

Construction and Research of a First-class Course on Photoshop Image Processing Based on CBL-PBL Teaching Methodology

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Abstract. The thesis takes the Photoshop Image Processing course as an example, based on the first-class course construction standards, for the status quo of “less innovation and more imitation” of the students in traditional Photoshop teaching, CBL-PBL teaching method is introduced into the teaching process. Moreover, the thesis will implement the integrated teaching implementation process, construct multi-dimensional ideological and political education, refine the course teaching process assessment, and strengthen the project-driven teaching practice, so as to enable students to deeply understand the knowledge and achieve the effect of learning by example.

Keywords: Photoshop image processing; CBL-PBL teaching methodology; multidimensional; project-driven.

1. Introduction

Curriculum is the core of school education construction. The construction of first-rate curriculum and first-rate subjects has become the foundation and key to cultivating first-rate talents in vocational schools and ordinary schools [1, 2]. The Photoshop Image Processing course is an essential professional course for the graphic design direction of information technology majors in secondary vocational schools, a core basic course for computer majors in higher vocational colleges, and an elective course for educational technology majors in general undergraduate college. It is preceded by courses such as “Art Design Basics” and “Computer Application Basics”, and followed by courses such as “Webpage Production” and “Three-dimensional Design”.

The current situation in the teaching of Photoshop Image Processing course, including the traditional teaching methods are detached from the reality of the need for innovative and entrepreneurial talents, and overly focus on the transmission of knowledge, but lack of training for students’ initiative and creativity. Therefore, in this paper, we will adopt the new teaching method of CBL-PBL (Case-Based and Problem-based Learning) and blended teaching mode, locate the accurate teaching objectives, build the ideological and political education, implement the diversified teaching and assessment methods, and organize the students to participate in the innovation competitions and other outreach activities, which are aimed at comprehensively improving the students’ scientific and innovative thinking and scientific inquiry ability, and cultivating the students’ independent learning, problem discovery, problem solving, practical and vocational abilities.

2. Teaching Methods

Case-based Learning (CBL) is a new teaching method that provides students with an immersive experience with the help of real cases existing around them and learning through case studies. This method enables students to change from mechanical imitation of the design process to flexible application of theoretical knowledge [3-6].

Problem-based Learning (PBL) is a teaching method in which the teacher throws out the problem, the students solve the problem according to their own thinking, and the teacher guides the students appropriately according to their progress in solving the problem. It emphasizes the

students' in-depth understanding of the knowledge and its practical application, and focuses on cultivating the students' hands-on ability, design ability, and innovative spirit [7-10].

The Photoshop Image Processing course is theoretically abstract but practically operational, which has high requirements for students' hands-on ability. The CBL-PBL teaching method can maximize the integration of theoretical knowledge and practical operation, and students can combine practical cases and specific problems to learn by example, which not only helps students to strengthen their professional quality, but also develops their innovative thinking [11-13].

The CBL-PBL teaching method was used in actual classroom teaching and the instructional design case is shown in Table 1.

Table 1. Design of the teaching process of “metallic three-dimensional lettering effect”

Teaching stage	Teachers' tasks	Students' tasks	Design purpose	Length of time
The teacher takes the theme design of “70 th anniversary of the campus” as an example, and clarifies the teaching objectives and main contents of this lesson	To show multiple real-life examples with differentiation and throw out the question	Students compare different real-life cases and envision solutions	Students will be able to identify the learning objectives of the lesson	5mins
The teacher assigns casework, and every 10 students form a learning group for independent and cooperative learning	To provide questions and requests to students	According to the information collected before class, and pre-study of the relevant knowledge points, the groups of students clarify the layer styles in the bevel and relief, stroke and projection and other special effects	Through independent study and group work, students will be able to appreciate the different effects of layer styles	15mins
The teacher provides appropriate guidance, small groups of students engage in in-depth discussions and co-creation	1. To supplement the students “layer styles” specific skills and operations 2. To inspire and guide students to analyze more complex text effects in depth	In small groups, show the “metal lettering effect” of different groups	Students can skillfully use the production tools, master the production process of text effects, and ultimately be able to design more complex text effects	15mins
Each group makes a short summary, the teacher finally summarizes and inspires students to make further revisions and refinements as appropriate	1. To sort and summarize the process of creating text effects 2. To focus on specific problems encountered by students during practice	Students break out of real-life examples and use “layer styles” to creatively create text effects	Students can apply what they have learned in this lesson in a comprehensive way	10mins

3. Teaching Models

In the traditional Photoshop Image Processing course classroom, students are usually passive acceptance of boring knowledge. In most cases they only obtain the experience of observation and lack the experience of direct participation. Therefore, the thesis combines the requirements of the course Photoshop Image Processing and the learning characteristics of students, with the help of Super Star Learning platform for “online + offline” blended teaching, make full use of the platform’s rich functional modules, set up a scientific course program, to provide students with a rich learning and practice space [14-16].

