

Research on the Development Practice of Undergraduate "CG Fundamentals" Course Based on OBE Concept

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ABSTRACT

Since 2006, with the trend of Chinese animation production decreasing after it increasing from low to high, it marks the transformation of Chinese animation from a growth model relying on government subsidies and production to a benign model that follows market rules and focuses on optimizing content. As a core course in the animation major, the objective of "CG Fundamentals" course should be making students achieve teaching goals of strong design, conceptualization, and image narrative abilities through learning, so as to become applied talents with high artistic cultivation and creative ability, mastering cutting-edge technologies, integrating science and art, strong language, emphasizing on professionalism, and broad vision.

Keywords: OBE concept, "CG Fundamentals" course, Degree of achievement of course objectives.

1. INTRODUCTION

The OBE concept education originated in Western countries in the 1990s, and after years of exploration in these countries, it has become a relatively systematic theoretical system. Students majoring in animation have a certain background in traditional painting. Based on traditional painting, they are trained in digital painting techniques, they abandon the theme content and thinking mode of traditional painting, and their digital painting language and modeling ability will be cultivated. Through a series of works, students can achieve the ability to flexibly use digital drawing for self-presentation and narrative expression using image language, in order to adapt to the design and production process of graphic and image drawing projects in the new era, master the main steps of the entire process of digital drawing, and serve other related courses such as image narrative, character modeling, and background art in the later stage animation major.

2. PROBLEMS IN THE TEACHING OF "CG FUNDAMENTALS" COURSE

2.1 Short Drawing Cycle for Students

In the teaching process prior to this study, the proposal and formulation of course objectives were generally collaboratively completed by the teaching team (including department heads and subject teachers), with reference to previous summaries. Therefore, the course objectives cannot keep up with the times. Meanwhile, streamlining class hours has become a double-edged sword in teaching reform. Before 2021, the number of digital painting courses related to "CG Fundamentals" has decreased by half. The total number of hours for courses related to CG basics, including "Digital Painting" and "CG Fundamentals," has decreased from 96 learning hours to one course, "CG Fundamentals," with 48 learning hours. The main target is first-year animation students, resulting in a teaching phenomenon of reduced hours but no reduction in content. The teaching objectives have also changed accordingly. After traditional sketching and color courses, the theme content of the "CG Fundamentals" course is more focused on

single still life, people, scenery, architecture and other individual element drawing. After the completion of the "CG Fundamentals" course, students are required to be able to draw a series of works by changing different compositions, colors, characters, backgrounds to achieve the purpose of the series of works. Therefore, the course content and objectives urgently need to be optimized and improved.

2.2 Limitations of Teachers Using Mainstream Software for Demonstration

The traditional classroom teaching of "CG Fundamentals" adopts a teaching model based on software demonstrated by teachers, and students need to strictly follow the teacher's teaching arrangement to passively learn; At the same time, teachers teach without discrimination, so that each student gains the same knowledge. For students with a good foundation in software, receiving unified learning content has certain limitations and cannot fully stimulate their initiative to think independently and solve problems. Furthermore, due to software limitations, students are unable to fully showcase their creativity and ideas for effective utilization, thereby increasing their enthusiasm for participating in teaching activities. In addition, the course of "CG Fundamentals" is only offered in the first semester, and if a unified software is used for teaching interaction, it will greatly limit students' learning enthusiasm.

2.3 Simple Course Evaluation Method

Traditional teaching generally focuses more on evaluating the quality of teachers' teaching, the construction of teaching resources, and the design of teaching processes, while the assessment and evaluation of students' learning situation is relatively simple, only judged by the scores of final assignments. For example, the animation major's "CG Fundamentals" course adopts a teaching evaluation method of "60% overall project evaluation score + 30% regular score + 10% attendance". This assessment method focuses on evaluating students' technical expression and ability to imitate and draw, but fails to assess students' application in graphic design and their ability to design thematic creative images. It ignores students' inability to organize and design complex images due to digital painting skills. With limited skills, students should be encouraged to provide

reasonable explanations and creative expressions of creative themes to demonstrate their comprehensive literacy.

3. REFORM STRATEGIES OF "CG FUNDAMENTALS" COURSE BASED ON OBE CONCEPT

In response to the problems existing in the teaching process of the "CG Fundamentals" course in the current animation major, the research group proposes a teaching reform strategy based on the OBE concept. Firstly, based on the graduation requirements of animation major, the course objectives of "CG Fundamentals" have been determined through research; Secondly, by restructuring and optimizing the main content of the course, a blended teaching model has been constructed to achieve maximum results; Finally, the evaluation framework has been reconstructed for achieving course objectives to meet the testing requirements of OBE philosophy for teaching effectiveness.

