



Research on Cultivating Strategies of Photoshop Graphic Image Processing Course Based on Project Teaching to Students' Innovative Ability

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Abstract. This paper explores in depth the training strategies and advantages of the project-based teaching "Photoshop Graphic Image Processing" course for students' innovative ability, analyzes the importance of project-based teaching to the cultivation of students' innovative ability, expounds the specific training strategies of project-based teaching in this course, and demonstrates its effectiveness through empirical cases, providing reference for improving students' innovative ability.

Keywords: project-based teaching; Photoshop graphics and image processing; innovation ability; training strategy.

1 Introduction

In today's era of vigorous development of the knowledge economy, innovation ability is undoubtedly the key competitiveness of talents. The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China emphasized upholding innovation as a core component in China's modernization efforts and implementing an innovation-driven development strategy. [1] The Outline of the Action Plan for Improving the Scientific Literacy of All People (2021-2035) also highlighted the need to enhance the level of science education in basic education, guide the transformation of teaching methods, and cultivate students with innovative potential. [2] The 'Photoshop Graphic Image Processing' course plays a crucial role in nurturing innovative talents. With its unique advantages, project-based teaching can effectively stimulate students' interest in learning and innovative thinking, thereby improving their practical and innovative abilities.

2 The Significance of Project-based Teaching in Developing Students' Innovative Ability

2.1 Student-Centered Learning Models Stimulate Innovation

Innovation ability includes innovative consciousness, innovative thinking and innovative skills. Project-based teaching fully demonstrates the student-centered concept. This teaching mode places a high emphasis on students' independent learning and cooperative learning, so that students can truly become the main body of learning. In the project-based teaching of the Photoshop Graphics and Image Processing course, students can independently choose the project theme according to their own interests and abilities, and independently decide the image processing method, method and style characteristics. This independent decision-making process fully gives students a broad space to display their personal creativity. For example, in a project teaching with the theme of "The Beauty of Nature - The Picture Scroll of the Four Seasons", students choose the focus of their performance according to their different feelings about the four seasons. Some students are fascinated by the vitality of spring, so they go deep into nature to take pictures of various flowers blooming, and use the color adjustment and filter functions of Photoshop software to create a spring picture scroll of "the sunrise and the river are red like fire"; some students are attracted by the colorful colors of autumn, collect a large number of pictures of autumn leaves, and through careful splicing and synthesis, show the autumn beauty of "the trees are all autumn colors, and the mountains are only sunset". In this process, students give full play to their subjective initiative, actively explore innovation, and transform their unique understanding of the four seasons into vivid image works.

In the course "Photoshop Graphic Image Processing", students, as active participants in the process of knowledge acquisition, continuously explore their own innovative potential through independent and cooperative learning.

2.2 Practice Platform Helps Improve Innovation Skills

Project-based teaching provides students with a solid platform for practice, enabling them to face practical problems and challenges head-on. In the course "Photoshop Graphic Image Processing", students can significantly improve their ability to solve practical problems by participating in projects such as advertising production, UI design, and photo retouching. As Professor Li Hua said, "In the field of digital art education, project-based teaching builds a bridge of practice for students, enabling them to continuously improve their innovative skills and better master professional technologies in practical operation." [3] In the process of solving problems, students need to use innovative thinking, boldly try different image processing techniques and methods, and strive to achieve the best results, so as to effectively exercise their own innovation skills. For example, in the project of designing a new electronic product promotional poster for a local technology company, students need to comprehensively consider various factors such as product characteristics, target audience needs, and market trends. Use creative and technical means to create attractive poster works. This

process not only enhances students' image processing skills, but also cultivates their innovative thinking and ability to solve practical problems.

2.3 Interdisciplinary Integration expands Innovation Space

Interdisciplinary learning plays a crucial role in the cultivation of students' innovative ability. The collision and blending of different subject elements can enable students to broaden their horizons and improve their comprehensive literacy.

