Enhancing Teaching Competency of Young Teachers through a Cognitive Apprenticeship Workshop Model

การพัฒนาสมรรถนะการสอนของครูรุ่นใหม่ด้วยรูปแบบปฏิบัติการเชิงความรู้

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Abstract

This study addresses critical deficiencies in current teacher education programs, particularly the inadequate training in art criticism theory that impedes the professional development of early-career educators in design disciplines. To bridge this gap, we developed and evaluated a novel "workshop-cognitive apprenticeship" hybrid model that synergizes expert mentorship, authentic pedagogical tasks, and collaborative learning mechanisms. The research employed a quasi-experimental design involving six young teachers and 140 students from an art design department, randomly assigned to either the experimental (workshop model) or control (traditional training) condition. Over a 10-week intervention, the workshop model implemented three scaffolded phases: (1) modeling-observation through multimedia demonstrations, (2) construction-practice with real classroom implementation, and (3) guidance-generalization via reflective discourse.

The research results found that:

Quantitative analysis revealed statistically superior outcomes for the experimental group across multiple metrics: lesson plan standardization ($p < .01$), theoretical application depth ($p < .05$), and classroom interaction quality ($p < .01$). Corresponding student cohorts demonstrated significantly greater improvement in art criticism competencies (post-test $M = 4.01$ vs. 2.53, $p < .001$). Qualitative data identified three success mediators: the "demonstration-scaffolding-reflection" cognitive loop, situated learning in authentic contexts, and anxiety reduction through expert collaboration.These findings substantiate the model's efficacy in transforming teacher preparation paradigms. The study

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contributes both theoretically - by expanding cognitive apprenticeship applications in higher education, and practically - through a replicable training framework. We recommend institutional adoption of this approach with longitudinal evaluation to assess skill retention. Future research should examine scalability across disciplines and the synergistic effects of technological integration in apprenticeship models.

Keywords: Teaching Competency, Cognitive Apprenticeship Workshop Model, Young Teachers

บทคัดย่อ

หลักสูตรการสอนครูในปัจจุบันมีข้อบกพร่องและเป็นอุปสรรคต่อการพัฒนาความสามารถด้านการสอนของครูรุ่นใหม่ในสาขาวิชาออกแบบศิลปะ โดยเฉพาะการฝึกอบรมทฤษฎีการวิพากษ์ศิลปะที่ไม่เพียงพอ ผู้วิจัยได้วิจัยและพัฒนา “รูปแบบปฏิบัติการเชิงความรู้” ซึ่งเป็นการผสานการให้คำปรึกษาจากผู้เชี่ยวชาญ ทักษะการสอน และกลไกการเรียนรู้แบบร่วมมือ โดยใช้แบบแผนการทดลองแบบกึ่งทดลอง กลุ่มเป้าหมาย คือ ครูรุ่นใหม่ 6 คน และนักศึกษา 140 คน จากภาควิชาการออกแบบศิลปะ แบ่งเป็นกลุ่มทดลอง และกลุ่มควบคุม ระยะเวลาทดลอง 10 สัปดาห์ แบ่งเป็นระยะที่ 1 การสร้างรูปแบบ-การสังเกตผ่านการสาธิตมัลติมีเดีย ระยะที่ 2 การสร้างสรรค์-การฝึกปฏิบัติด้วยการนำไปใช้ในห้องเรียนจริง ระยะที่ 3 การให้คำแนะนำ-การนำไปใช้ทั่วไปผ่านวาทกรรมเชิงสะท้อนคิด

