combines it with other disciplines based on the creativity, flexibility and integration properties of visual arts. The creativity of the course is to form a unique point of view in the process of visually expressing the theme

of "traditional culture", express subjective emotions, and refer to the "traditional culture" creation results generated by AI to complete the work. The course objectives are set as follows:

First, understand the essence of traditional culture. Students will have an in-depth understanding of the core elements of traditional culture, including but not limited to calligraphy, Chinese painting, paper-cutting, shadow play, traditional festivals and celebrations, folk tales and myths, etc. Through research and analysis, students can identify and explain the potential value and application of these traditional cultural elements in modern visual communication design.

Second, master generative AI technology. Students will learn the basic principles of generative AI and practice the automatic generation of images, graphics and text content using mainstream generative AI tools (such as DALL-E, Midjourney, Stable Diffusion, etc.).

Third, the integration and innovation of traditional culture and AI art. Students will explore how to combine traditional cultural elements with generative AI technology to create visual communication design works that are both culturally rich and modern. Through project practice, students will learn to use AI technology to innovate traditional patterns, color matching, composition layout, etc., while maintaining respect and inheritance of traditional culture.

Fourth, critical thinking and aesthetic improvement. Cultivate students to critically evaluate the application effect of generative AI in visual communication design, understand its limitations and possible ethical and social impacts. Through case analysis, improve students' artistic appreciation ability and aesthetic level, and learn to examine and evaluate the cultural connotation, creative expression and technical realization of design works from multiple perspectives.

Fifth, teamwork and project management. In group projects, students will learn how to communicate effectively, divide labor and cooperate, and jointly promote the implementation of design projects, including conception, technology selection, design iteration and final display. Emphasize the importance of cross-disciplinary cooperation, encourage students to cooperate with classmates from different professional backgrounds, and jointly explore the new boundaries of the integration of traditional culture and AI.

Sixth, sustainable development and social responsibility. Guide students to think about the role of visual communication design in promoting cultural inheritance, enhancing social cohesion, and promoting sustainable development. Students are encouraged to design projects with a sense of social responsibility, such as using AI technology to contribute to the protection of intangible cultural heritage and public welfare publicity.

4.2 Selecting Generative AI as a Learning Tool

In order to effectively use artificial intelligence as a learning tool, it is necessary to practice the actual use of artificial intelligence programs, conduct appropriate teaching according to the students' digital literacy level, and determine the methods and tools of learning. For text-based image generation artificial intelligence, there are programs from different platforms, and each program has different accessibility, user interface and functions, and usage methods, so choosing a program suitable for personal expression of creativity is a very important issue. First of all, art learning tools should have the characteristics of convenience, appropriateness, functionality, practicality, creativity, etc. In this study, generative AI can be used in the conception stage of artistic expression activities. It is both a medium for learning and a focus of education. Therefore, the text-based image generation artificial intelligence Midjourney and Stable Diffusion were selected as learning tools for the course.

4.3 Teaching Plan

Visual communication design is the active behavior of conveying something through visual forms. Its design reflects the characteristics of the times and its rich connotations. In modern society, visual communication design has changed from a single applied art painting to a visual information communication method with modern design elements. The course of this study aims to cultivate students' visual communication design ability and creative thinking by applying generative AI as a creative tool and combining traditional cultural elements. It includes four stages, as shown in Table 1.

Table 1: Generative AI empowers art course teaching plan

Teaching Plan	Course Content	Teaching Methods
Phase 1: Traditional culture and design foundation	● The concept and importance of traditional culture ● Basic concepts and principles of visual communication design ● Extraction and analysis of visual elements of traditional culture	● Lecture method: explain the historical background of traditional culture and basic theoretical knowledge of design ● Case analysis method: analyze the application cases of traditional culture in visual communication design ● Group discussion method: students discuss the visual elements of traditional culture in groups and extract design inspiration
Phase 2: Introduction and Application of Generative AI Technology	● Basic concepts of generative AI ● Application of generative AI in visual communication design, including creative generation, image and graphic generation, etc. ● Practical exercises using generative AI tools	● Lecture method: explain the basic principles and application scenarios of generative AI technology ● Practical operation method: students use generative AI tools for practical operation exercises under the guidance of teachers ● Work evaluation: teachers evaluate students' generative AI design works and put forward suggestions for improvement
Phase 3: Creative design combining traditional culture with generative AI	● Integrated design of traditional cultural elements and generative AI technology ● Case analysis of the application of traditional culture in modern visual communication design ● Planning and implementation of creative design projects	● Project-based learning: students work in groups to carry out creative design projects, combining traditional cultural elements with generative AI technology ● Group discussion method: students work in groups to discuss the creative points and implementation plans of design projects ● Tutor guidance: teachers provide full guidance on students' design projects, provide technical support and design suggestions ● Work display and evaluation: students display their design works, conduct