3.1 Adopting the OBE Concept to Formulate Teaching Objectives

In order to further clarify the connotation of the graduation requirements for animation majors, improve their directional guidance for talent cultivation, and take into account the requirements of easy implementation and evaluation, after multiple research and discussions by the research group, the graduation requirements have been reasonably and effectively decomposed and refined; Further revisions will be made through careful study by the Teaching Work Committee. (As shown in "Table 1") By setting the corresponding high and low levels of completion goals, the distinction of goals can be made, so that the class hours clearly know the requirements that this course should achieve. The course content can be completed through copying, discussion, self-study, and further inquiry-based learning.

Table 1. Teaching objectives of "CG Fundamentals" course

Graduation requirements	Supporting graduation requirements indicators	Supporting strength	Course objectives
Discipline accomplishment	2.3 [Professional skills] Master the basic theoretical knowledge of CG, master various digital painting styles and techniques, proficiently use basic skills of different software operations, proficiently master CG drawing techniques and methods for solving theme image drawing.	H	Course objective 1
Innovation practice ability	3.2 [Innovation ability] Master the history and forefront of understanding CG basics, understand the differences and connections between CG basics and traditional painting, broaden the knowledge horizon in the field of CG basics, and be able to creatively use CG techniques to solve basic problems in digital storytelling.	M	Course objective 2
Development awareness	5.1 [Career planning] Master the basic drawing process of CG basics, cultivate students' professional awareness, understand the relationship between CG basics and other disciplines and professional skills, and be able to creatively apply the knowledge and abilities of CG basics to animation and design production.	M	Course objective 3

3.2 Reorganization of Teaching Methods and Content

Based on the OBE concept established earlier, this article has restructured the teaching methods and content of the "CG Fundamentals" course. On the basis of retaining the original core content, this course fully utilizes the combination of online and offline classroom forms, online learning techniques, and offline interactive discussion learning and drawing. Teachers establish course teaching video resources, provide reference e-books for teaching, and enrich students' horizons. In the classroom, the latest teaching concepts and content can be introduced, and joint teaching can be conducted with Beijing Film Academy to integrate the accumulated classic cases and methods into the classroom, allowing students to experience the use of digital painting to record inspiration sources and moments in life, enriching teaching resources and cases.

In the course design, a self-exploratory learning method of appreciation and learning should be incorporated, allowing students to persist in collecting famous paintings from CG artists, study a master's work every day, and discuss and learn the painting techniques, styles, and ideas of their works. They can share them on the internet, and students can leave messages and participate in discussions with each other, or view works of other masters that interest them, in order to broaden their horizons.

In daily assignments, the teachers can set up a series of drawings with the same theme and project-based learning with different design methods for different themes, showcasing diverse design ideas

and techniques, presenting harmonious but different drawings, strengthening communicative learning, igniting learning enthusiasm, and broadening the learning path of painting.

The teaching content and organizational implementation of the course are as follows:

It is divided into three projects: CG vector illustration design, bitmap style illustration design, and thick coating style illustration design. Within three weeks, teachers will set low-level and high-level teaching objectives for each chapter based on the aforementioned core ideas, clarify theoretical and practical teaching content, conduct online learning and offline reporting, and collect and organize materials. The time allocation is as follows. (As shown in "Table 2")

Table 2. "CG Fundamentals" course tasks and time schedule

Class times	Chapter	Main teaching content	Teaching methods and hour allocation					
			Self-study	Theory	Practice	Discussion	Report	Assignments
1	Topic 1	Experiment 1: Vector illustration design and production Theory: Understanding the concept and historical development of painting Demonstration: Characteristics and basic operating procedures of painting software Practice: Accuracy practice Assignment: Photo copying	1	1	2			2
2	Project 2	Experiment 2: Vector illustration design and production Comment on homework: photo copying	2	1				
3		Event: CG illustration sharing (1) Practice: Summary practice of similar item combinations, summary practice of different item combinations			2	2	1	1
4		Assignment: Black and white monochrome drawing	2					2
5	Project 2	Experiment 3: Vector illustration design and production Activity: Psychological association of light color Report: Overview and explanation of daily necessities	1	2				
6		Activity: CG illustration sharing (2) Experiment: Analysis of light and shadow colors of objects with similar color conditions under different light source conditions, and analysis of color changes of objects under the same light source conditions under different color conditions			2	1	2	
7		Thinking Expansion: Reasoning about the changes in color temperature	1	1			2	2
8	Project 3	Experiment 4: Design and production of thick coating style illustrations Activity: Story imagination Quick Question Training 1: Watch, listen, speak quick question training Quick question training 2: Drawing solitaire	1	2				
9		Assignment: Drawing a series of illustrations with different emotions, angles, or camera lighting and shadows related to the same story theme			2	2		
10							2	3
11	Topic 2	Topic 2: Course summary and works sharing Review assignment: Narrative perspective and composition Painting style and color		2				
12		Experiment 4: Drawing Dongpo's illustration series in Huangzhou						4

