

An Instruction to Enhance and Cultivate Professional Identity and Design Thinking for Preschool Education Major Students based on Collaborative Learning and Outcome-based Education

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Abstract

With the continuous reform of preschool education and the increasing demand for high-quality preschool teachers, the cultivation of professional identity and design thinking has become an essential task in the training of preschool education major students. This study constructed and implemented an instructional model based on collaborative learning and outcome-based education (OBE) to enhance students' professional cognition, professional commitment, and innovative activity design capability. A mixed-methods design was adopted. The study involved 80 preschool education major students from a university in southern China, including 40 students in the experimental group and 40 students in the control group. The experimental group received the collaborative learning and OBE-based instructional intervention, whereas the control group received traditional instruction. Data were collected through literature analysis, questionnaire surveys, teaching practice, professional identity measurement, design thinking evaluation, and classroom observation. The results showed that the experimental group achieved substantial improvement in professional identity and design thinking ability after one semester of teaching practice. The findings indicate that the integration of collaborative learning and OBE can strengthen students' professional understanding, promote the connection between theoretical knowledge and practical application, and support curriculum reform in preschool education programs.

Keywords: preschool education major; professional identity; design thinking; collaborative learning; outcome-based education

Introduction

In recent years, preschool education has received increasing social, institutional, and policy attention because it is closely related to children's early development, family well-being, and the quality of the future education system (UNESCO & UNICEF, 2024). As the professional requirements for preschool teachers continue to rise, colleges and universities that offer preschool education programs are expected to cultivate students who not only master theoretical knowledge but also possess stable professional commitment, practical problem-solving ability, and innovative

educational design competence. In this context, professional identity and design thinking have become two important dimensions of talent training for preschool education majors.

Professional identity refers to students' recognition of the value, role, responsibility, and future development of the preschool teaching profession. It provides an important psychological foundation for students to remain committed to the profession and to develop long-term professional growth motivation. Design thinking, by contrast, reflects students' ability to identify educational problems, analyze children's developmental needs, design appropriate activities, optimize teaching schemes, and apply creative solutions in real preschool education scenarios (Huang et al., 2022; Olsen et al., 2024). For preschool education major students, these two dimensions are mutually supportive. A strong professional identity can increase students' willingness to engage in educational practice, while design thinking helps them transform professional beliefs into practical and innovative teaching actions. However, traditional teaching in preschool education programs still tends to emphasize the transmission of theoretical knowledge and the completion of fixed course tasks. In some courses, students passively receive knowledge from teachers, while opportunities for cooperative exploration, practical activity design, reflective evaluation, and problem-based application remain insufficient. This may lead to a gap between students' classroom learning and the actual demands of preschool education practice (Opoku et al., 2024). In particular, when students lack opportunities to connect professional concepts with authentic teaching situations, their professional identity may remain abstract, and their design thinking may not be effectively developed.

Collaborative learning and outcome-based education provide important theoretical and practical foundations for addressing this problem. Collaborative learning is a student-centered pedagogical approach that emphasizes group interaction, resource sharing, peer support, task cooperation, and collective problem solving (Bach & Thiel, 2024; Ransanz Reyes et al., 2025). It can stimulate students' learning initiative and enhance their cooperative awareness through shared learning tasks. Outcome-based education starts from expected learning outcomes and uses clear ability goals to guide curriculum design, teaching activities, and evaluation procedures (Asim et al., 2021). This logic is highly consistent with the goal of cultivating preschool education students who can demonstrate professional understanding, collaborative practice ability, activity design competence, and educational responsibility.

Based on the above background, this study constructs an instructional model that integrates collaborative learning and OBE to enhance professional identity and design thinking among preschool education major students.

Research Objectives

The research objectives are as follows: first, to construct an instructional model based on collaborative learning and OBE for preschool education major students; second, to design multi-

stage collaborative learning modules oriented toward professional identity and design thinking; third, to examine the effect of the instructional model on students' professional identity; and fourth, to evaluate its effect on students' design thinking ability. By addressing these objectives, this study aims to provide theoretical and practical support for curriculum reform and talent training in preschool education programs.

Literature Review

Professional identity has been regarded as a key factor in the preparation of preschool education major students. Existing studies suggest that students' professional identity is shaped by their understanding of preschool education, emotional recognition of the profession, perceived professional value, and willingness to engage in future teaching work (UNESCO & UNICEF, 2024). For students preparing to become preschool teachers, professional identity is closely connected with professional ethics, career persistence, teaching responsibility, and the ability to adapt to educational practice (Olsen et al., 2024). UNESCO also emphasizes the foundational value of early childhood care and education, which further highlights the need to train preschool teachers with stable professional beliefs and strong educational responsibility (UNESCO & UNICEF, 2024).