Project-based teaching actively encourages cross-disciplinary integration, integrating knowledge and skills from different disciplines into one project. In the course "Photoshop Graphic Image Processing", it can be closely integrated with disciplines such as art, design, and photography. For example, in the project teaching with the theme of "Modern Interpretation of History and Culture", students use the history discipline to study the cultural characteristics, traditional costumes, and architectural styles of a specific historical period, use the color matching theory and composition rules of the fine arts discipline to lay the overall tone and layout of the image, combine the creative concepts of the design discipline to carry out innovative designs, and use the framing skills of the photography discipline to shoot material photos. Finally, the materials are finely processed through Photoshop software to achieve the perfect integration of elements from different disciplines. In the process, students not only enhance their image processing skills, but also understand and interpret history and culture from multiple disciplinary perspectives, expand the space for innovation, and develop the ability to think across disciplines and apply knowledge comprehensively.

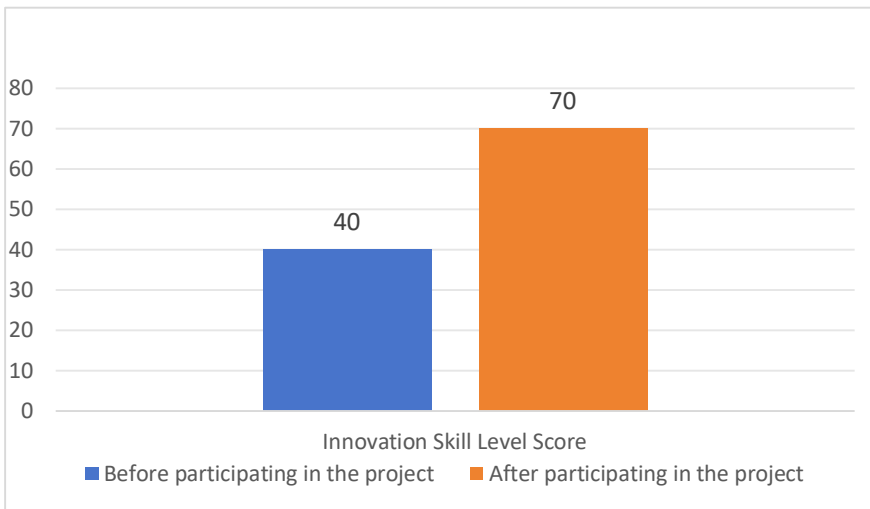


Fig. 1. Project-based teaching helps to improve innovative skills

The project-based teaching of interdisciplinary integration prompts students to jump out of the thinking mode of a single discipline, to integrate the knowledge and methods of different disciplines, and then to explore more novel and unique creative points. At

the same time, in the practice of interdisciplinary projects, students cultivate comprehensive literacy, enhance the ability to integrate knowledge and practical application ability. So that they can flexibly apply multi-disciplinary knowledge to innovative responses when facing complex problems. And actual survey data also confirms this positive effect. After the survey, the average score of an art major student's innovation skill level before participating in the project was 40 points. After participating in project teaching such as advertising production, UI design, and photo retouching, the average score of innovation skill level increased to 70 points. (see Fig. 1)

The reason for this significant change is that during the implementation of the project, the majority of students are no longer limited to the thinking mode of books, but dare to try new creative concepts, technical means and forms of expression. They refine the core selling points of products with different ideas in advertising production, put forward refreshing ideas, develop novel interaction patterns in UI design, and boldly use color collision and fusion in photo decoration to present a different visual effect.

3 Optimal Cultivation Strategy of Project-based Teaching in Photoshop Graphics and Image Processing Course

3.1 Project Design and Topic Selection Strategy

In the project design and topic selection of Photoshop Graphic Image Processing course, it is essential to formulate scientific and reasonable strategies.

