The Application of AIGC in 3D Graphic Design Courses

-- Taking the Cinema4D Teaching Course as an Example

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Abstract. AIGC, which stands for Artificial Intelligence Generated Content, is a new form of content creation following PGC and UGC. Its rise is due to breakthroughs in deep learning technology and the increasing demand for digital content. AIGC can create new forms of digital content generation in multiple fields such as dialogue, images, and videos based on models trained with large amounts of data. In art design courses, AIGC can expand creativity, improve efficiency, and achieve personalized design. Taking the Cinema4D teaching course as an example, AIGC can quickly generate renderings based on sketches during the modeling process, reducing the debugging phase; it can output initial drafts that match the design style in a short time during the rendering stage; and it can also rapidly generate multiple posters and character portrait materials that fit the brand's tone for advertising design. Integrating AIGC into Cinema4D teaching helps students enhance their design capabilities and adapt to the new trends in industry development.

Keywords: AIGC; 3D Teaching; Cinema 4D; Graphic Design.

1. Introduction

In today's digital age, digital technology is developing at an unprecedented speed. AIGC (Artificial Intelligence Generated Content), as a new form of content generation, has emerged accordingly. Relying on cutting-edge technologies such as deep learning and natural language processing, AIGC has powerful data processing and generation capabilities, and is gradually permeating and profoundly influencing various fields, especially teaching activities in art and design.

Taking the widely used Cinema 4D teaching in the field of 3D graphic design as an example, the traditional teaching model faces many difficulties. From the perspective of creative inspiration, students are often limited by their own limited knowledge reserves and fixed ways of thinking, making it difficult for them to break the mold and explore unique and novel design concepts. In terms of operation, the complex tools and functions of Cinema 4D, such as polygonal modeling, material texture editing, and animation production, present a steep learning curve for beginners, increasing the difficulty of learning and consuming a lot of time and energy. Moreover, due to the limitations of knowledge transfer and creative inspiration in traditional teaching, teaching efficiency is hard to improve effectively.

The emergence of AIGC provides new ideas and methods for solving these problems. By learning and analyzing a vast amount of design data, it can provide students with diversified creative inspiration and break through mental barriers. With simple text input, it can quickly generate relevant design concepts and models, reducing the operational threshold and improving teaching efficiency. This article aims to deeply explore the application of Artificial Intelligence Generated Content (AIGC) in 3D graphic design courses, especially Cinema 4D teaching courses, and to provide new ideas and methods for teaching and practice in related fields as well as the evaluation criteria for student works.

This paper briefly describes AIGC products suitable for students, clarifies their advantages and characteristics in content generation, and how to apply them to teaching activities. It then analyzes in detail the current situation and needs of Cinema 4D teaching courses, including course objectives, teaching content, and difficulties faced by students.

On this basis, the specific application of AIGC in Cinema 4D teaching is deeply explored. For example, in the creative conception stage, AIGC can generate a variety of creative solutions to inspire students' design thinking. In the operational stages of modeling and rendering, AIGC's intelligent algorithms can improve operational efficiency and lower the learning threshold. At the same time,

through case analysis, the application effects of AIGC in Cinema 4D teaching are demonstrated, verifying its effectiveness and feasibility.

Finally, the future development trend of AIGC application in 3D graphic design courses is anticipated. It points out its great potential in promoting teaching innovation and cultivating high-quality design talents, and also raises possible problems and challenges in the application process, providing a reference direction for future research.

2. AIGC Products Suitable for Art and Design Teaching

2.1 Midjourney

Midjourney is a well-known AI drawing tool. Its functional feature is to transform textual descriptions into images. By describing the design requirements, users can have the AI generate corresponding images according to their needs, which facilitates more people in expanding visual creativity. [1] However, the software also has its drawbacks. It has relatively high requirements for students' usage. First of all, students are required to be proficient in the use of English, especially in describing the style of the picture, the size and position of objects, etc. They need to provide detailed descriptions as shown in Figure 1.