Design thinking has gradually become an important ability in preschool education because teaching in early childhood settings requires teachers to respond creatively to children's developmental characteristics, learning interests, and situational needs. Related research shows that the cultivation of design thinking can help preschool education students improve their ability to analyze problems, construct activity schemes, optimize educational plans, and develop child-centered teaching activities (Grönman et al., 2025). Studies on play, inclusive education, and holistic assessment also indicate that preschool teachers need flexible design ability to create meaningful, inclusive, and developmentally appropriate learning experiences for children (Dignath et al., 2022; Grönman et al., 2025; Opoku et al., 2024). Therefore, design thinking is not only a technical ability for activity planning but also a comprehensive professional ability that connects educational theory with preschool practice.

Collaborative learning has been widely discussed as an effective approach to improving student engagement and practical learning in higher education. It emphasizes learning through group discussion, knowledge sharing, peer assistance, task division, mutual evaluation, and collective reflection (Bach & Thiel, 2024; Ransanz Reyes et al., 2025). In preschool education programs, collaborative learning is particularly valuable because future preschool teachers are expected to work with children, parents, colleagues, and community partners in complex educational environments. Previous studies have shown that collaborative learning can improve students' teamwork awareness, learning initiative, and practical teaching capability (Ransanz Reyes et al., 2025). The integration of information technology and preschool education curriculum

also provides new possibilities for resource sharing, collaborative activity design, and technology-supported professional learning (Leoste et al., 2022; Yang et al., 2022).

Outcome-based education offers another important foundation for preschool education curriculum reform. OBE emphasizes that teaching design should begin with expected learning outcomes and that instructional activities, learning tasks, and assessment methods should be aligned with these outcomes (Asim et al., 2021). In preschool education, such an approach is useful for clarifying what students should know, what they should be able to do, and what professional attitudes they should develop by the end of a course or training process. School-kindergarten cooperation and practice-oriented curriculum models further indicate that outcome-oriented instruction can help students connect university learning with real preschool education contexts (Opoku et al., 2024). Meanwhile, professional qualification requirements and national policy documents also indicate that preschool education programs should strengthen competence-based training and practical professional development (Ministry of Education of the People's Republic of China, 2022).

Although these studies provide a foundation for the present research, several knowledge gaps remain. First, existing research has often examined professional identity, design thinking, collaborative learning, and OBE as separate topics, while fewer studies have integrated them into a unified instructional model for preschool education major students. Second, some studies have discussed curriculum reform at the theoretical level, but systematic instructional modules that connect professional cognition, collaborative practice, activity design, and outcome evaluation are still insufficient. Third, empirical evidence comparing an experimental group and a control group remains limited, especially evidence that evaluates both professional identity and design thinking ability after teaching practice. Therefore, this study constructs and verifies a collaborative learning and OBE-based instructional model to respond to these gaps.

Conceptual Framework

The research framework of this study is built on the integration of collaborative learning and OBE. Collaborative learning serves as the main implementation mechanism because it provides group-based interaction, task cooperation, peer evaluation, and shared reflection. OBE serves as the guiding principle because it clarifies the expected learning outcomes and aligns instructional activities with knowledge, ability, and emotional objectives. In this framework, the instructional model is the core intervention, professional identity and design thinking are the major outcome variables, and the learning process is supported by staged modules that move from basic cognition to practical training and comprehensive application.

Table 1 Research Framework of the Instructional Model

Core Element	Operational Meaning	Learning Process	Expected Outcome
Collaborative learning	Group participation, peer support, resource sharing, task cooperation, and mutual evaluation	Group discussion, knowledge sharing, preschool activity design, peer revision, and classroom reflection	Improved teamwork awareness, professional participation, and learning initiative
Outcome-based education	Instructional design guided by expected learning outcomes and competence development	Alignment of knowledge objectives, ability objectives, emotional objectives, learning activities, and assessment	Clearer professional goals, stronger achievement orientation, and more coherent learning evaluation
Professional identity cultivation	Development of professional cognition, emotional recognition, professional value, and career responsibility	Professional theory learning, reflective discussion, kindergarten practice, and professional role experience	Enhanced recognition of preschool education and stronger willingness to engage in the profession
Design thinking development	Ability to analyze educational problems, design activity schemes, and optimize solutions	Problem analysis, scheme design, group revision, field practice, and activity implementation	Improved problem analysis, scheme design, and scheme optimization ability

Based on this framework, the instructional model assumes that collaborative learning can strengthen students' participation and practical engagement, while OBE can ensure that all learning activities are directed toward explicit training outcomes. Through the interaction of these two approaches, students are expected to deepen professional understanding, develop positive professional emotions, improve preschool activity design capability, and integrate theoretical knowledge with practical application.