Stimulate the Desire for Innovation. The topic of the project needs to fully consider the students' interest and acceptance ability, and ensure that there is a certain degree of difficulty, so that students can gain a strong sense of achievement when completing the project. Projects related to topics such as social hotspots, environmental protection, and technology can be selected to guide students to pay attention to social issues in the process of image processing and fully release their creativity. For example, with the current global attention to climate change, it is possible to set up a project with the theme of "Green Future", Prompt them to actively explore and try new image processing methods, and let students use Photoshop technology to show the sustainable world in their hearts. In this project, more than 80% of the students expressed great interest in this theme and actively engaged in image processing creation. Through a survey of the students participating in this project, it was found that 70% of the students said that their understanding of sustainable development had become deeper after the completion of the project, and they had tried at least two new technical methods in the process of image processing.

Inspire Innovation. Use a variety of resources to widely display excellent Photoshop graphic image processing works to inspire students to innovate. You can collect the winning works of well-known design competitions at home and abroad, organize students to appreciate and discuss, and deeply analyze the creative essence and tech-

nical characteristics of the works. For example, display the winning graphic works on the "National College Student Art Advertising Competition" to guide students to experience the author's unique creative ideas, bold color matching and exquisite image processing skills. During the discussion, students' minds collided with each other, and sparks of inspiration continued to burst forth. At the same time, their horizons were broadened and innovative inspiration was effectively stimulated.

Create Innovative Scenarios. The project topic is closely integrated with practical application, and practical project cases are introduced, so that students can actively explore the application value of Photoshop graphic image processing in real life, and improve their learning interest and innovation awareness. For example, cooperating with enterprises to carry out product packaging design projects, students can experience the whole process from creative conception to actual production in real project situations, and exercise their innovation and practical ability. Or cooperate with cultural institutions to design publicity posters for traditional art exhibitions, so that students can feel the charm and value of culture in inheritance and innovation.

3.2 Guide Students to Study Independently and Strengthen Group Cooperative Learning

In the course of "Photoshop Graphic Image Processing", guiding students to learn independently and strengthening group cooperative learning is the key path to cultivate students' innovative ability and comprehensive literacy.

Provide Abundant Resources. Provide students with a variety of learning resources, such as teaching materials, courseware, teaching videos, online courses, etc., so that students can choose the learning content and method according to their own needs. Encourage students to use online learning platforms for independent learning and communication. For example, provide students with professional Photoshop tutorial website links, students can log in to learn in their spare time, and communicate with learners from different regions, sharing unique ideas and practical skills with each other.

Encourage Independent Exploration. Students are encouraged to boldly explore and try independently during the implementation of the project, and cultivate innovative thinking and practical ability. Teachers set open questions and tasks to guide students to use Photoshop technology to carry out innovative practice. For example, allowing students to design a creative image synthesis work independently requires students to actively try different technologies and methods in the creative process, giving full play to their imagination and creativity.

Reasonable Group Cooperation. Establish a group cooperation mechanism, clarify the division of labor and responsibilities of members, so that students can play their

respective advantages in the group and complete the project tasks together. For example, in a group project, different roles such as team leader, technical specialist, and creative specialist can be set up, so that students can learn from each other and promote each other in the process of cooperation. Through this teamwork approach, the majority of students can not only improve the quality and efficiency of project completion, but also cultivate innovative thinking in cooperation, learn to think and solve problems from different angles, and lay a solid foundation for future study and work.

3.3 Diversified Teaching Methods and Timely Guidance

In project-based teaching, the choice and guidance of teaching methods are of great importance.

Adopt Diverse Teaching Methods. In project-based teaching, teachers can adopt diverse teaching methods such as case teaching, group discussion, and practical operation to guide students to actively participate in the implementation of the project. Case teaching inspires students to innovate by displaying excellent works and deeply analyzing their creative and technical characteristics. Group discussions enable students to share creative experiences, promote exchanges and cooperation. Practical operation, as the core link, allows students to master image processing technology in practical operation and improve practical ability. As Ye Shengtao said: "The teaching of teachers is not in the overall award, but in the camera induction." [4] In the project-based teaching, teachers use a variety of teaching methods to induce students to actively participate in project implementation, stimulate students' innovative inspiration, promote students' in-depth communication and cooperation, and enable students to master image processing technology in practical operation to improve their practical ability.

Timely Guidance and Feedback. Teachers should provide timely guidance and feedback to help students solve problems encountered during the implementation of the project. Personalized guidance can be provided to students through online Q & A, classroom tutoring, etc.

