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Exploration and Practice of Integrated Teaching Combining "Composition Design and PS Tools"

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Abstract: With the gradually expanding influence of digital technology in the field of art and design education, traditional composition design courses should also gradually integrate digital technology to achieve integrated development. This paper analyzes the limitations of traditional composition teaching and the central role of Photoshop (PS) in digital design. Based on this, it constructs an integrated teaching model with project-based learning as the core, aiming to explore and practice the deep integration of composition design theory and Photoshop (PS) tools. Practical verification shows that this model significantly improves students' understanding of composition principles, PS application skills, digital visual expression abilities, and innovative thinking.

Keywords: Composition design; Photoshop; Integrated teaching; Teaching innovation; Practical exploration

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1. Theoretical basis

1.1. Overview of composition design theory

Composition design is a fundamental subject in artistic design that explores the organizational principles of visual elements in two-dimensional or three-dimensional space. Its aim is to cultivate students' cognition and creativity in formal aesthetics. The core lies in utilizing visual elements such as points, lines, planes, volumes, colors, textures, and spaces, combined with compositional principles like repetition and variation, balance and symmetry, rhythm and meter, contrast and unity, density and distribution, to create visually aesthetic and functional forms. Points are the smallest visual units; lines are the trajectories of points, possessing directionality; planes are the trajectories of lines, possessing shape and volume; volumes are the superposition of planes, forming three-dimensional entities. These elements are interrelated and transformable [1].

Composition design is mainly divided into three categories: plane composition (two-dimensional visual organization), color composition (color attributes and emotional expression), and three-dimensional composition (spatial relationships of three-dimensional forms). The abstract and universal principles of composition serve as the foundation for artistic design creation, and they are also important pathways for cultivating designers'

critical thinking, sense of form, and innovation ability [2].

1.2. Characteristic analysis of digital design tool (Photoshop)

Photoshop (PS), as a powerful bitmap processing software, is an indispensable tool for digital design. Its core characteristics endow it with unique advantages in realizing and expanding composition design ideas: 1. Pixel-level precise control: PS operates based on pixels, enabling precise control of compositional elements, which is crucial for rigorous compositional relationships. 2. Layer system: Each compositional element is independent within its own layer, facilitating free arrangement, combination, deformation, overlay, and attribute adjustment. This enhances the efficiency and modifiability of compositional experiments. 3. Non-destructive editing: Features such as smart objects, adjustment layers, and masks ensure that editing does not damage the original data, facilitating repeated attempts and iterative optimization during exploration. 4. Rich tools and filters: Tools like brushes, selection tools, shape tools, gradients, filters, and layer styles help quickly generate compositional elements, simulate materials, and achieve complex visual effects. 5. Color management and expressiveness: A comprehensive color management system provides precise control over colors, assisting students in intuitively exploring color relationships and emotional expressions. 6. Visualization and real-time feedback: An intuitive interface and real-time feedback enable students to quickly validate ideas, make timely adjustments and optimizations, and form a positive interactive learning cycle [3].

PS is not just a drawing tool, but also a powerful visual experimentation platform that transforms abstract compositional theories into operable digital languages, providing infinite possibilities for the practice of compositional principles and cultivating students' digital design thinking for the future.

1.3. Relevant theories of integrated teaching

The integrated teaching model of "compositional design + PS tools" requires educational theoretical support, mainly involving constructivist learning theory, project-based learning (PBL) theory, and technology-assisted teaching theory.

Constructivist learning theory: Learners actively construct understanding through interaction with the environment and accumulation of experience. In integrated teaching, students manipulate compositional elements in PS, actively explore compositional representations in a digital environment, and build experience with the synergistic effects of compositional principles and digital tools by attempting to solve problems, which they then share and interact with their group [4].

Project-based learning (PBL) theory: This theory is oriented towards real or simulated complex problems, where students acquire knowledge and skills through the completion of comprehensive projects. It fosters abilities such as problem-solving, critical thinking, and collaboration. In integrated teaching, incorporating design and Photoshop (PS) operations into practical projects promotes the enhancement of students' comprehensive abilities and the deep integration of knowledge [5].

Technology-assisted instruction theory: This theory utilizes information technology to optimize the teaching process and enhance teaching effectiveness. In integrated teaching, PS tools provide visualization, interactivity, efficiency, and reproducibility, expanding learning boundaries and stimulating innovation.

