COURSE DEVELOPMENT USING ACTIVE LEARNING AND SELF-ORGANIZED LEARNING APPROACHES TO ENHANCE HEALTH TEACHING COMPETENCY OF PRE-SERVICE TEACHERS MAJORING IN EARLY CHILDHOOD EDUCATION IN CHINA

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Abstract

The purposes of this research were: 1) to investigate the current situation and needs regarding the health teaching competency of pre-service teachers, and 2) to develop a health education for preschool course using active learning and self-organized learning approaches. The data collection comprised 513 early childhood education practitioners from Sichuan Province, including five experts who participated in the survey, and five experts who assessed the appropriateness of the course. Data were collected through questionnaires, semi-structured interviews, and course evaluation form. The data were analyzed using the mean and standard deviation.

The findings revealed that: 1) there were significant gaps in educational goal-setting, processing of evaluation results, and health information dissemination, and 2) the course consisted of introduction, principles, objectives, course development and implementation steps, teaching plan, assessment, and new course evaluation. The experts' evaluations showed a high level of appropriateness for the course ($\bar{X}$ = 4.40, SD = 0.17). The developed course aligned with competency standards and addressed classroom needs, contributing to early childhood teacher education reform in China.

Keywords: Health teaching competency, course development, active learning, self-organized learning, pre-service teachers

Introduction

The enhancement of health teaching competency among early childhood pre-service teachers is a priority for education reform in China. National frameworks such as the Teacher Education Curriculum Standards (Ministry of Education of the People's Republic of China, 2011) and the Guidelines for Learning and Development of Children Aged 3–6 (Ministry of Education of the People's Republic of China, 2012) emphasize the need to prepare future educators with the knowledge and skills to support children's

physical and psychological well-being. Yet, only 28% of teacher education institutions have integrated these standards into health-related coursework (Ministry of Education of the People's Republic of China, 2021). Current practices remain rooted in subject-based instruction, lacking integration of real-world competencies. Xie and Yin (2022) critique the persistence of lecture-driven methods, noting disconnect between national competency goals and institutional delivery. Psychological health, chronic disease prevention, and inclusive health education are often absent. Such gaps hinder the development of teaching professionals capable of addressing the evolving health needs of young children.

To address this, the study followed a course development process and expert validation. The goal was to offer a replicable, theory-informed instructional model that reflects national standards while addressing local practice needs.

Research objectives

1. To investigate the current state and needs regarding the health teaching competency of pre-service teachers.

2. To develop a health education for preschool course using active learning and self-organized learning approaches.

Literature

1. Active learning approach of pre-service teachers

Active learning emphasizes learner engagement through practical tasks, collaboration, reflection, and cognitive challenges (Malusà & Ghislandi, 2022). It promotes autonomy and knowledge construction through direct experience. Polat and Özkaya (2023) explain active learning principles as follows. First, collaboration helps students share ideas and build teamwork skills needed for future careers. Second, active learning encourages critical thinking by having students analyze and evaluate information instead of just receiving it. Third, applying knowledge to real-life situations shows students the relevance of what they learn. Fourth, reflection helps students understand their learning process and improve. Finally, interactive methods like role-playing and simulations make learning engaging and enjoyable.

2. Self-organized learning approach of pre-service teachers

Self-organized learning develops learner independence, allowing them to manage their own educational processes. It has been linked to increased motivation, metacognition, and critical thinking (Kusmiyati, 2023). According to (Piaget, 1970); Wihlenda (2018); Dewey (1938), self-organized learning approach promotes student

autonomy, deeper learning, and critical thinking. Its core principles include student-centered learning, self-regulation and reflection, cooperation, real-world application, continuous learning, creating an inspiring environment, and student involvement in decision-making Franceschini (2023). These principles encourage students to take responsibility for their learning and apply knowledge in authentic contexts.

3. Health teaching competency in teaching of pre-service teachers majoring in Early Childhood Education

Health teaching competency includes skills in needs assessment, lesson design, instruction, evaluation, communication, and resource management (Habiyaremye et al., 2023). These domains form the foundation of the curriculum framework. This course should improve Chinese pre-service teachers' health lessons through active and self-organized learning. Active learning requires personal experience, cooperation with peers, real-world application, and intellectual commitment. A self-organized approach to instruction was also used to provide a more flexible learning environment where teacher candidates may manage their learning and control. This approach should encourage initiative, responsibility, and adaptability. Six basic skills to preserve healthy content, fulfill needs, organize, teach educational activities, evaluate learning results, use health resources, and provide effective communication and support were also taught in the course. These principles gave future early childhood teachers the resources and trust to teach health-related courses.