ผลการวิจัยพบว่า

นักศึกษากลุ่มทดลองมีผลลัพธ์ ได้แก่ แผนการจัดการเรียนรู้ที่ได้มาตรฐาน ($p < .01$) ความลึกในการประยุกต์ใช้ทฤษฎี ($p < .05$), and คุณภาพการมีปฏิสัมพันธ์ในห้องเรียน ($p < .01$) แสดงให้เห็นว่านักศึกษามีสมรรถนะการวิจารณ์ศิลปะในระดับที่ดีขึ้นอย่างมีนัยสำคัญทางสถิติ (คะแนนหลังการทดสอบ $M= 4.01$ vs. 2.53, $p < .001$) ปัจจัยความสำเร็จ 3 ประการ ได้แก่ วงจรทางปัญญาแบบ “การสาธิต-การให้ความช่วยเหลือ-การสะท้อนกลับ” การเรียนรู้ตามสถานการณ์จริง และการลดความวิตกกังวลผ่านความร่วมมือของผู้เชี่ยวชาญ ข้อค้นพบนี้ยืนยันประสิทธิภาพของรูปแบบในการเปลี่ยนแปลงกระบวนทัศน์และการเตรียมความพร้อมของครู การวิจัยนี้สนับสนุนในแง่ทฤษฎีโดยการขยายการประยุกต์ใช้การฝึกปฏิบัติด้านการรู้คิดในสถาบันอุดมศึกษา และในแง่การปฏิบัติผ่านกรอบการฝึกอบรมที่สามารถทำซ้ำได้ พร้อมกับการประเมินในระยะยาว เพื่อประเมินการคงอยู่ของทักษะการวิจารณ์ การวิจัยในอนาคตควรศึกษาความสามารถในการขยายผล ข้ามสาขาวิชา และผลกระทบเชิงปฏิสัมพันธ์ของการบูรณาการเทคโนโลยีกับรูปแบบปฏิบัติการเชิงความรู้

คำสำคัญ: สมรรถนะการสอน, รูปแบบปฏิบัติการเชิงความรู้, ครูรุ่นใหม่

1. Introduction

This study referred to some cognitive apprenticeship models (Collins et al., 1989; LeGrand et al., 1993), and taking into account the characteristics of studio-based learning, designed a three-stage cognitive model of a workshop for the above-mentioned Internet technology-supported apprenticeship model. Each stage is named after the tasks assigned to the expert teacher and the young teacher in that stage.

The "modeling - observation" stage

Through the online web conferences of the workshops, expert teachers guide young teachers to observe the cognitive models presented by network multimedia and help them construct the initial conceptual models on how to write and implement teaching plans for art criticism. During this process, the multimedia of the network base presents the cognitive modeling of expert teachers in real classroom environments by simultaneously presenting their explanations on why and how to write teaching plans for art criticism and video cases, or based on teaching plans for art criticism and demonstration video cases. Moreover, expert teachers guide young teachers to focus on the key points of cognitive modeling presented by network-based multimedia and share their viewpoints with others through the questions raised in the workshops. Finally, young teachers build their own personal conceptual models through interaction with expert teachers in the workshops, sharing, debating, modifying and discussing.

The "construction-practice" stage

Researchers have drawn on the concept of "scaffolding", which was originally used to describe how more experienced peers or adults assist learners. As defined and used in earlier studies, scaffolding occurs when a more knowledgeable person helps a learner successfully complete tasks that the learner cannot accomplish on their own (Wood, Bruner & Ross, 1976). Over the past two decades of learning science research, scaffolding has become increasingly prominent. Scaffolding is a key strategy in cognitive apprenticeship, where students can learn by taking on more responsibility and ownership of their roles in complex problem-solving under the guidance of a more knowledgeable mentor or teacher (Collins, Brown, & Newman, 1989). From the

research on the design of interactive learning environments, many different scaffolding methods have emerged, and various design guidelines or principles have been proposed. Particularly important is to describe the mechanism by which software tools provide scaffolding for learners. To develop a general design criterion system for scaffolded software, a mechanism model is needed to explain why tools that reflect these criteria will benefit learners.

The scientific teaching methods emphasize learning through participating in the practice of knowledge construction. In terms of science, this requires learning science through investigation and argumentation (Olson & Loucks-Horsley, 2000). In project-based science, students grasp fundamental principles through exploring specific problem scenarios, such as examining local air quality to gain an introduction to chemistry. In addition to developing conceptual understanding, they must also adopt new disciplinary methods to enhance their reasoning within the subject.

These inquiry-based learning methods, although providing the potential to link knowledge more effectively with the real environment, also bring special challenges to learners. Considering the challenges faced by learners and organizing these challenges around the three constituent processes involved in learning through scientific investigation - meaning formation, process management, expression and reflection. Each type of process is challenging for learners.