		self-evaluation and mutual evaluation, and teachers conduct summary evaluation
Phase 4: Design Ethics and Social Responsibility	• Basic principles and considerations of design ethics • Social responsibility in visual communication design • Ethical considerations of traditional culture in visual communication design	• Lecture method: Explain the importance of design ethics and social responsibility • Ethical case discussion: Students discuss design ethics cases and analyze moral dilemmas • Social service projects: Students participate in social service projects related to traditional culture and practice social responsibility • Social responsibility project report: Students report their experience and reflections on participating in social service projects

4.4 Teaching Evaluation

Teaching evaluation includes course objectives, evaluation criteria and evaluation methods. The course objective of this study is to use generative AI to empower the development and implementation of art curriculum, observe and summarize the teaching process, and innovate the teaching system. Therefore, the focus of the evaluation is on the effectiveness and appropriateness of using generative AI as a learning tool in art courses. To this end, this study conducted a questionnaire survey on learning after the course practice, and as a researcher and teacher, reflected on and qualitatively evaluated the course development and implementation process. Among the 48 students, all students participated in the questionnaire, and the response rate reached 100%. The participating students were 27 undergraduate juniors (56.3%) and 21 sophomores (43.7%).

First, in order to understand whether students have experience in artificial intelligence education and the differences, when asked "Have you known about artificial intelligence before", 30 (62.5%) students answered "No". As for the students who answered that they knew about artificial intelligence, the survey found that the content was mainly "metaverse" or "robots", so they had no experience similar to this course.

Secondly, in order to understand the students' interest in this course plan, when answering "What is the most interesting activity in class?", 15 (31.3%) students answered "expressive activities using traditional cultural elements", and 10 (20.8%) students answered "activities using generative AI" were interesting. Another 8 (16.7%) said there were no interesting activities. Therefore, the empowerment of artificial intelligence has aroused the interest of most students.

When asked about "the experience of using image-generating AI", 28 (58.3%) said they had never used it. When asked about the use, usability and effectiveness of generative AI, "whether the image-generating AI achieved the expected results", 25 (52.1%) answered "as expected" and 5 (10.4%) answered "exceeded expectations". 18 (37.5%) answered "below expectations". Most people got as much or more results as expected.

When asked "Is it difficult to use the image-generating AI tool, and if difficult, what is the reason", 26 (54.2%) students answered "not difficult". Among the students who found it difficult, 10 (20.8%) answered "because it was difficult to write explanatory sentences", 7 (14.6%) answered "because an account (login) was required", and 4 (8.3%) answered "because there were no suitable tutorials". This result shows that it is not very difficult for college students to use generative AI programs, but how to write prompts to get the results they want and the login process are factors that reduce usability.

Next, in order to understand whether generative AI is effective as a learning tool for artistic expression activities, when asked "What are the difficulties in artistic expression activities", a total of 26 students (54.2%) answered "difficult". Among them, 14 (53.8%) said it was difficult to "imagine what to draw or express", and 8 (30.7%) said it was difficult to "express their thoughts and feelings truthfully". Another 3 (11.5%) said they had difficulty "using other drawing tools such as PS". Therefore, when asked "whether the use of generative AI helps artistic expression activities, and if so, in what aspects", a total of 43 people (89.6%) said it was helpful. Among them, 15 people (34.9%) answered that "expressing thoughts and feelings as they are" and "not willing to use other tools to create images", and 13 people (30.2%) answered that they were helped by "imagining what to draw or express". Five of the 48 people (10.4%) said "not helpful". These answers show that it helped students in "what to draw", "expressing thoughts and feelings", and "using art tools" that they found difficult in artistic activities.