Together, these theories provide a framework for integrated teaching, emphasizing a student-centered approach where knowledge is constructed and abilities are cultivated through practice and technological support.

2. Analysis of the current situation and integration pain points in design teaching

2.1. Limitations of traditional design teaching

The traditional design teaching model faces multiple limitations in the digital era: 1. Disconnect from industry practices: There is an excessive reliance on manual operations like hand-drawing and cutting-and-pasting, creating a significant gap with the digital workflows commonly used in the modern design industry. This leads to a disconnection between learning and practical application. 2. Inadequate integration of theory and practice: The teaching of design principles tends to be theoretically abstract, making it difficult for students to apply them to digital creations. This results in a "mere theoretical discussion" phenomenon. 3. Monotonous teaching methods and low interest in learning: Traditional classroom lectures and assignments are often boring, lacking interaction and fun, which limits students' enthusiasm. 4. Restricted development of innovative thinking: The high cost of modifications in manual operations discourages students from making bold attempts and iterative optimizations, thus inhibiting the development of innovative thinking.

2.2. Inadequate application of PS tools in current teaching

Despite Photoshop's dominance in the design field, its application in the teaching of compositional design in many universities remains inadequate. Most institutions offer PS skills as a separate course, lacking organic connections with basic theoretical courses such as compositional design. The operation of PS stays at a basic level, lacking deep integration. Even when PS applications are involved, they are limited to simple processing or layout, and are not used as a visualization and practical platform for compositional principles. There is a lack of systematic, integrated teaching design in coursework, and courses do not include projects that combine compositional theory with PS operations. Teachers demonstrate functions in a fragmented manner, making it difficult for students to establish a complete understanding of "theory-tool-practice-effect." Finally, the widespread lack of integration of teaching concepts and practices among teachers, as well as insufficient understanding or experience in the deep application of PS and its integration into compositional teaching, results in students having a weak understanding of PS application.

2.3. Challenges faced by integrated teaching

Although integrated teaching has significant advantages, it still faces challenges in practice: 1. Cross-domain requirements for teachers' knowledge and skills: Teachers need to be proficient in compositional theory and PS operations and application skills, facing significant transformation pressure. 2. Curriculum system and teaching resource adjustment: Comprehensive adjustments are needed in the course syllabus, content, assignment formats, and evaluation systems, as well as the development of related teaching resources, which involves a large workload. 3. Student foundation differences and adaptability: Students have varying levels of computer and PS knowledge, and introductory learning may take up too much time, requiring guidance. 4. Software and hardware facility support: Well-equipped computer classrooms, sufficient software licenses, and a stable network environment are needed. 5. Evaluation mechanism establishment: A scientific, objective, and comprehensive evaluation system needs to be designed, taking into account compositional principles, PS skills, and the innovation of works. Based on the above challenges, facing and actively responding to them is the key to successfully implementing the integrated teaching mode of "compositional design + PS tools."

3. Construction of an integrated teaching model combining "Composition design + PS tools"

Based on the analysis of the limitations of traditional teaching and the pain points of integration, this study constructs a teaching model with deep integration of "Composition design + PS tools" as the core, aiming to achieve an organic unity of theory and practice.

3.1. Setting course objectives

The course objectives of the integrated teaching model cover the cultivation of formal aesthetic sensibility and the application ability of digital tools, specifically as follows:

Knowledge objective: Master the elements and principles of composition, and understand the technical logic of PS implementation.

Ability objectives: 1) PS tool application: Proficiently master the core operations of PS and apply them to composition creation. 2) Compositional thinking and digital expression: Able to convert abstract composition principles into PS operations for efficient and flexible visual expression. 3) Innovation ability: Utilize PS features to conduct compositional experiments and cultivate innovative design thinking in a digital environment. 4) Problem-solving ability: Comprehensively apply compositional knowledge and PS skills to solve visual and technical problems.

Quality objectives: Cultivate students' perception and appreciation of formal beauty, stimulate interest and enthusiasm in digital design, and foster habits of independent thinking, active learning, and team collaboration.

3.2. Reconstruction of course content and design of integration points

The reconstruction of course content is the core of the integration model, where composition design theory and PS operations are deeply bound, transforming into a synchronous and spiraling structure of "Theory-Tool-Practice."