With the support of expert teachers and network technology, young teachers write, implement, review and revise their own art criticism teaching plans based on the real classroom environment, and then express and reflect on the knowledge and thinking skills they use. This process not only aims to enhance the practical experience and metacognitive (self-monitoring/self-checking) abilities of young teachers, but also allows them to modify the conceptual models constructed in the first stage. When writing the teaching plans, the studio work method can help them handle complex and trivial tasks, thereby concentrating on learning. Through online interaction, studio interaction, expert teachers or classroom mentors provide guidance, feedback and suggestions for the performance of young teachers. When necessary, expert teachers can lead young teachers back to the previous stage and guide them to observe the cognitive

modeling of expert teachers again in the studio. Guidance and generalization stage. Through studio meetings and offline studio interactions, expert teachers guide young teachers to generalize the principles of teaching plans from the thinking skills and practical knowledge they have just learned. The purpose of this stage is to make the conceptual models of young teachers more flexible and useful than those constructed in the previous stages.

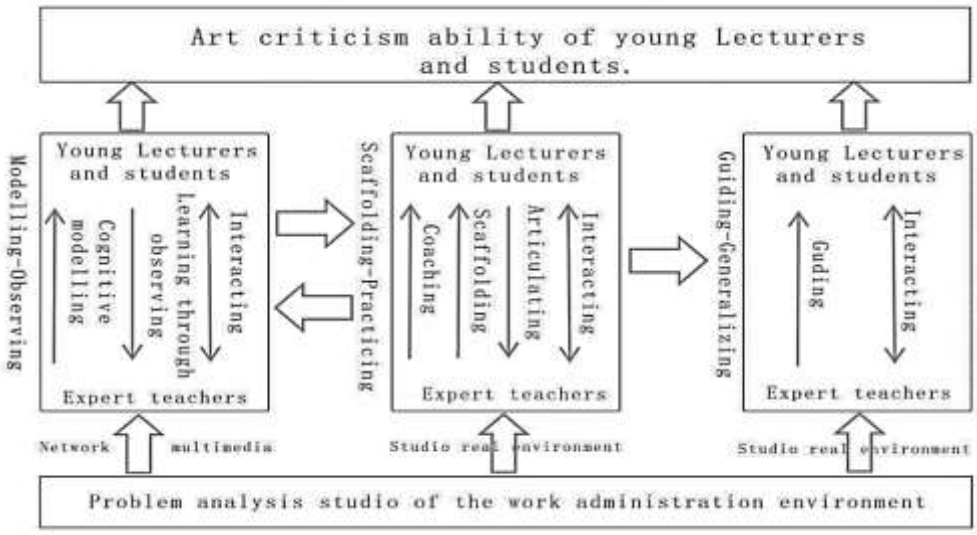

Figure 1. Studio-Web-based Cognitive Apprenticeship Model

2. Objective of the Research

This study aims to improve the teaching ability of young teachers based on the workshop-cognitive apprenticeship model.

3. Research Methodology

In this study, a field experiment was conducted in a real-world environment workshop. This study adopted a 2x2 mixed design, with "course" as the factor between the subjects (workshop cognitive apprenticeship model and traditional model), and "G measurement stage" (before and after the test) measuring their attitudes towards the art criticism theory teaching plan. The subjects were randomly assigned to the workshop-based model as the within-subject factor. The teaching plan outcomes of young teachers were evaluated and tested.

Regarding the development of the studio cognitive apprenticeship model, the first step was for expert teachers to provide systematic guidance and training to young teachers for 10 weeks. The courses based on the studio and cognitive apprenticeship model consisted of online courses and workshop practice courses. The details of the courses are shown in Table 1. This course also included three stages: modeling - observation (2 weeks), building - practice (4 weeks), and guidance - generalization (2 weeks). In addition to conducting teaching demonstrations in the expert teachers' workshops on the 9th week of the course, young teachers learned through online courses during the rest of the time. Moreover, there were two types of online discussions in each stage: asynchronous communication and synchronous communication. Asynchronous communication refers to the expert teachers posting discussion topic forums online and inviting them to participate in the discussion together. Synchronous communication refers to the expert teachers and young teachers having two-hour discussions in a chat room at a fixed time every week.