As a researcher and teacher, it can be confirmed that there are differences in the course process and results compared with works that do not use generative AI. In other courses that do not use generative AI on similar topics, homework is done only based on learners' ideas, and it takes a relatively long time to collect materials and determine preliminary plans, and there is a lack of detailed descriptions or multiple expression elements in actual creation. The results of the questionnaire survey of this course, which was conducted with reference to the AI-generated image, show that there was no great difficulty in "how to express" during the conception and creation process. In addition, in order to obtain the desired effect, the prompt content can be modified to gradually concretize one's own ideas.

5. Conclusion

From the evaluation results, it can be seen that the application of generative AI in art curriculum is conducive to artistic expression activities. The number of students who think that the level of results is at or above expectations is greater than that of students who answer below expectations, which is a positive result. From the perspective of teachers, courses empowered by generative AI not only improve students' immersion in class, but also show better results in terms of the diversity of results and the delicacy of expression than courses using traditional education methods.

Art connects the senses and thinking. Art curriculum teach students to solve problems creatively in the process of expanding knowledge and experience and visualize them as works. Therefore, image-based generative AI in the era of

artificial intelligence is an excellent tool for art curriculum to create. This study proposed and implemented generative AI as a tool for art education, taking the visual communication art course as an example, and explored the methods and possibilities of selecting and using generative AI in art curriculum. After the course practice, through the survey results of students, image-based generative AI produced the expected results and helped solve the difficulties in conceiving works, expressing thoughts and feelings, and using other creative tools. The evaluation of teachers also showed that generative AI can improve students' attention and help students who have difficulties in art creation to learn. Students are able to further concretize their ideas by writing prompts and refer to the images generated thereby. In this way, more forms of results can be seen compared to courses that do not use image-generating AI. In addition, in order to improve the effectiveness of using generative AI and reduce negative experiences, it is necessary to master the skills of using generative AI software.

With the rapid development of new technologies such as artificial intelligence, the field of education is undergoing unprecedented changes. Artificial intelligence provides more possibilities for education, promotes the innovation of art curriculum teaching models and improves the quality of education. Educational curriculum that use artificial intelligence technology must also maintain attention and research to build a virtuous cycle structure of education to cope with changes. This study will help develop a complete art curriculum project that can be applied to the actual education field in the future, and contribute to the next stage of generative artificial intelligence application research.

Acknowledgments

This paper is supported by the following fund project: "Exploration of the construction path of first-class visual communication majors based on the development of Shanxi's characteristic professional towns", a general project of higher education teaching reform and innovation project in Shanxi Province (No.: J20230024).

References

[1] Sohail S S, Farhat F, Himeur Y, et al (2023). Decoding ChatGPT: a taxonomy of existing research, current challenges, and possible future directions. Journal of King Saud University-Computer and Information Sciences, p.101675.

[2] Sheridan, K. M., Veenema, S., Winner, E., & Hetland, L (2022). Studio thinking 3: The real benefits of visual arts education. Teachers College Press.

[3] Kim J O, Kim J (2020). Development and application of art based STEAM education program using educational robot. Robotic systems: Concepts, methodologies, tools, and applications. IGI Global, p.1675-1687.

[4] Huang K L, Liu Y C, Dong M Q, et al (2024). Integrating AIGC into product design ideation teaching: An empirical study on self-efficacy and learning outcomes. Learning and Instruction, p.101929.

[5] Jiang Q, Zhang Y, Wei W, et al (2024). Evaluating technological and instructional factors influencing the acceptance of AIGC-assisted design courses. Computers and Education: Artificial Intelligence, p.100287.

[6] Zhu S, Wang Z, Zhuang Y, et al (2024). Exploring the impact of ChatGPT on art creation and collaboration: Benefits, challenges and ethical implications. Telematics and Informatics Reports, p.100138.

[7] Lee, Jaeye (2023). Practical Aspects of AI Collaborative Art Teaching and Learning. Art Education Discussion, p.128-155.

[8] Unggi Lee, Sang-Hee Kang, Jong-Chan Lee, et al (2020). Development of Deep Learning-based Art Learning Support Tool: Using Generative Modeling. A Study on Education Information Media, p.207-236.