3.4 Diversified Evaluation Methods and Feedback

Enhanced Process Evaluation. The evaluation of project-based teaching should go beyond the single focus on the results of the work, and comprehensively cover students' innovation ability, teamwork ability, and problem-solving ability during the implementation of the project. Process evaluation can be carried out in multiple ways such as students' learning logs, project progress reports, and group discussion records, to gain in-depth insight into students' learning trajectories and growth veins. As educator Bloom said: "Evaluation is not to distinguish, but to promote." [5] Process evaluation aims to promote students' all-round development, witnessing students' progress and challenges in the progress of the project.

Constructing a Diversified Evaluation Model. Comprehensive use of teacher evaluation, student mutual evaluation and self-evaluation. Teacher evaluation provides evaluation and guidance for students' works and performance from a professional perspective; student mutual evaluation prompts students to gain advantages from tasting other people's works, improve aesthetic level and innovation ability; self-evaluation leads students to reflect and summarize their own learning process and achievements, and clarify shortcomings and efforts.

Insist on Timely Feedback. Teachers should provide timely feedback and suggestions to help students improve their works and enhance their abilities. Written comments and face-to-face communication can be used to allow students to clarify their own strengths and weaknesses. Establish a scientific and reasonable evaluation system to objectively and comprehensively evaluate students' project implementation process and results, motivate students to treat creation with a more rigorous attitude, move forward steadily through reflection and improvement.

4 Empirical Case Study

Taking the "Creative Campus Action of Let Youth Create Dreams in Innovation" as an example, it deeply analyzes the cultivation process of students' innovative ability in the Photoshop Graphic Image Processing course based on project-based teaching.

4.1 Project Background

In order to stimulate students' innovative vitality and enrich campus culture, the school carries out campus activities with innovation as the core, requiring students to use the knowledge learned in the Photoshop Graphic Image Processing course for event planning and publicity design.

4.2 Project Implementation Process

Introduction stage: Teachers select and display past successful campus activity cases, and guide students to analyze the highlights and characteristics. Clearly define task requirements and evaluation criteria, and emphasize the theme and significance of the activity, and lay the foundation for student project exploration.

Planning stage: Students discuss in groups to determine the theme and format of the event, develop a detailed planning and publicity design plan, including design plans for event posters, brochures, online promotion materials, etc., and determine specific steps such as material collection and image processing methods to ensure the orderly progress of the project.

Implementation stage: Students collect materials according to the plan and carry out creative design. In the process of image processing, make full use of various skills learned and give play to one's own creative ability to create attractive and infectious publicity works.

Display and evaluation stage: Each group presents the results, conduct self-evaluation, mutual evaluation and teacher evaluation. The evaluation content covers the theme fit, creativity, publicity effect, image processing effect, feasibility of planning plan, etc. Teachers summarize and comment on the project results of each group, affirm the innovative highlights, point out the shortcomings and put forward suggestions for improvement.

4.3 Project Effect Analysis

Since the implementation of this project in a school in March 2024, remarkable results have been achieved. A total of 78 student works were received, including 21 excellent works, 43 good works, and 14 general and poor works. Through follow-up surveys of students participating in the project, it was found that 70% of the students said that in subsequent assignments of other courses, they would actively try to apply the Photoshop image processing skills mastered in this project. In addition, 60% of the students believe that the innovative thinking cultivated in the project process is also helpful for solving problems in other disciplines. Project-based teaching has effectively stimulated students' enthusiasm for the course "Photoshop Graphic Image Processing" in this school. Compared with traditional teaching methods, students can deeply feel the fun and sense of achievement of learning in project practice, and then engage in learning more actively. This positive learning attitude will have a profound impact on their entire learning career.

Through this project teaching, students are not only proficient in Photoshop image processing technology, but also cultivate innovative thinking and activity planning ability. In terms of cooperative learning, the advantages of project-based teaching are fully reflected. Students learn to divide and cooperate in group projects, complete project tasks together, and improve their good teamwork spirit and interpersonal skills.