Close integration of theoretical knowledge and Photoshop (PS) practice: Point composition: In PS, create and arrange points through brushes, shapes, pattern fills, and filters, observing the effects in real-time. Line composition: Utilize the pen tool, brushes, and shape tools in PS to achieve line compositions with different dynamics and emotions, exploring overlay and lighting effects. Surface composition: Use selection tools, shapes, fills, masks, and blending modes in PS to create, overlay, and combine surfaces, forming spatial relationships.

Color composition: Experiment with color in PS using adjustment layers, gradients, color pickers, and blending modes, experiencing visual impact and emotional expression.

PS application of compositional principles: Design practical PS projects for repetition and variation, balance and symmetry, rhythm and cadence, contrast and unity, utilizing features like transformations, filters, and alignments.

Unit project design: Use projects as a vehicle to integrate compositional elements, principles, and PS operations, simulating the actual design process. For example, creating a "City Impression" poster with point, line, and surface composition, or an "Emotional Color" themed illustration.

Case introduction and analysis: Before each knowledge point or project, introduce excellent digital design cases, analyze their compositional principles, and PS implementation paths to stimulate students' interest.

3.3. Teaching methods and strategies

Integrated teaching adopts diversified teaching methods to promote active learning and deep participation from students:

Combination of lecturing and real-time demonstration: Deliver precise theoretical explanations while the teacher demonstrates PS operations in real-time, turning abstract principles into concrete examples to improve learning efficiency.

Workshop-style practice: The classroom focuses on hands-on practice by students, with teachers providing guidance, immediate feedback, and personalized instruction.

Project-based learning (PBL): A core methodology where learning in each stage revolves around projects, with students participating throughout the process to stimulate their intrinsic drive for learning.

Flipped classroom and online resources: Basic PS operations and theoretical knowledge are videotaped for self-study before class, while class time is dedicated to advanced practices and problem-solving.

Group collaboration and peer review: Encouraging group projects to foster collaboration and enhance critical thinking and communication skills through peer reviews.

4. Teaching practice and case analysis

In this study, the integrated teaching model of "Composition Design + PS Tools" was applied to the "Composition Design" course for a certain year of art design students at our university. Taking the "Emotional Composition Poster Design" project as an example, the teaching process and student works are detailed below.

4.1. Teaching practice participants and course background

Practice participants: 30 students in the second year of the undergraduate visual communication design major. Students have a basic understanding of traditional painting and color, but their PS skills are relatively weak.

Course background: "Composition design" is a professional foundation course with a total of 48 class hours, 4 hours per week, focusing on the digital expression of plane composition and color composition.

4.2. Implementation of integrated teaching process: Taking the "Emotional composition poster design" project as an example

The project aims to enable students to express specific emotions through PS, using constituent elements such as points, lines, planes, and colors, as well as principles of composition.

4.3. Project background and task setting

Background: Emotional expression is crucial in visual communication, and the ability to convey emotions through abstract visual elements is an essential skill for designers. Task: Select an emotion and design an abstract poster with strong emotional appeal using points, lines, planes, colors, and Photoshop tools. The poster should have a clean and simple design, clear compositional relationships, and appropriate color usage.

4.4. Teaching process

4.4.1. Phase 1: Theoretical introduction and photoshop basics review (4 hours)

Theoretical explanation: Review the principles of graphic and color composition, focusing on explaining the symbolic meaning of compositional elements in expressing emotions.

Case analysis: Showcase excellent abstract emotional posters, analyze their composition, and explore the possibilities of achieving similar designs using Photoshop.

Photoshop basics review and reinforcement: Based on the project requirements, reinforce core operations such as layer management, selection, shapes, filling, transformation, layer styles, blending modes, and color adjustment.

Classroom practice: Assign simple exercises related to Photoshop operations to ensure mastery of the tools.

4.4.2. Phase 2: Sketch conception and photoshop composition experimentation (8 hours)

Emotional association and sketch conception: Students select an emotion and quickly sketch ideas using hand drawing or Photoshop to determine the composition and element forms.

Photoshop composition experimentation: Guide students to experiment with point, line, and plane constructions in Photoshop based on their sketches, applying compositional principles such as repetition and variation, contrast and unity, rhythm and meter. Teachers will circulate and provide guidance, encouraging bold experimentation.

4.4.3. Phase 3: Poster Refinement and Completion (4 class hours)

Detail adjustment and optimization: Students adjust poster details based on feedback (element positioning, colors, layer effects).