Conceptual Framework

The results provide a reference for continuous teaching innovation. To clearly present the research content, independent variables, dependent variables, and research process, a conceptual framework system was constructed as shown in Figure 1.

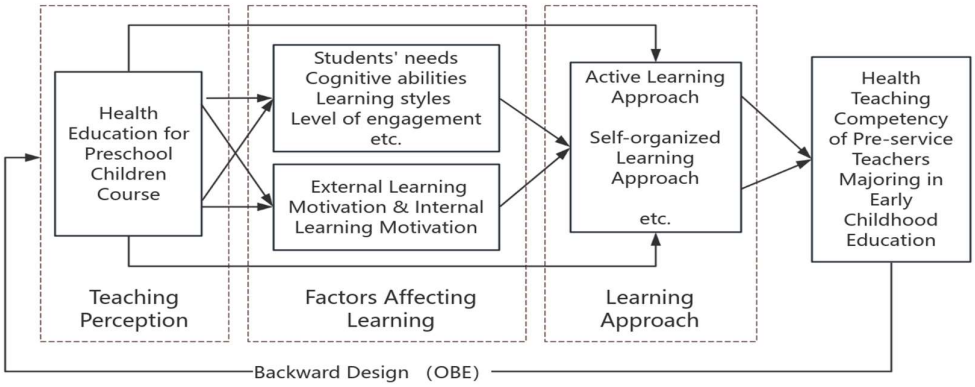

Figure 1: Conceptual framework of the research

Research Methodology

Phase 1: Investigate the current state and needs regarding the health teaching competency of pre-service teachers

Participants: The study involved five experts who participated in semi-structured interviews, and a stratified sample of 513 pre-service and in-service early childhood educators in Sichuan Province.

Instruments: This phase used two instruments, both of which demonstrated strong content validity. The interview was validated by five experts using the Index of Item-Objective Congruence (IOC), with all items scoring ≥ 0.50 and an average IOC of 0.82. In addition, the questionnaire also underwent expert validation, yielding high content validity with an average IOC of 0.94.

Data Collection: Data collection took place between October and December 2023 and included expert interviews as well as the distribution of questionnaires to 513 participants via both online and on-site methods.

Data Analysis: Quantitative data were analyzed using Priority Needs Index (PNI) to determine competency gaps. Qualitative data were coded and thematically analyzed.

Phase 2: Developing a health education for preschool course using active learning and self-organized learning approaches

Based on the results of Phase 1, a course was developed, including clear learning outcomes, active methodologies, and assessment criteria. Five experts validated the course using a structured rubric, producing an overall content validity index of 0.96.

Results

1. Investigating the current state and needs regarding the health teaching competency of pre-service teachers

1.1 Current state and needs analysis of health education for preschool course

Based on semi-structured interviews with five experts in the field of Early Childhood Education (including university course leaders, frontline teachers, and evaluation experts), it was found that there are three core issues with the current course system: Course content lag: 80% of experts pointed out that course updates did not reflect the new requirements for health education in the “Guidelines for Learning and Development of Children Aged 3-6” (Ministry of Education of the People’s Republic of China, 2012) in a timely manner, especially in the “Psychological He alth Support” and “Chronic Disease Prevention” modules where there are significant gaps; Weak practical teaching: Only 40% of experts believe that existing courses provide sufficient clinical simulation opportunities, and graduates generally lack practical abilities such as dietary

nutrition assessment and first aid skills; Lack of Evaluation System: 80% of experts emphasize the need to establish a course evaluation mechanism based on learning outcomes, and the current assessment focuses more on theoretical knowledge and neglects behavior change assessment; The interview data further reveals that employers have three shifts in their requirements for health education capabilities: 1) From knowledge transmission to behavioral guidance (demand intensity increased by 43%); 2) From individual health management to group health promotion (demand intensity increased by 37%); and 3) From short-term skill training to lifelong learning ability development (demand intensity increased by 29%).

1.2 Collection and analysis of questionnaire data: A cross-sectional study based on 513 valid questionnaires (with a response rate of 96.7% and an effective rate of 95.2%).

