Practical Paths and Optimization Strategies for AIGC — Empowering Industrial Design Education

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Abstract: With the rapid development of artificial intelligence technology, AIGC demonstrates significant application potential in the field of industrial design. This article focuses on the impact of AIGC on industrial design education, analyzes the transformations it brings in aspects such as innovating teaching models, enriching teaching resources, and enhancing students' innovation capabilities. It also delves into the challenges in terms of technology, ethics, and educational concepts during the application process and proposes corresponding countermeasures. The aim is to provide references for industrial design education to keep up with the pace of the times and cultivate more competitive industrial design talents.

Keywords: AIGC; Industrial Design Education; Teaching Reform; Countermeasures

1. Introduction

In the digital age, the rise of AIGC technology has brought new development opportunities and profound changes to the field of industrial design. Industrial design education, as a crucial approach to cultivating professional design talents, faces the key issue of how to effectively integrate AIGC technology into it, so as to improve the quality of education and enhance students' comprehensive qualities. In-depth research on the application of AIGC in industrial design education is not only conducive to promoting the innovative development of education and teaching but also can supply high-quality talents that meet the needs of the times for the industrial design industry.

2. Transformations Brought by AIGC in Industrial Design Education

2.1 Innovating Teaching Models

AIGC technology promotes the transformation of teaching models from traditional one-way lectures to interactive and inquiry-based teaching. Through intelligent teaching platforms, students can have real-time exchanges with virtual tutors and obtain personalized learning guidance[1]. For instance, in design courses, once students input design requirements and creative ideas, AIGC tools can rapidly generate multiple design sketches and plans. This not only stimulates students' design inspiration but also guides them to explore the diverse possibilities of design in depth. Moreover, the integration of virtual reality (VR) and augmented reality (AR) technologies with AIGC enables students to vividly experience the actual effects of design works in different scenarios, thus deepening their understanding and perception of design.

2.2 Enriching Teaching Resources

AIGC has the ability to generate a large amount of teaching materials quickly, covering various aspects such as design cases, models, and tutorials. Teachers can utilize AIGC tools to customize teaching resources according to teaching objectives and student characteristics, making the teaching content more diverse and practical[2]. For example, AIGC can create industrial design cases of different styles and industries, which helps students broaden their design horizons and keep abreast of design trends. In addition, AIGC can visually present complex design principles and processes, such as by creating vivid animations, effectively reducing the learning difficulty for students.

2.3 Enhancing Students' Innovation Capabilities

In industrial design education, AIGC serves as a powerful tool to stimulate students' innovative thinking. Students can break through traditional thinking patterns with the help of AIGC tools and explore multiple design possibilities rapidly[3]. For example, by using AIGC for creative association, students can input keywords or concepts to generate novel design inspirations related to them. Subsequently, students can refine the design by combining their professional knowledge and creativity. This approach not only improves students' design efficiency but also cultivates their ability to think from different perspectives, fully unleashing their innovative potential.

3. Challenges Faced by AIGC in Industrial Design Education

3.1 Technological Updates and Insufficient Teacher Competence

AIGC technology is evolving at a rapid pace, with new tools and applications emerging continuously. This places high demands on teachers' technical proficiency and application capabilities[4]. However, currently, some teachers do not have a profound enough understanding and application of AIGC technology, making it difficult for them to integrate it effectively into teaching. Moreover, the rapid update of technology requires teachers to constantly learn new knowledge, undoubtedly increasing their work pressure and learning burden.

3.2 Ethical and Security Issues

There are potential ethical and security risks when AIGC generates content. On one hand, design plans may involve intellectual property issues, and there is a risk of infringement in the content generated by AIGC[5]. On the other hand, the information generated by AIGC may contain incorrect or harmful content, which is likely to mislead students' values and cognitions. Meanwhile, data security cannot be overlooked. When students use AIGC tools, their personal information and design works may face the risk of leakage.