3.3 Evaluation of the Course Objective Achievements

It is necessary to encourage students to participate in various competitions, including the National Advertising Art Design Competition for

College Students, the University Digital Art Competition, Milan Design Week, etc., so that students who cannot fully master all painting skills and design methods can express and design their creativity through their understanding of the theme of the competition, using composition, light and

shadow, perspective, and color, enriching assessment methods, and opening up feedback channels between teaching and learning. The first is the diversified examination formats. This course records and evaluates the cultivation and achievement of students in terms of graduation requirements, knowledge, abilities, and qualities through regular performance (10%), homework (30%), and final exams (60%), promoting students' active and proactive learning. The second is that, classroom performance is quantified through three observation points, namely classroom attitude, participation in discussions, and painting style and techniques. The third is that, homework must be completed within the designated time. Score according to the scoring criteria on a percentage scale, and convert the total score to 30 points. The fourth is that, students are the main body of learning, and this course not only evaluates the achievement of course objectives through the assessment method set by teachers based on the nature of the course, but also examines the achievement of course objectives from the perspective of students' "learning" through a survey questionnaire after the course ends, promoting the deep integration of "learning" and "teaching". Real time feedback on teaching effectiveness, timely adjustment of course progress and teaching methods. From the overall scores of students in Animation Class 2301 and (Chinese and foreign) Animation Class 2301, it can be seen that 3 and 4 students respectively scored above 90 points, 20 and 23 students scored between 80-89 points, and 2 and 3 students scored between 70-79 points. The average score for both classes is 88 points. According to the "CG Fundamentals" professional course, the standard score is 75 points, which exceeds the standard score and meets the expected course objectives.

3.4 Teaching Improvement Measures

The first lesson in the online classroom is designed in an easy-to-use case study format, which does not limit students' learning software. Instead, it allows students to learn the ideas of painting, understand the full process of conception, design, sketching, coloring, and saving of complete images, and the software process operated by the teacher. This makes it convenient for students who are new to digital painting to pause and watch basic painting techniques, and apply them in a similar way.

Through interactive teaching, students are guided to self-learning by showcasing and

interpreting master works among themselves, enhancing their understanding of different master works, and strengthening their ability to learn professional knowledge. This provides a bridge for communication and learning among peers, as well as between students and teachers, laying the foundation for internal motivation and increasing their willingness to learn independently. Through the flipped classroom, students can become the main body of learning, learn from each other, drive the learning atmosphere, showcase their achievements, and broaden their learning paths.

It is necessary to make full use of the college's construction platform and Chinese and foreign educational resources, including the Dabie Mountain Agricultural Culture Museum, the Literature and Book Resource Library, the National Media and Art Experimental Teaching Demonstration Center, and the Library of the Academy of Fine Arts; It is also necessary to collaborate with teachers from Beijing Film Academy to build a CG basic course platform, utilizing its advanced learning methods and ideas, sharing course teaching experiences, and strengthening the multidimensional thinking and diversified integration of teaching.

4. CONCLUSION

The core basic course of animation major - "CG Fundamentals" has problems such as unclear teaching objectives, lagging teaching modes and methods, and simple teaching evaluation standards. In response to the above issues, the research group has carried out teaching reform for the course based on the OBE concept, formulated course objectives with students as the center, restructured teaching methods and content, constructed an evaluation of the achievement of course objectives, and carried out teaching. The evaluation of objectives has met expectations. Through daily interaction, online courses, and homework assignments, a relatively complete online and offline learning system has been constructed, enabling students to combine painting, discussion, research, and data collection for the course, and to improve their comprehensive abilities and qualities such as expression and teamwork. The above teaching reform has achieved a shift from teacher-centered to student-centered, enhanced the interaction effect between teachers and students, improved students' learning enthusiasm, and laid a good foundation for students in this major to continue studying the course in the second semester.

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