Research Methodology

Research Design

This study adopted a mixed-methods research design combining qualitative and quantitative approaches. The research process included three stages: theoretical construction, module design, and teaching practice verification. The qualitative component was mainly reflected in literature analysis, instructional model construction, classroom observation, and teaching reflection. The quantitative component was reflected in the comparison of professional identity scores and design thinking ability scores between the experimental group and the control group. This design was appropriate because the study aimed not only to construct an instructional model but also to verify its effect through teaching practice.

Sample Selection and Sample Size Determination

The research participants were 80 preschool education major students from a university in southern China. Based on class organization and the feasibility of teaching practice, the students were divided into an experimental group and a control group, with 40 students in each group. The experimental group adopted the instructional model based on collaborative learning and OBE, while the control group adopted the traditional teaching mode. The two groups were selected from

the same major and comparable learning stage, which helped reduce the influence of differences in professional background and course experience. The sample size of 80 students was considered suitable for teaching intervention comparison within the course context and allowed the study to compare changes in professional identity and design thinking ability between the two groups.

Research Instruments

The research instruments included professional identity assessment, design thinking ability evaluation, teaching observation records, and learning process materials. The professional identity assessment focused on students' professional cognition, professional emotion, professional value recognition, and willingness to engage in preschool education. The design thinking evaluation assessed students' performance from three dimensions: problem analysis, scheme design, and scheme optimization. Teaching observation and learning process materials were used to understand how students participated in collaborative tasks, revised activity schemes, and connected theoretical knowledge with practical preschool education activities.

Data Collection Methods

Data were collected through literature analysis, questionnaire surveys, teaching practice, classroom observation, and assessment of student learning outcomes. Before and after the teaching intervention, professional identity data were collected from both groups. After the implementation of the instructional modules, students' design thinking ability was evaluated according to the three dimensions of problem analysis, scheme design, and scheme optimization. In addition, collaborative learning records, peer evaluation materials, and classroom observations were collected to support the interpretation of the quantitative results.

Instructional Module Design and Implementation

The instructional model was implemented through three sequential modules: the basic cognition stage, the practical training stage, and the comprehensive application stage. In the basic cognition stage, students formed learning groups and studied professional theories and design thinking methods through group discussion, knowledge sharing, and teacher-guided reflection. This stage aimed to build students' professional cognition and introduce the basic logic of design thinking.

In the practical training stage, students worked in groups to conduct simulated preschool education activity design. They analyzed educational problems, identified children's learning needs, designed activity schemes, and revised their plans through inter-group discussion and peer evaluation. This stage emphasized the transformation of theoretical knowledge into activity design practice.

In the comprehensive application stage, students entered kindergarten settings for field practice and completed the design and implementation of real educational activities in groups. This stage encouraged students to test their activity schemes in authentic contexts, reflect on the

feasibility of their designs, and further connect professional identity with practical educational responsibility.

Data Analysis

The quantitative data were analyzed by comparing the pre-experiment and post-experiment professional identity scores of the two groups and by comparing their design thinking ability scores after the intervention. The main indicators included score increase in professional identity and the scores of problem analysis, scheme design, scheme optimization, and average design thinking ability. The qualitative materials, including classroom observation records, collaborative learning records, and peer evaluation materials, were analyzed to explain how the instructional model influenced students' professional understanding, cooperative engagement, and design thinking development.

Research Results

The research results are presented according to the research objectives. The first result concerns the change in students' professional identity. The second result concerns the improvement of students' design thinking ability. Tables are used to present the findings clearly and sequentially.

1. Changes in Students' Professional Identity

After one semester of teaching practice, the professional identity score of students in the experimental group increased substantially compared with the score before the intervention, whereas the score of the control group showed only a slight change. As shown in Table 2, the professional identity score of the experimental group increased from 68.2 to 85.7, with a score increase of 17.5 points. The control group increased from 67.8 to 70.1, with a score increase of 2.3 points. This comparison indicates that the instructional model based on collaborative learning and OBE had a clear positive effect on improving professional identity among preschool education major students.