Visual effect enhancement: Utilize PS masks, mixing modes, filters, etc., to enhance visual hierarchy and texture.

Self-assessment and improvement: Students conduct self-assessments based on requirements and refine their work.

4.4.4. Phase 4: Result presentation and peer evaluation (4 class hours)

Work presentation: Students take turns presenting their posters, elaborating on design concepts, emotional expression, and the application of compositional principles.

Peer review: Other students provide feedback on aesthetics, emotion, and PS skills.

Teacher summary: The teacher systematically reviews the works, highlighting strengths and weaknesses, and emphasizing common issues.

4.5. Analysis of student works

The “Emotional Composition Poster Design” project has yielded a plethora of creative works. Two representative examples are analyzed:

4.5.1. Case study 1: “Tranquility” theme poster

Work description: Predominantly cold tones (blue, cyan) with a large rectangular area and slender horizontal lines. It includes soft circular color blocks and a few extremely fine horizontal lines. The composition leans towards symmetrical balance.

Composition principle analysis: Plane composition (rectangles create a sense of space, soft edges enhance tranquility); Line composition (horizontal lines provide a sense of stable extension); Color composition (cold tones are harmonious and unified, conveying tranquility); Balance and unity (approximate symmetry, visual

balance).

PS tool utilization: skilled use of shape tools, layer masks, and Gaussian blur filters to achieve soft edges; Solid color adjustment layers and gradient tools for precise color control; Clear layer management.

4.5.2. Case study 2: "Vitality" theme poster

Work description: Dominated by warm tones (orange, yellow, red), the poster features a profusion of lines varying in thickness (diagonal and curved) and irregular shapes. The image is filled with radial and spiral elements, creating a strong sense of dynamism and bright, saturated colors. Compositional principles analysis: Line composition (diagonal, intersecting, and radial lines create a sense of speed and direction, while curves add flexibility); Shape composition (irregular shapes intertwined and overlapping to enhance momentum); Color composition (high-purity warm color contrasts, gradients to enhance a sense of liveliness, conveying passion); Rhythm and meter (repeating arrangements of elements of different sizes, forming a diffusive visual rhythm).

PS tool utilization: Skillfully using the Pen Tool to draw complex curves and irregular shapes; duplicating layers and freely transforming them to quickly generate repeating elements; using blending modes and layer styles to enhance effects; precisely controlling color fills and gradients.

Summary: The integrated teaching approach allows students to: 1. More intuitively understand compositional principles; 2. Enhance digital practical skills; 3. Stimulate innovative thinking. This approach significantly compensates for the deficiencies of traditional teaching methods.

5. Teaching effectiveness evaluation

To comprehensively evaluate the effectiveness of the integrated teaching model, this study employs various quantitative and qualitative methods, including student surveys, teacher observation and reflection, and comparative analysis of student works before and after the intervention.

5.1. Design of evaluation methods

5.1.1. Student questionnaire survey

Purpose: To quantitatively evaluate students' acceptance of the model, learning interest, improvement in PS skills, understanding of compositional principles, and cultivation of innovative thinking. Content: The survey adopts Likert five-point scale multiple-choice questions and open-ended questions, covering interest in PS-assisted learning, self-perceived improvement in PS skills, clarity of understanding compositional principles, confidence in digital expression, and satisfaction with project-based teaching.

Recipients: All 30 students.

5.1.2. Teacher observation and reflection

Purpose: To qualitatively analyze students' classroom engagement, problem-solving, collaboration, and teaching issues. Content: Teachers record students' PS operations, compositional ideas, and teacher-student interaction performance, and write teaching logs after class to reflect on strengths and weaknesses.

5.1.3. Comparative analysis of works before and after

Purpose: To visually evaluate students' improvement in PS skills and compositional design abilities. Method: Compare works before and after teaching, evaluating compositional relationships, visual effects, PS technique

application, and innovativeness. Scoring: Anonymous scoring by the instructor and two design professionals.

5.2. Analysis of evaluation results

In the student questionnaire survey, learning interest increased significantly: 90% of students liked the integrated model and believed that combining it with PS was more interesting and practical. PS skills improved significantly: 85% of students believed that their PS operation skills (such as layers, masks, etc.) had improved significantly. Deepened understanding of compositional principles: 78% of students indicated that their understanding of compositional principles became more intuitive and profound through PS practice. Enhanced digital expression ability: 82% of students improved their confidence and ability in digital visual expression. Satisfaction with project-based teaching: 88% of students liked project-based learning and believed that it allowed them to apply what they had learned.