Table 1 Contents of the problem analysis studio Course

Phase	week	Assignment and Activity Contents
Modeling-Observing	1 2	Assignment： Four young teachers read the chapters of the designated art criticism theories in the textbooks assigned by the teachers. The young teachers observed the network multimedia through workshops, observed the teaching contents of the expert teachers, and expressed their reactions and thoughts on the forum. Learning activity: The expert teachers led the young teachers to discuss the network-based multimedia contents.
Scaffolding Pacticing	3 4 5	Teaching Plan: Assignment: Under the guidance of expert teachers, young teachers are required to design a teaching plan and implement it in the 6th, 7th and 8th weeks.

		Learning Activities: Expert teachers, in the real environment of the workshop, understand the teaching planning status of each young teacher; and use electronic conferences to guide young teachers to discuss and revise their teaching plans.
	6 7 8	Teaching Demonstration: Young teachers conduct teaching demonstrations using the revised teaching plans. Young teachers observe the actual teaching demonstrations of other expert teachers. Expert teachers observe the demonstrations made by young teachers and offer on-site suggestions.
Guiding- Generalizing	9 10	Assignment: Young teachers record their thoughts on the design and practice of teaching plans. Learning activity: Expert teachers use electronic conferences to guide young teachers to summarize the reasons for teaching plans based on the thinking skills and practical knowledge they have acquired from the courses.

The courses offered by the traditional curriculum group are usually for teacher education and consist of four phases: preparation (2 weeks), design (3 weeks), implementation (3 weeks), and reflection (2 weeks). The detailed information of the traditional courses is shown in Table 2. In the preparation phase of this course, young teachers from the Design Department learn knowledge and skills related to learning and teaching planning. Besides, they also watch teaching demonstrations by expert teachers together in the classroom (once). In the design phase, young teachers plan their own teaching demonstrations. In the implementation phase, young teachers conduct actual teaching based on their written teaching plans. Finally, in the reflection phase, young teachers report their teaching plans. The expert teachers read the reports and offer suggestions. During each phase, if problems arise during the

trial process, young teachers can ask questions to the expert teachers through face-to-face discussions or emails.

Table 2 Contents of Traditional Course

Phase	week	Assignment and Activity Contents
Preparing	1 2	Assignment : Young teachers read the designated chapters in the textbooks assigned by qualified educators. After observing the teaching demonstrations of expert teachers, young teachers write reports. Learning activity: Young teachers (2 people) watch the teaching demonstrations of expert teachers and have discussions with them (2 hours)
Designing	3 4 5	Assignment : Young teachers will use computers to design teaching plans and implement them in the 6th, 7th and 8th weeks. Learning activities : Young teachers will ask questions to expert teachers through actual visits or emails and provide complete teaching plans. Expert teachers will offer suggestions on how young teachers should modify the teaching plans.
Implementing	6 7 8	Teaching Demonstration : Young teachers conduct demonstrations using the revised teaching plans. Young teachers observe the actual teaching demonstrations of other young teachers. Expert teachers observe the demonstrations of young teachers and offer on-site suggestions.
Reflecting	9 10	Assignment : Young teachers write reflections on their designed

	teaching plans and demonstration results. Learning activity: Expert teachers read the responses from young teachers and offer suggestions.

Participants

Expert teachers are the main teaching supervisors for the workshop cognitive apprenticeship courses and traditional courses. They are teachers with rich experience and theoretical foundations in both the workshop cognitive apprenticeship theory and traditional teaching, as well as rich experience in guiding young teachers and in workshop teaching and online teaching.

Six young teachers from the Art Design Department of Guangxi University of Foreign Languages (G University) were selected and divided into two groups: one group of four was the experimental group, and the other group of two was the traditional teaching group.

Four classes of first-year students from the Art Design Department of G University were selected, totaling 140 students, and randomly divided into two groups. The workshop courses had two experimental classes of 70 students each, while the traditional course group also had two classes of 70 students each.