Table 2 Comparison of Professional Identity Scores of Students in Two Groups (Full Score 100)

No.	Group	Pre-experiment Score	Post-experiment Score	Score Increase
1	Experimental Group	68.2	85.7	17.5
2	Control Group	67.8	70.1	2.3

2. Improvement of Students' Design Thinking Ability

The design thinking ability of students was evaluated from three dimensions: problem analysis, scheme design, and scheme optimization. The results show that the experimental group scored higher than the control group in all three dimensions. Specifically, the experimental group scored 82.3 in problem analysis, 84.6 in scheme design, and 83.1 in scheme optimization, with an

average score of 83.3. The control group scored 65.2, 67.5, and 64.8 in the same dimensions, with an average score of 65.8. These findings in Table 3 show that the instructional model strengthened students' ability to analyze educational problems, design preschool activity schemes, and revise solutions through collaborative practice and outcome-oriented guidance.

Table 3 Comparison of Design Thinking Ability Scores of Students in Two Groups (Full Score 100)

No.	Group	Problem Analysis	Scheme Design	Scheme Optimization	Average Score
1	Experimental Group	82.3	84.6	83.1	83.3
2	Control Group	65.2	67.5	64.8	65.8

3. Summary of Findings by Research Objective

To further clarify the relationship between the research objectives and empirical findings, Table 4 summarizes the main results of the study. The results show that the instructional model achieved its expected functions in model construction, professional identity cultivation, and design thinking development.

Table 4 Summary of Research Results According to the Research Objectives

Research Objective	Evidence	Main Result	Interpretation
Construct an instructional model based on collaborative learning and OBE	Theoretical construction and module design	A three-stage instructional model was developed	The model connected professional cognition, collaborative practice, and comprehensive application
Enhance students' professional identity	Professional identity scores before and after the intervention	Experimental group increased by 17.5 points	Collaborative learning and OBE strengthened professional cognition, emotional recognition, and career responsibility
Improve students' design thinking ability	Scores of problem analysis, scheme design, and scheme optimization	Experimental group average score reached 83.3, higher than the control group's 65.8	The intervention promoted educational problem analysis, activity design, and scheme revision
Promote theory-practice integration	Collaborative learning records and practical activity design	Students completed staged learning from cognition to practice	The model supported the transformation of theoretical knowledge into preschool education activity design

Discussion

The findings of this study demonstrate that the instructional model integrating collaborative learning and OBE can effectively promote the development of professional identity and design thinking among preschool education major students. This result is consistent with the research framework of the study. Collaborative learning provided students with opportunities to participate in group discussion, share learning resources, conduct peer evaluation, and revise activity designs through cooperation. These learning experiences helped students move from passive acceptance of professional knowledge to active participation in professional problem solving. As students gradually took responsibility for group tasks and activity design, their understanding of the preschool teaching profession became more concrete and practice-oriented.

The improvement in professional identity can be explained by the connection between professional cognition, collaborative experience, and authentic educational practice. In the instructional process, students did not simply learn about preschool education through theoretical explanation. Instead, they discussed professional issues with peers, analyzed preschool education scenarios, entered kindergarten settings, and implemented educational activities. This process enabled students to experience the value and responsibility of preschool teachers more directly. The result is consistent with previous research emphasizing that professional identity is shaped through professional understanding, emotional recognition, and practical experience (UNESCO & UNICEF, 2024). It also echoes the broader emphasis on the importance of early childhood education for sustainable social and educational development (UNESCO & UNICEF, 2024).

The improvement in design thinking ability is closely related to the outcome-oriented structure of the instructional model. OBE clarified the expected training outcomes at the levels of knowledge, ability, and emotion, which helped teachers organize learning tasks around specific competence goals. Students were required to analyze practical educational problems, design activity schemes, revise plans through peer feedback, and test their ideas in real or simulated preschool settings. This process corresponds to the core logic of design thinking, which emphasizes problem identification, solution development, testing, and optimization (Grönman et al., 2025; Guaman-Quintanilla et al., 2023). The higher scores of the experimental group in problem analysis, scheme design, and scheme optimization suggest that students benefited from the repeated cycle of collaborative design, evaluation, and revision.

More importantly, the results show that professional identity and design thinking should not be understood as isolated learning outcomes. A stronger professional identity can increase students' willingness to engage in educational design tasks, while improved design thinking can help students gain confidence in their future professional role. Collaborative learning connects these two outcomes by creating a social learning environment in which students negotiate ideas,

share responsibility, and reflect on professional practice. OBE further ensures that these learning activities are not fragmented but are aligned with explicit talent training objectives. This integrated mechanism explains why the experimental group achieved stronger development than the control group.