Online video teaching is characterized by concise content, diversification and easy dissemination, which enables students to learn anytime and anywhere, and at the same time does not take up too much of students’ extracurricular time. Online video teaching is suitable for boring theoretical knowledge and easy-to-understand practical knowledge. Teachers are able to create teaching scenarios on this basis to promote students’ active learning, and students can complete their mastery of knowledge in a short time [17, 18].

Classroom teaching is characterized by timely feedback and strong constraints, and teachers can timely grasp the knowledge that students do not understand and provide targeted guidance in a timely manner. Classroom teaching is suitable for more systematic knowledge, teachers focus on explaining the difficult problems that students think through classroom teaching, thus effectively enhancing teaching effectiveness.

The combination of online video teaching and classroom teaching mode is suitable for both highly memorable and highly comprehensible and operational knowledge points. For example, in the teaching of “fine selection of image materials” knowledge, students first studied through online videos to memorize the characteristics of the lasso, pen and other tools, and the teacher guided students to master the lasso, pen and other tools of the operation steps in the class. The combination of online video teaching and classroom teaching can maximize the advantages of each other, make the best use of their strengths and avoid their weaknesses, and thus realize the overall improvement of teaching quality [19, 20].

The online teaching resources of the course mainly rely on the Super Star Learning platform, through which teachers can easily manage the course construction and student learning. The platform’s course construction includes: lesson plans, teaching PPTs, teaching explanation videos, tool operation demonstration videos, course exclusive material resource library and question bank and other related learning resources, in addition, the platform also has notification, check-in, discussion, homework, polling, exams, questionnaires, and other related activity resources. Teachers can supervise the learning behavior of students on the platform, issue tasks for the students and interact with students through the problem feedback exchange area [21].

4. Teaching Content Design

Thought and politics elements are fully integrated and infiltrated into the process of course teaching, and permeate the teaching objectives, syllabus, teaching process and teaching evaluation. Ideological political education and curriculum education are working together to promote the implementation of the fundamental task of cultivating moral integrity and lay a solid foundation for the realization of the “two properties and one degree” curriculum standard [22-24].

Taking the teaching content of “image selection - the use of lasso tool and quick selection tool” as an example, the specific teaching design process is as follows.

(1) Knowledge Introduction

Show pictures: white swans have been rendered homeless due to pollution.

Play animation: to introduce the learning task, to help the white swans to migrate to a new home, and finally to emphasize that to ensure the healthy growth of the swans. We need to penetrate the

awareness of environmental protection, call on students to protect our common home, and ultimately realize the harmonious coexistence of man and nature.

(2) Knowledge preparation and instruction

① Knowledge preparation

The teacher asks questions about the focus of the previous lesson, that is, image selection- the use of checkbox tool, and guides all students to recall the role of each attribute of the checkbox tool.

② Knowledge instruction

First of all, students watch the teaching content of “the use of the lasso tool and quick selection tool” through the online video before class, then students download the five material pictures needed for this lesson. The teacher asks students to freely choose the appropriate lasso tool or quick selection tool, and pick out objects from the five material pictures. Finally the teacher presents different students’ rendering, and guides students to summarize the advantages and disadvantages of the lasso tool and quick selection tool and the applicable objects.

(3) Consolidation of knowledge

Students complete the task “help the white swan to move to a new home”, and take turns to present their work, including the specific selection tools used, small ideas, etc.

(4) Summary of knowledge

Students summarize the irregular shapes applicable to lasso tool and quick selection tool, and provide examples.

Teacher shows the video of “white swans in a good environment” for students, once again calling on them to start protect the environment from themselves.

(5) Casework

Case requirements: students create a “Desert Sky” by using the material images. They should master the operational skills of the lasso tool and quick selection tool. The general effect is shown in Fig 1, and students can add personal creativity as appropriate.



Fig. 1 Desert Sky

(6) Student case presentations

A sample drawing of the complete realization of Student 1’s work is shown in Fig 2. The visual effect, position, color, and scale of the image are consistent with the sample drawing. It can be seen that Student 1 has completed the rendering, but lacks thought and design for the material.

A sample drawing of the complete realization of Student 2’s work is shown in Fig 3. The visual elements of the image are complete, the overall sense of the image is strong, the colors are harmonious, and the visual effect is vivid. It can be seen that Student 2 has created and played with the material according to his own ideas, and emphasized the overall coordination and creativity of the image.