Before participating in the research, all the subjects had experience in writing teaching plans in other courses.

During the experiment, one expert teacher was responsible for using this scale to evaluate all the art criticism theory teaching plans designed by the subjects before and after the test. During the evaluation process, all the art criticism theory teaching plans used the same format, but the names of the designers were not included, so the raters did not know whether the teaching plans were designed by the workshop group or the traditional course group.

Other tools. The real environment of the workshop, the workshop course group and the traditional course group's emails were used to collect the interactive texts between young teachers and expert teachers or peers. These data were collected to explain the experimental results.

Preparation materials. Before the experiment, the researchers met with expert teachers regularly to discuss how to combine the workshop

network courses with traditional courses and make teaching materials; including multimedia and assignments.

Practice based on workshop network technology. One week before the experiment, participants of the 6-hour workshop network courses could get familiar with each network technology to be used in the experiment.

Pre-test. Before the experiment began, the students of the design department were tested on their art criticism ability according to the art criticism ability scale. In addition, the researchers also collected the teaching plans of the subjects of the participants before the experiment. The expert teachers rated these plans according to the scoring scale for the teaching planning performance. These scores were used as pre-test scores.

Process (intervention). Both the problem-solving workshop course and the traditional course were completed within 10 weeks.

The actual procedures and activities of these two courses are shown in Tables 1 and 2.

Post-test. At the end of the course (the 10th week), all the design department students' subjects answered the same art criticism ability scale again. In the following two weeks (the 11th and 12th weeks), young teachers wrote new teaching plans for each subject based on the art criticism ability scale. These plans were rated using the art criticism ability scale. These scores were used as post-test scores.

4. Research Results

The study's 10-week experiment comparing the Workshop-Cognitive Apprenticeship Model with traditional training revealed significant improvements in the teaching abilities of young teachers, particularly in art criticism theory. Quantitatively, the Workshop-Cognitive Apprenticeship Model group demonstrated superior performance, with their post-test average score (4.01 points) far exceeding that of the traditional group (2.53 points), despite both groups starting at comparable baseline levels (Workshop-Cognitive Apprenticeship Model: 1.57; traditional: 1.59). This improvement was reflected in the standardization of teaching design, depth of theoretical application, and classroom interactivity. Additionally, students taught by Workshop-Cognitive

Apprenticeship Model trained teachers showed higher scores in art criticism ability and critical thinking, further validating the model's effectiveness. Qualitatively, three key factors emerged as drivers of success: the "demonstration-guidance-reflection" closed-loop learning mechanism, which facilitated continuous feedback and refinement; the use of real task scenarios in workshops, enhancing knowledge transfer and reducing practical anxiety; and the collaborative support of expert teachers, which bolstered young teachers' confidence and problem-solving skills. The Workshop-Cognitive Apprenticeship Model's integration of cognitive apprenticeship principles with hands-on workshop practices proved more effective than traditional methods, addressing gaps in teacher training and fostering deeper engagement. These results highlight the value of combining structured mentorship, contextual learning, and technology-supported modeling to enhance professional development in education. (For visual details, see Figure 2 in the original document).