Teacher observation and reflection: Class participation is high, students' problem-solving abilities have improved, and innovative works have emerged. However, some students with weak Photoshop skills need more guidance, and the allocation of course time needs to be optimized.

Comparison of works before and after: There has been a significant improvement in the completion and visual effects of the works, compositional relationship expression, digital features, and innovation.

Conclusion: The integrated teaching model has achieved remarkable results, effectively improving students' Photoshop skills, understanding of compositional principles, learning interest, digital expression ability, and innovative thinking, thus compensating for the deficiencies of traditional teaching methods.

6. Existing problems and teaching reflection

Although the integrated teaching model has achieved positive effects, there are still challenges in practice that require continuous reflection and improvement.

6.1. Challenges encountered in practice

1. Large differences in students' Photoshop foundations: Some students with no foundation spend a lot of time in the initial stage, affecting their learning of compositional principles. It is necessary to consider students with different foundations. 2. Balancing teaching time and content allocation: Compositional theory and Photoshop skills are complex, and class time is limited, making it difficult to balance teaching content and practical time. 3. Sustainable demand for teachers' ability improvement: Teachers need to continuously learn new Photoshop functions and digital design trends, and improve their teaching design abilities for integrating theory and tools. 4. Maintenance and upgrading of software and hardware facilities: Photoshop has high requirements for computer configuration, and software updates are frequent. Equipment failures can affect teaching. 5. Complexity of homework correction and evaluation: The evaluation dimensions have increased (compositional principles, Photoshop skills, innovation), which requires higher professional judgment from teachers.

6.2. Improvement measures for the issues

To optimize the integrated teaching model in the future, the following measures can be considered: 1. Stratified teaching and personalized guidance: Conduct diagnostic tests to assess students' Photoshop (PS) foundations, provide additional tutorials or coaching, and assign tasks tailored to different levels in the classroom. 2.

Optimizing course content and time management: Streamline theories, highlight key points, select projects carefully to ensure adequate exploration time, and strengthen pre-class preparation and post-class expansion. 3. Enhancing teachers' professional development: Organize regular advanced Photoshop training, encourage experience sharing, and invite industry experts to give lectures. 4. Improving software and hardware environment: Regularly update computer lab equipment and software versions, and provide unified installation packages. 5. Establishing a diversified evaluation system: Improve process-based evaluation, introduce peer review and group presentations, and establish clear scoring criteria.

6.3. Teaching reflection and experience summary

This exploration of integrated teaching has provided valuable experience for the reform of basic art and design courses. Digitization is a trend in design education, and the deep integration of traditional theories with modern digital tools is key to cultivating design talents who meet the demands of the times.

Key experience summary: Project-driven learning is the core, and incorporating digital design projects significantly enhances learning interest and practical abilities. Photoshop is an extension of compositional thinking and an important platform for students to explore compositional possibilities and realize their creativity. Teachers should take on the role of guides, shifting from being knowledge providers to learning facilitators, providing technical and design inspiration. Continuous reflection and improvement are essential. Teaching reform is a dynamic process that requires constant summation, problem identification, and iterative optimization. Through continuous reflection and improvement, the integrated teaching model will be continuously refined, contributing to cultivating artistic design talents with innovative spirits and digital literacy.

7. Conclusion

This study has delved into and practiced the integrated teaching mode of "Composition Design + PS Tools." By analyzing the limitations of traditional teaching methods, the necessity of deep integration in the digital age has been clarified. The research constructed a fusion model based on constructivism and project-based learning, which was systematically verified in teaching practice. The practical results indicate the following points: 1. Enhanced understanding of compositional principles: intuitive PS operations enable students to explore compositional elements and principles more intuitively and flexibly, deepening aesthetic cognition. 2. Significantly enhanced practical ability in digital design: students have mastered the core operations of PS, using it as a tool to realize compositional ideas and solve visual problems. 3. Stimulate interest in learning and innovative thinking: the modifiability and efficiency of PS encourage bold and creative attempts, increase initiative, and produce more digitally distinctive and innovative works. 4. Provide a feasible path for the reform of art and design foundation courses: integrating basic theory with mainstream digital tools is an effective way to improve teaching quality and cultivate interdisciplinary talents.

Disclosure statement

The authors declare no conflict of interest.

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