Figure 1. Description of the Visual Content

In teaching, it is necessary to inform students how to use these terms and provide the correct English translations for them in order to generate the corresponding renderings. Another issue is the requirement for a stable internet connection and the relatively high cost of the paid service, which can pose certain difficulties for students to some extent.

2.2 Dui You

Dui You is a design service platform launched by Alibaba Design, a subsidiary of Alibaba Group in China. The main feature of this platform is its extensive collection of high-quality 3D materials, covering categories such as characters, scenes, and elements. It supports online editing and is free for commercial use. Users can modify the color and background of existing 3D models. For students in the classroom, all interfaces are in Chinese, and they can use Chinese to describe the terms. In classroom teaching, this saves students the time needed to learn English on their own and reduces the time spent learning professional terminology. With standardized descriptions, creative images can be generated.

2.3 Ji Meng

Ji Meng is a one-stop AI creative platform launched by Shenzhen Lianmeng Technology Co., Ltd., a subsidiary of ByteDance [2]. It supports text-to-image and image-to-image generation. Users can input keywords or descriptions to generate corresponding images. It also allows for creative modifications such as background replacement, style conversion, and maintaining character poses on uploaded images. Additionally, it features layer-by-layer AI generation, AI expansion, partial repainting, and partial erasure. In classroom use, students can take existing models and use AI repainting to showcase multiple creative variations of the images.

3. Stages of Cinema 4D Teaching Courses Where AIGC Should Be Applied

3.1 Course Introduction Stage

With the continuous development of Artificial Intelligence Generated Content (AIGC) technology, its potential for application in the field of education is becoming increasingly remarkable. AIGC can inject new vitality into the teaching process, especially in terms of stimulating students' interest, where it shows great value. Teachers can skillfully use AIGC tools to generate highly visually striking Cinema 4D works, such as amazing science fiction scenes and fantastic dream creatures. These works, with their realistic effects and rich imagination, can allow students to intuitively feel the unique charm of 3D design. When students see these eye-catching 3D works, their curiosity and desire to explore will be quickly ignited, thus generating a strong interest in the course. This kind of interest stimulation not only enables students to participate more actively in learning in class but also lays a good foundation for subsequent teaching activities, making the teaching process smoother and more efficient. Through the deep integration of AIGC and 3D design teaching, teachers can create a creative and interesting learning environment for students, helping them better understand and master the relevant knowledge and skills of 3D design, cultivate their innovative thinking and practical abilities, and open a door full of possibilities for their future development.

3.2 Basic Theory and Operation Learning Stage

AIGC (Artificial Intelligence Generated Content) has shown great potential in the field of education, especially in helping students understand complex concepts. Taking polygonal modeling as an example, this field is often full of challenges for beginners because it involves many complex geometric principles and operational skills. However, with the help of AIGC technology, simple and understandable modeling step demonstration animations can be generated. These animations can clearly and intuitively show every key link of polygonal modeling step by step, from the basic vertex creation to the complex face patch splicing. Every step is presented through vivid visual effects,

enabling students to easily follow the pace and understand the logical relationships. In addition, AIGC can also generate vivid 3D model examples. Through these examples, students can intuitively see the specific impact of different operations on the model's shape. For example, how the model's shape will change when the position of a certain vertex is adjusted, and how the model's structure will change when an edge is added or deleted. This intuitive way of presentation not only helps students better grasp the operational skills but also stimulates their interest and enthusiasm for polygonal modeling, making them more actively involved in the learning process. With the help of AIGC, complex concepts that were originally obscure and difficult to understand become vivid and easy to understand, greatly improving students' learning efficiency and depth of understanding.

3.3 Creative Conceptualization Stage

In today's learning environment, which is full of innovation and imagination, AIGC (Artificial Intelligence Generated Content) is not only a supportive tool, but also an indispensable and important component. For students, the emergence of AIGC has greatly lowered the threshold for creative expression, enabling them to quickly transform their vague and abstract creative ideas into concrete and visible images or simple models. This ability is of inestimable value in stimulating students' creativity and imagination.