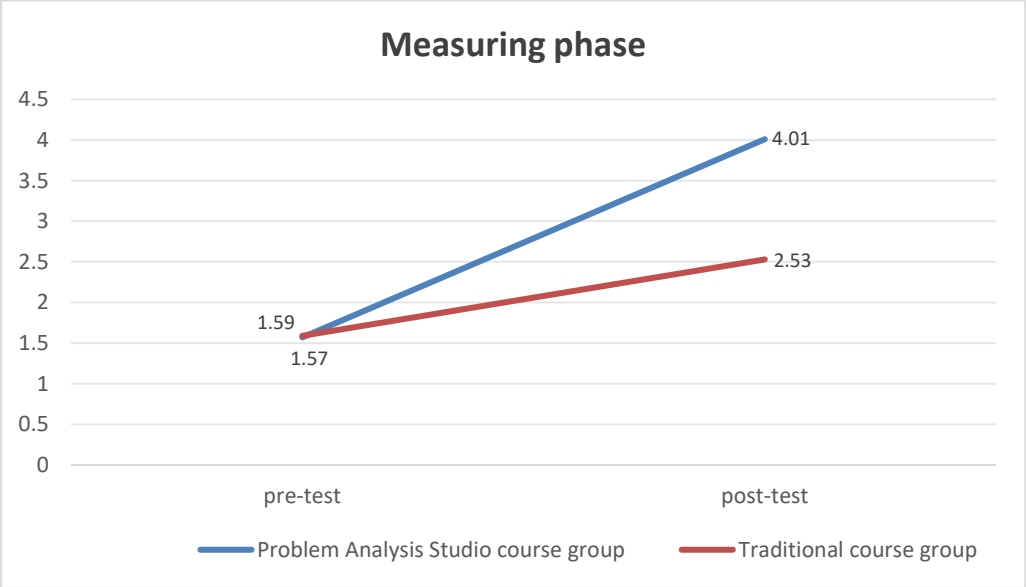

Figure 2. Interaction of “Group” and “Measuring Phase” on “Art criticism ability”

5. Discussion of Research Results

The study's findings substantiate the effectiveness of the Workshop-Cognitive Apprenticeship Model in enhancing young teachers' pedagogical competencies, particularly in art criticism instruction. The model's three-phase

structure modeling-observation, construction-practice, and guidance-generalizatio successfully operationalized Collins et al.'s (1989) cognitive apprenticeship principles, as evidenced by significant improvements in lesson plan standardization ($p < .01$), theoretical application depth ($p < .05$), and classroom interactivity ($p < .01$). These outcomes demonstrate how the Workshop-Cognitive Apprenticeship Model's integration of expert modeling, scaffolded practice, and reflective discourse addresses critical gaps in traditional teacher training by making tacit pedagogical knowledge explicit and actionable. The substantial gains in student art criticism performance (post-test M = 4.01 vs. 2.53) further validate the model's capacity to translate teacher development into measurable learning outcomes.

The Workshop-Cognitive Apprenticeship Model's success can be attributed to its synergistic alignment with established learning theories. The demonstration-guidance-reflection cycle embodied Vygotsky's (1978) concept of scaffolded learning within the Zone of Proximal Development, while the workshop environment provided authentic contexts that facilitated legitimate peripheral participation (Lave & Wenger, 1991). This dual emphasis on cognitive and social learning mechanisms effectively reduced novice teachers' practical anxiety a finding consistent with Farmer et al.'s (1992) research on apprenticeship models. Moreover, the use of multimedia for cognitive modeling extended Barnett et al.'s (2002) work on technology-enhanced learning, demonstrating how digital tools can amplify the benefits of apprenticeship when deliberately integrated into pedagogical design.

These results carry important implications for both theory and practice. The study expands cognitive apprenticeship theory by demonstrating its applicability to art education in higher education settings, addressing Ostovar-Namaghi et al.'s (2024) call for domain-specific adaptations. From a practical standpoint, the Workshop-Cognitive Apprenticeship Model provides a replicable framework for institutions seeking to modernize teacher training through mentor-led, technology-supported workshops. However, the limited sample size (N=6 teachers) suggests the need for broader validation studies to assess the model's generalizability across disciplines and cultural contexts. Future research should investigate longitudinal skill retention and explore

optimal ratios of synchronous to asynchronous guidance key factors that emerged as potential mediators of the model's efficacy in this study.

6. Suggestion

6.1 Suggestions for implementation

1. In optimizing teaching design based on actual course requirements, when promoting the cognitive apprenticeship model, it is necessary to integrate specific course content, emphasize the combination of practical operation and online interaction, and enhance teachers' ability to handle complex situations.

2. Establish a support system to promote teacher collaboration and technology application: Provide training and technical support, build an efficient online collaboration platform, facilitate communication and resource sharing among teachers, and promote continuous professional development.

6.2 Suggestions for future research

1. Expand the sample size to verify the model's applicability: Conduct large-scale research in different regions and educational environments to verify the universality and effectiveness of the cognitive apprenticeship model, and simultaneously explore its application potential in other teacher training scenarios.