At the level of innovation ability, the student-centered learning model has fully stimulated their initiative and creativity, injecting new vitality into the school's artistic creation atmosphere. The publicity works produced by the students are bright and creative, which effectively stimulates the enthusiasm of the whole school's teachers and students to participate.

In order to gain a more intuitive understanding of students' performance after the project-based teaching, we use a radar map to evaluate from multiple dimensions such as innovation ability, image processing technology mastery, teamwork ability, activity planning ability, and learning enthusiasm. (see Fig.2).

From the radar chart, we can see the advantages and disadvantages of students in various aspects after project-based teaching. For example, students scored high in innovation ability and teamwork ability, with 80 points and 75 points respectively, but there is still room for improvement in the mastery of image processing technology, with a score of 60 points. This design can help teachers to further guide and cultivate students in a targeted manner.

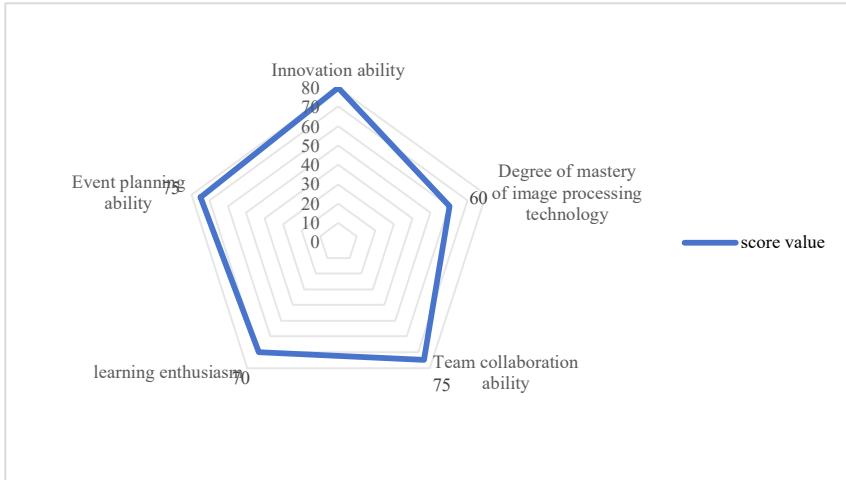


Fig. 2. Project Effect Analysis Radar Chart

4.4 Problems and Solutions during Project Implementation

There is a problem

Some students lack innovation ability, and their works lack uniqueness. Students have different degrees of mastery in image processing technology, resulting in large differences in the quality of works. There are problems such as unclear division of labor and poor communication in group cooperation, which affect the progress and quality of the project.

Solution

In response to the problem of insufficient innovation ability, teachers can increase creative inspiration links, such as organizing creative brainstorming and sharing excellent creative cases, to stimulate students' innovative thinking. At the same time, students are encouraged to observe life more, think more about problems, find creative inspiration from different angles.

For cases with different degrees of image processing technology mastery, teachers can carry out targeted technical tutoring, such as setting up technical small classes, providing online tutorials, etc., to help students improve their technical level. At the same time, students are encouraged to learn from each other and help each other to improve together.

In order to solve the problems in group cooperation, teachers can clarify the division of labor in the group at the beginning of the project, formulate detailed cooperation rules and communication mechanisms. During the implementation of the project, strengthen the supervision and guidance of group cooperation, and solve problems in a timely manner. At the same time, encourage effective communication and coordination within the group to improve the efficiency and quality of cooperation.

5 Conclusion

The "Photoshop Graphic Image Processing" course based on project-based teaching has remarkable results in cultivating students' innovative ability. Its unique feature is that it takes students as the center, stimulates independent learning and cooperation, builds a practice platform and promotes interdisciplinary integration. This not only enhances students' innovation and practical ability in this course, but also provides inspiration for other courses, that is, we should pay attention to the main body position of students, strengthen the integration of practice and interdisciplinary, adopt diversified teaching methods and a multi-faceted evaluation system to jointly contribute to the cultivation of high-quality talents.

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