Fig. 2 Student 1's work



Fig. 3 Student 2's work

5. Teaching Assessment

The teaching assessment of the course “Photoshop Image Processing” needs to focus on multiple assessment, and the specific description of the type of assessment is shown in Table 3.

Table 3. Specific categorization of process assessment

Types of assessment	Forms of evaluation	Effects	Adjustment of thinking
Regular grades (30%)	1. Classroom presentations: examination and evaluation of the points taught in class through questioning. 2. After-class homework: examination and evaluation of the points taught in class by assigning relevant homework. 3. Unit tests: examination and evaluation of unit content in the form of a written test.	Students are tested on their presentation skills, mastery and comprehension of the points taught in class, and ultimately, real-time adjustments are made to the lesson plan based on student performance.	If most students lack mastery of the relevant unit knowledge, teachers should summarize and guide the relevant unit content in a timely manner and make appropriate adjustments to the teaching of the content of the next unit.
Midterm examination (15%)	Written exam: assessment and evaluation of the knowledge points learned in the previous period through basic theoretical knowledge and case studies.	Students are tested on their mastery and understanding of the knowledge points learned in the previous period, and teachers will make appropriate adjustments to the teaching program in the later period according to the students' performance.	If students' midterm assessment scores are generally low, teachers need to summarize and guide the knowledge points taught in the early stage, and make appropriate adjustments to the later stage of teaching appropriately.
Practical assessment (15%)	Case design and report summarization: teachers first release practical cases in conjunction with the relevant teaching contents of each module; then, students are required to complete the design tasks within the specified time, and analyze and summarize	Students are tested on their design skills, appreciation and analysis of their work.	If the quality of most students' practical case work is low, teachers need to summarize and guide the relevant case in time and adjust the practical teaching methods appropriately.

	the works; finally, students are required to submit the works and case analysis report.		
Final examination (40%)	Independent creativity and production: teachers give a theme for students to complete a series of works production around the theme; the work requires novel content, unique structural design, clear expression of ideas, and the overall style of positive.	Students are tested on their ability to synthesize and apply knowledge, hands-on operation, and innovative and creative ideas.	According to the results of students' final assessment, teachers need to summarize the overall situation of this semester's course teaching, find out the students' prevailing knowledge weaknesses, and in the next semester's teaching process to focus on the corresponding knowledge points, while appropriately adjusting the teaching content and teaching methodology, to fully enhance the students' interest in learning the course.

6. Teaching Outreach

Teaching practice can promote students' enthusiasm for image processing and design, consolidate their understanding of what they have learned, stimulate their enthusiasm for practice in the field of graphic design, improve their technical and artistic skills, and lay a foundation for future career development. This thesis adopts "project-driven teaching practice", which makes students understand the design process of the whole project, so as to drive the project from conception to realization [25].

6.1 Innovation Skills Competition

To accelerate the cultivation of innovative and entrepreneurial talents and to promote mass entrepreneurship and innovation, innovative and creative competitions of "graphic design type" have emerged, such as the China Computer Design Competition for College Students, the National Advertising Art Design Competition for College Students and other innovative and entrepreneurial competitions [26, 27]. Through the various projects of the competition, teaching is associated with social dynamics, and cultural design is combined with innovative thinking, so that students can go out of the classroom, bring their thinking and innovation to real situations, and create high-quality works with individuality, expressiveness and visual appeal. Students can also flexibly apply the theoretical knowledge they have learned in different scenarios, so that what they have learned and thought can be truly practiced to meet the needs of their future careers in advance, and ultimately to meet the needs of the country and the society for skilled personnel.

6.2 School-Enterprise Cooperation

To realize the talent cultivation mode of "integration of engineering and learning, school-enterprise cooperation", the main focus is on classroom teaching, supplemented by practical training projects. Based on the demand of enterprises for technical talents, teachers lead students to participate in actual projects of enterprises, analyze customers' needs in depth, strictly follow the design requirements, put forward feasible realization plans, and keep up with the development and

changes of the market [28, 29]. Students are able to go out of the classroom, bring their creativity and ideas to real projects, and deeply experience the design solutions that meet the needs of enterprises. Students can also get professional skills training in the enterprise, and adapt to the process of future work in advance, finally students reach the level of meeting the needs of skilled personnel in the enterprise.

7. Summary

This thesis is based on CBL-PBL teaching method, based on the needs of technical talents, creating diversified teaching situations, inspiring students in an integrated mode, emphasizing the synergy of imitation and innovation. Which can not only broaden students' creative ideas, improve their practical ability, and help them comprehensively grasp the techniques of expression, but also strengthen the students' quality of modern art, and improve their aesthetic perceptiveness.

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