For example, when a unique idea such as a "steampunk-style airship" emerges in a student's mind, it is often difficult for them to accurately present it with their own drawing or modeling skills. However, with the help of AIGC tools, students only need to simply input this descriptive keyword, and the AIGC system will quickly understand its intention and generate a series of related concept drawings. These concept drawings not only intuitively show the appearance characteristics of the steampunk-style airship, such as the retro metal texture, complex gear structure, and unique flight posture, but also provide students with rich inspiration and clear direction through different design styles and details.

In this way, AIGC not only helps students to concretize abstract ideas, but also stimulates them to further explore and deepen the possibilities of design. Students can think based on these concept drawings, further refine their design ideas, and even use these concept drawings as a starting point for more creative extensions and innovative practices. AIGC plays a crucial role in this process. It not only provides students with a platform for creative expression, but also greatly expands their thinking boundaries, allowing creative sparks to burst forth more freely.

3.4 Project Implementation Stage

AIGCplays a crucial role in improving students' project efficiency and optimizing outcomes. When students embark on actual projects, they often need to spend a significant amount of time building basic models or designing scene layouts from scratch. However, AIGC can quickly generate high-quality basic models and scene layouts, providing students with a solid starting point. These generated contents not only cover common design elements and structures but can also be preliminarily customized according to the specific needs of the project. Students can modify and improve upon these foundations, thereby greatly saving the time and effort required for designing from the ground up, allowing them to devote more time to refining creativity and details.

After the initial draft is completed, the role of AIGC does not end. It can further conduct a comprehensive evaluation of the initial draft based on design principles and aesthetic standards. AIGC can analyze various aspects of the work, such as composition, color matching, and element proportions, and provide specific optimization suggestions. For example, it can point out whether the position of a certain element needs to be adjusted to achieve better visual balance, or suggest changing a particular color to enhance the overall aesthetic appeal. These optimization suggestions are not only based on extensive design theories and practical experience but also take into account current design trends, helping students to review their work from a professional perspective and further improve the quality and professionalism of their work.

In this way, AIGC not only provides efficient basic support for students in the early stages of the project but also offers strong guidance for optimizing their work in the later stages. This comprehensive support enables students to complete projects more efficiently while ensuring that the quality of their work reaches a higher level. The application of AIGC not only improves students' work efficiency but also helps them continuously learn and grow in the design and creation process, ultimately achieving more outstanding work outcomes.

In summary, the integration of AIGC (Artificial Intelligence Generated Content) into Cinema 4D courses (a professional 3D modeling and animation software) can play a significant role in multiple key stages, providing comprehensive support for students' learning and creation.

4. Case Studies of AIGC in Cinema 4D Teaching Courses

4.1 Case of Creative Inspiration

In the early stage of creative inspiration in the course, the teacher assigned the task of "designing a unique future transportation vehicle." At first, student Xiao Li had no idea where to start. By using an AIGC tool and inputting "future transportation vehicle, integrating sci-fi and eco-friendly elements," AIGC generated a series of highly creative concept drawings. Some were levitating, teardrop-shaped cars with solar panels on the body; others were aircraft that unfolded like wings, powered by hydrogen energy. Inspired by these ideas and combining his interest in space exploration, Xiao Li designed a future urban commuting vehicle that looks like a spaceship and is powered by anti-gravity technology. See Figure 2.



Figure 2. Futuristic Urban Commuting Vehicle Resembling a Spaceship

4.2 Case of Basic Modeling Assistance

When teaching basic modeling, student Xiao Wang had difficulty understanding the complex polygonal modeling operations and kept making mistakes while creating a simple mechanical part model. Using an AIGC assistant tool, Xiao Wang input "mechanical part, cubic main body, with cylindrical protrusions and threads," and AIGC quickly generated the corresponding basic model along with simple modeling step prompts. Referring to the model and steps, Xiao Wang successfully completed his own part modeling and gained a deeper understanding of polygonal modeling operations.