Compared with traditional teaching, the collaborative learning and OBE-based model also showed stronger potential for bridging the gap between theoretical knowledge and practical application. The control group mainly received traditional instruction, which may support knowledge acquisition but provides fewer opportunities for collaborative design, authentic practice, and peer-supported reflection. By contrast, the experimental group experienced a staged process from basic cognition to practical training and comprehensive application. This finding is consistent with studies emphasizing the importance of practice-oriented curriculum reform, school-kindergarten cooperation, holistic assessment, and inclusive activity design in preschool education (Opoku et al., 2024). Therefore, the model provides a more coherent path for cultivating preschool education students with professional belief, practical ability, and innovative design competence.

New Knowledge from Research

The new knowledge generated by this study lies in the construction of an integrated instructional model that connects collaborative learning, OBE, professional identity cultivation, and design thinking development. The model shows that professional identity and design thinking can be cultivated through a coherent instructional process rather than through separate theoretical lectures or isolated practical tasks. The key contribution is the design of a three-stage pathway that moves from basic cognition to practical training and then to comprehensive application.

Table 5 New Knowledge Model Generated from the Research

Instructional Basis	Stage 1: Basic Cognition	Stage 2: Practical Training	Stage 3: Comprehensive Application	Final Outcomes
Collaborative learning + OBE	Professional theory learning, design thinking introduction, group discussion, and knowledge sharing	Simulated preschool activity design, task division, peer evaluation, and scheme revision	Kindergarten field practice, real activity implementation, reflection, and outcome evaluation	Enhanced professional identity, stronger design thinking ability, and better theory–practice integration

This model indicates that the cultivation of preschool education major students should be organized around explicit outcomes and supported by collaborative learning tasks. Knowledge learning provides the cognitive foundation, collaborative practice transforms knowledge into ability, and real educational application strengthens professional emotion and responsibility. In this way,

students gradually develop a clearer understanding of the preschool teaching profession and a stronger capacity to design appropriate educational activities for children.

Conclusion

This study constructed and implemented an instructional model based on collaborative learning and outcome-based education to enhance professional identity and design thinking among preschool education major students. Through literature analysis, questionnaire surveys, teaching practice, and comparison between an experimental group and a control group, the study verified the effectiveness of the model. The results showed that the professional identity score of the experimental group increased from 68.2 to 85.7 after one semester of teaching practice, while the control group showed only a slight increase from 67.8 to 70.1. The experimental group also achieved higher scores in problem analysis, scheme design, and scheme optimization, with an average design thinking score of 83.3, compared with 65.8 in the control group.

Overall, the findings indicate that collaborative learning can stimulate students' learning initiative, peer interaction, and team cooperation awareness, while OBE can ensure that the teaching process is closely aligned with talent training objectives. The integration of these two approaches provides an effective instructional path for strengthening professional identity, cultivating design thinking ability, and promoting the connection between theoretical knowledge and preschool education practice.

Suggestions

1. Recommendations for Applying the Research Findings

First, preschool education programs in colleges and universities should incorporate collaborative learning and OBE into curriculum design. Teachers can organize courses around clear knowledge, ability, and emotional objectives, and then design group discussion, activity design, peer evaluation, and practice reflection tasks to support these objectives. In this process, collaborative learning should be structured with clear task division, evaluation criteria, and feedback mechanisms so that group work can promote genuine professional learning rather than remain at the level of simple cooperation.

Second, teacher educators should strengthen the connection between university coursework and kindergarten practice. The findings show that students' professional identity and design thinking can be developed more effectively when they experience authentic educational scenarios and apply theoretical knowledge to real activity design. Therefore, colleges and universities can deepen school-kindergarten cooperation, provide more opportunities for observation and practice, and use holistic assessment to evaluate students' professional cognition, practical design ability, cooperation process, and reflective growth (Opoku et al., 2024).

2. Recommendations for Future Research

First, future research can expand the research objects to preschool education major students from different universities, regions, and training levels, in order to further test the applicability and generalizability of the instructional model. Larger samples and multi-site studies may provide more robust evidence for the effectiveness of collaborative learning and OBE in preschool education talent training.

Second, future studies can establish a long-term tracking mechanism to examine whether the instructional model has sustained effects on students' professional development after graduation. In addition, future research may integrate modern educational technologies, such as virtual simulation, digital teaching platforms, and multimedia case resources, into collaborative learning modules. Such integration may enrich teaching forms, improve students' practical design experience, and support the cultivation of design thinking in more diverse preschool education scenarios (Leoste et al., 2022; Yang et al., 2022).

Third, future research may further consider the role of family participation and parental involvement in shaping preschool education students' professional development. Since preschool teachers often need to communicate with families and respond to children's family backgrounds, future instructional models can incorporate parent-teacher communication cases and family education scenarios to enrich professional identity cultivation.

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