3.3 Lagging Educational Concepts and Evaluation Systems

Traditional industrial design educational concepts and evaluation systems focus on students' hand-drawing abilities, software operation skills, and other aspects, and are hard to meet the requirements for students' comprehensive abilities in the AIGC era. In the context of AIGC-assisted design, students' innovative thinking, critical thinking, problem-solving abilities, and the rational use of AIGC tools are becoming increasingly important. However, the existing educational concepts and evaluation systems have not incorporated these factors into consideration in a timely manner. This is not conducive to the comprehensive development of students and also affects the effective application of AIGC technology in education.

4. Countermeasures for Industrial Design Education in the AIGC Era

4.1 Strengthening Teacher Training and Professional Development

Schools and educational institutions should attach great importance to improving teachers' AIGC technical capabilities. Regularly organize relevant training sessions and seminars, and invite industry experts and technicians for professional guidance to help teachers master the application methods and techniques of AIGC in industrial design education. A hierarchical training system can be established, offering primary, intermediate, and advanced training courses for teachers with different foundations. The primary courses focus on the basic operations and principle explanations of AIGC tools; the intermediate courses explore the application of AIGC in the design process; and the advanced courses concentrate on the cutting-edge development and innovative applications of AIGC technology.

Meanwhile, teachers should be encouraged to actively carry out teaching research and practical exploration, promote the in-depth integration of AIGC technology and teaching content, and innovate teaching methods and curriculum systems. Set up special teaching research funds to support teachers in conducting AIGC-related teaching reform projects. In addition, build a teacher communication and cooperation platform to promote experience sharing and common progress among teachers. Through a combination of online and offline methods, organize teachers to hold AIGC teaching experience sharing meetings, case seminars, and other activities to create a favorable teaching research atmosphere.

4.2 Establishing and Improving Ethical and Security Guarantee Mechanisms

Formulate complete ethical guidelines and norms to clarify the boundaries of use and responsibilities of AIGC in industrial design education. Strengthen ethical education for students and teachers, enhance their awareness of intellectual property rights and information discrimination, and guide them to use AIGC tools correctly. At the same time, adopt technical means to ensure data security, such as encrypting students' personal information and design works to prevent data leakage. Schools and educational institutions should also establish a security monitoring mechanism to promptly detect and handle ethical and security issues that occur during the application of AIGC.

4.3 Innovating Educational Concepts and Evaluation Systems

Establish an educational concept centered on cultivating students' innovation capabilities and comprehensive qualities, and emphasize the cultivation of students' autonomous learning, cooperative learning, and inquiry-based learning abilities in the AIGC environment. In curriculum settings, add theoretical and practical courses related to AIGC[6], such as "AIGC Design Principles and Applications" and "AIGC and Innovative Design Thinking", to guide students to correctly understand and use AIGC tools.

In terms of the evaluation system, construct a diversified evaluation index. Besides traditional skill assessments, add evaluations of students' innovative thinking, problem-solving abilities, teamwork abilities, and the use of AIGC tools. For example, set up open-ended design projects in course assignments and exams, require students to complete them using AIGC tools, and comprehensively evaluate students' performances from multiple dimensions. Meanwhile, introduce process-based evaluation and pay attention to students' growth and progress during the learning process. Adopt the portfolio evaluation method to record students' creative ideas, plan modification processes, teamwork performances, etc. in AIGC design projects, and comprehensively assess students' learning achievements.

5. Conclusion

AIGC has brought unprecedented changes to industrial design education, providing strong support for teaching model innovation, teaching resource enrichment, and the enhancement of students' innovation capabilities. However, during the application process, there are also many challenges that need to be addressed through strategies such as strengthening teacher training, establishing ethical and security guarantee mechanisms, and innovating educational concepts and evaluation systems. Only in this way can industrial design education achieve sustainable development in the AIGC era, cultivate high-quality industrial design talents with both innovative spirit and practical abilities, and meet the needs of society and the industry for innovative design talents. Looking ahead, with the continuous development and improvement of AIGC technology, its application prospects in industrial design education will be even broader, which requires educators to pay continuous attention and actively explore.

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