4.3 Case of Material and Rendering Optimization

In the material and rendering section of the course, student Xiao Zhang was unable to achieve the desired texture when creating the material and rendering effect for a vintage wooden chest. With the help of an AIGC analysis tool, Xiao Zhang uploaded his work and input "vintage wooden chest, add signs of age and a sense of luster." AIGC provided suggestions for adjusting the material parameters,

such as reducing the clarity of the wood texture, increasing roughness, and adjusting reflectivity. After making the suggested changes, Xiao Zhang rendered a wooden chest with realistic texture that perfectly conveyed the vintage charm.

4.4 Case of Full-Process Assistance in Project Practice

In the final project "Commercial Packaging Display Scene," the student team fully utilized AIGC. During the early planning stage, they used AIGC to generate overall layout concept drawings for the park. In the modeling phase, AIGC quickly generated basic models for product accessories and decorations. During the material and rendering stage, they referred to AIGC's optimization suggestions. In the animation production phase, AIGC assisted in generating camera movement paths and keyframe references. [3] Ultimately, the team efficiently completed the project. The work was not only creatively novel but also visually impressive. See Figure 3.



Figure 3. Commercial Packaging Display Scene

5. Evaluation System of AIGC in Cinema 4D Teaching Courses

5.1 Work Outcome (40%)

Model Quality (20%): Assessed from three aspects: model precision, detail handling, and structural rationality. Models with sufficient polygons, reasonable topology, rich details, and logical structure can earn high scores; conversely, those with obvious issues will receive lower scores.

Material and Rendering (10%): Judged by whether the rendered materials authentically reproduce the texture of objects and whether the lighting effects are natural. Works that create a good atmosphere can earn high scores.

Animation Performance (10%): Examines the smoothness, rhythm, and creativity of action and camera design in animations. Smooth and creative animations will receive higher scores.

5.2 Creative Thinking (30%)

Uniqueness (15%): Works that demonstrate innovation in concept and presentation, breaking traditional thinking, can earn higher scores.

AIGC Inspiration Util (ization15%): Assesses whether students can transform AIGC-generated inspiration into their work and further develop it. Higher scores are given for effective transformation and innovation.

5.3 AIGC Tool Utilization (20%)

Prompt Usage (10%): Evaluates whether the prompts input by students are accurate and rich, and whether they can precisely and detailedly describe their needs to guide AIGC to generate ideal content. High scores are given for effective prompt usage.

Result Screening and Integration (10%): Observes the efficiency and accuracy of students in screening AIGC results, as well as their ability to integrate the selected results into the Cinema 4D creation process. High scores are given for quick screening and smooth integration.

5.4 Learning Attitude and Collaboration Skills (10%)

Learning Attitude (5%): Assessed based on students' participation in AIGC-assisted teaching in class and their independent use of AIGC tools for learning after class. High scores are given for active participation and independent learning.

Collaboration Skills (5%): In group projects, observes students' collaboration with team members and their contributions to the team. High scores are given for good collaboration and significant contributions.

6. Learning Challenges of AIGC in Cinema 4D Teaching Courses

6.1 Difficulty in Changing Mindsets

Over-reliance on AIGC: With the assistance of AIGC tools, students can quickly obtain a large number of creative ideas and design solutions. For example, in a scene design course, when student Xiao Zhang was given the task of "designing a fantasy forest scene," he directly used AIGC to input keywords and obtained a series of concept drawings of fantasy forests in various styles. He did not think deeply about these concept drawings but simply chose one of them and built the scene according to the elements in the drawing. As a result, he lacked independent thinking and creative exploration throughout the creative process, and his final work lacked uniqueness and depth, being just a superficial imitation of the AIGC results. [4]

Difficulty in Balancing Human-Computer Collaboration: Students need to find a balance between the assistance provided by AIGC and their own professional knowledge and creativity. For example, when making character animations, student Xiao Li wanted to use AIGC-generated animation keyframes to improve efficiency on the one hand, but on the other hand, he was worried that this would make the animation lose its own style. In practice, he either over-relied on the keyframes generated by AIGC, making the animation smooth but lacking personality, or completely abandoned AIGC's help and made it frame by frame by himself, which consumed a lot of time and resulted in unsatisfactory animation effects due to limited skills.