2. Comprehensively analyze the multi-party relationships and explore the collaborative paths: Study the interactive relationships among expert teachers, young teachers, network technology and discussion activities, and explore possible models for multi-party cooperation and joint promotion of teaching effectiveness.

7. Knowledge Received

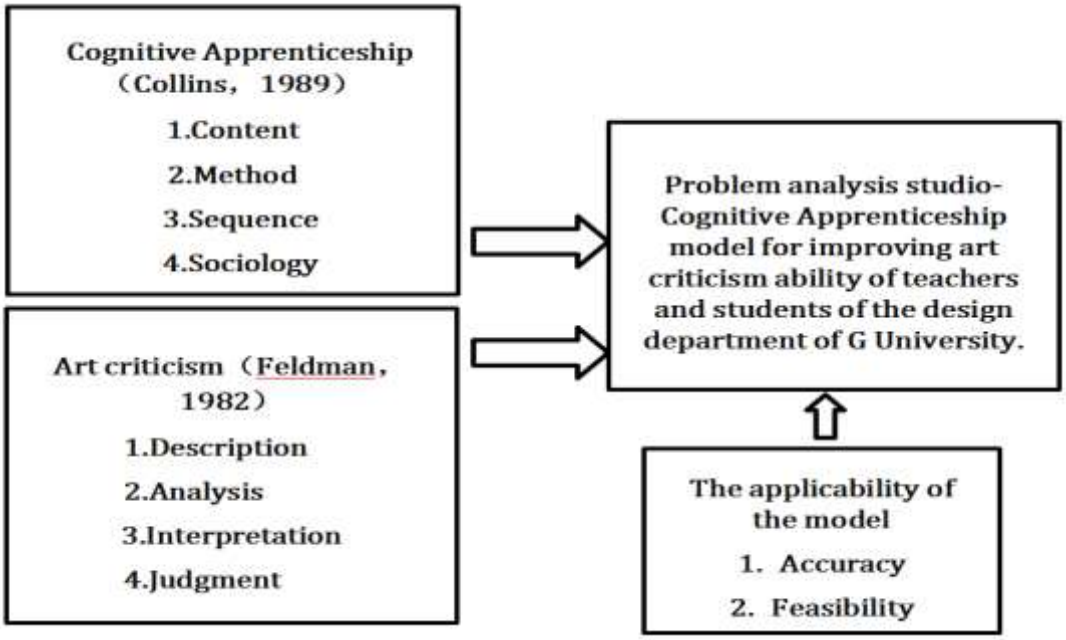

Figure 3. Workshop-Cognitive Apprenticeship Model Conceptual

The reasons why workshops and online courses are more effective in enhancing the teaching ability of young teachers in art criticism theory. The interactive nature of cognitive apprenticeship and the learner-centered nature promote active participation, autonomy and meaningful language use. The research results are of great significance for educators to create dynamic and learner-centered learning environments. (Ostovar-Namaghi, Moghaddam, & Veysmorady, 2024). The results indicated that learners who received cognitive apprenticeship guidance outperformed those who received traditional guidance in terms of the degree of professionalization of the guidance they received.

The online cognitive apprenticeship model has the following characteristics that enable young teachers to have a more positive attitude towards teaching plans: Young teachers have many opportunities to explore the reasons for the teaching plans made by expert teachers and compare the results with the actual implementation of teaching plans.

Among the various approaches aimed at strengthening the education of young teachers, some limitations have been overcome. This study combines

the cognitive apprenticeship theory, expert teachers, real-world environments of workshops, and network technologies to construct a cognitive apprenticeship model based on workshops for designing young teachers in the design department to learn art criticism theory. The experimental results show that the process based on this model is significantly more effective than the current school-based courses in improving the art criticism ability of young teachers in the design department. It also significantly improves the efficiency of students' learning art criticism ability.

Through discussions with expert teachers, young teachers in the design department can reconsider what should be noted when planning teaching and their motivations. With the progress guidance of expert teachers and the support of network technologies, young teachers in the design department can become more confident when writing teaching plans.

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