6.2 Technical Integration Challenges

Compatibility Issues Between AIGC and Cinema 4D: Although AIGC can generate basic content, various problems often occur when importing it into Cinema 4D. For example, in a product modeling assignment, student Xiao Wang generated a minimalist lamp model through AIGC. When he imported the model into Cinema 4D for further material and lighting processing, he found that part of the model's structure was damaged, and the number of polygons in the imported model was inconsistent with the original model, resulting in the loss of model details. In addition, the material and texture of the model became chaotic after import. The metal texture that was presented in AIGC became a plastic texture in Cinema 4D, which forced Xiao Wang to spend a lot of time repairing and adjusting the model.

Difficulty in Understanding AIGC Technical Principles: The technical principles behind AIGC, such as deep learning and generative adversarial networks, are relatively abstruse for students. Taking image generation tools as an example, when student Xiao Zhao used AIGC to generate character images, he did not know how to adjust parameters to achieve precise control over the character's facial expressions and clothing styles. Due to the lack of understanding of the technical principles, he could only blindly try different parameter combinations, which not only wasted a lot of time but also made it difficult to achieve the desired results.

6.3 Tool Utilization Barriers

Inaccurate Prompt Input: Accurate input of prompts is the key to obtaining ideal AIGC results, but students often find it difficult to describe their needs in precise language. For example, when designing a cyberpunk-style transportation vehicle, student Xiao Chen simply wrote "cyberpunk transportation vehicle" when inputting prompts, without detailing the type of transportation vehicle (such as car, spaceship, etc.) and its main features (such as glowing lines, exposed machinery, etc.). As a result, the AIGC-generated results were either strange abstract shapes or conventional transportation vehicles that were far from the cyberpunk style.

Insufficient Ability to Screen Effective Results: AIGC usually generates a large number of results, and students may lack the ability to screen out the most suitable ones for their needs. In a building design course, student Xiao Sun used AIGC to generate dozens of architectural sketches in different styles. Faced with these sketches, he felt very confused and did not know how to choose the best solution for his project from so many similar designs. He spent a lot of time comparing and screening but could not determine the final plan, which seriously affected the project progress.

7. Conclusion

The application of AIGC in Cinema 4D teaching courses has brought profound changes to 3D graphic design education. In terms of application effects, AIGC has significantly improved teaching efficiency. In the basic modeling section, students can quickly generate basic models with the help of AIGC, reducing repetitive labor, allowing teachers to devote more energy to guiding creativity and skills. At the same time, AIGC greatly stimulates students' creativity. By generating a variety of creative references, it opens up new design ideas for students, prompting them to break traditional thinking and create more unique and innovative works.

However, there are also some challenges in the application process. In terms of thinking, some students are overly dependent on AIGC and find it difficult to balance human-computer collaboration, leading to a decline in their ability to think independently and explore creativity. Technically, there are compatibility issues between AIGC and Cinema 4D, such as precision loss and material confusion after model import, and students find it difficult to understand the complex technical principles of AIGC. In terms of tool usage, students often fail to obtain ideal results due to inaccurate prompt input, and their ability to screen effective results also needs to be improved.

Despite the difficulties, the application prospects of AIGC in 3D graphic design courses are still broad. With the continuous development of technology, the integration of AIGC and Cinema 4D will become closer, and compatibility issues are expected to be resolved. In the future, teachers should guide students to use AIGC correctly, cultivate their independent innovation ability and human-computer collaboration ability, and make AIGC a powerful tool to help students grow in the field of 3D graphic design, cultivating more professional talents with innovative thinking and practical ability for the industry.

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