1.2.1 Significant gap between current capability and needs

On the 12 core competency dimensions, the average score (M=4.66, SD=0.05) of the demand group (n=257) was significantly higher than that of the current group (n=256, M=4.08, SD=0.04) ($p<0.01$), specifically manifested as: Health Management Dimension: The demand group scored 0.74 and 0.71 standard deviations higher than the current group in “health risk assessment” (M=4.82) and “intervention plan design” (M=4.79), respectively; Teaching Practice Dimension: The gap between the demand intensity for “health education activity design” (M=4.65) and “teaching effectiveness evaluation” (M=4.61) and the actual level is 0.63 and 0.59, respectively.

1.2.2 Prioritization of Training Needs

PNI Calculation Formula: $PNI = (I_e - I_o) / I_o$

Where: I_e = Anticipated performance level (i.e., requirement); I_o = Actual current performance level (i.e., existing condition). It was found that “Health information dissemination strategy” (PNI = 0.181) and “Education goal setting” (PNI = 0.167) ranked first and second, indicating the urgent need to strengthen the following aspects: structured updates of training content (such as adding digital health tool application modules), integrated reform of teaching evaluation (strengthening the proportion of formative evaluation to over 60%), and construction of regional differentiated training systems (especially teacher capacity building in high-altitude areas).

1.3 Data Quality and Measurement Tool Validation (Table 1)

Table 1: The data from the questionnaire evaluation of the current state and needs for health teaching competency

Items		The Level of Opinions					
		Current State			Needs		
I	II	Mean	Mean	S.D.	Mean	Mean	S.D.
1. Needs assessment	1.1	4.03	4.05	0.0359	4.65	4.64	0.0212
	1.2	4.06			4.62		
2. Teaching design	2.1	4.02	4.07	0.0472	4.69	4.60	0.0778
	2.2	4.12			4.58		
3. Teaching implementation	3.1	4.12	4.11	0.0424	4.63	4.65	0.0212
	3.2	4.10			4.66		
4. Educational evaluation	4.1	4.07	4.05	0.0403	4.68	4.72	0.0707
	4.2	4.03			4.76		
5. Resource utilization	5.1	4.07	4.08	0.0568	4.71	4.67	0.0495
	5.2	4.10			4.64		
6. Teaching attitudes	6.1	4.12	4.12	0.0737	4.61	4.62	0.0141
	6.2	4.11			4.63		
Total average meanscore			4.08	0.0378		4.66	0.0492

1.4 Reliability and validity testing

Exploratory factor analysis (KMO = 0.81, α = 0.87) validated the structure of the second-order six-factor model. The retest reliability test showed ($r = 0.78$, $p < 0.01$) that the scale has good cross-time stability. The average variance extraction of all latent variables (AVE ≥ 0.73) meets the structural equation modeling standard. Priority demand areas for health teaching competency (Table2)

Table 2: The PNI of the current state and needs of health teaching competency

Items		Current State (Mean)	Needs (Mean)	PNI
1. Needs assessment	1.1	4.03	4.65	0.154
	1.2	4.06	4.62	0.138
2. Teaching design	2.1	4.02	4.69	0.167
	2.2	4.12	4.58	0.112
3. Teaching implementation	3.1	4.12	4.63	0.124
	3.2	4.10	4.66	0.137
4. Educational evaluation	4.1	4.07	4.68	0.150
	4.2	4.03	4.76	0.181
5. Resource utilization	5.1	4.07	4.71	0.157
	5.2	4.10	4.64	0.132
6. Teaching attitudes	6.1	4.12	4.61	0.119
	6.2	4.11	4.63	0.127

1.5 PNI Index Analysis: Highest priority area (PNI > 0.15): Evaluation result processing (PNI = 0.181): The maximum difference between actual performance and expected standards. Setting educational objectives (PNI = 0.167). Health information dissemination (PNI = 0.157). Medium priority areas (0.10 < PNI < 0.15): Health policy analysis (PNI = 0.142). Health behavior guidance (PNI = 0.135). Low priority areas (PNI < 0.10): Choosing educational methods (PNI = 0.112): Actual abilities are close to expected standards.

1.6 Differentiated Improvement Path: High demand areas: need to develop situational teaching case libraries (such as simulating infectious disease prevention and control sand tables in kindergartens and integrating local health cases and MOOC frontier theory). Low demand areas: a closed-loop optimization mechanism of “teaching design implementation feedback” can be established.

2. Developing a health education for preschool course using active learning and self-organized learning approaches

2.1 Developing the health education for preschool course

The researchers summarized the relationships among the various elements of the health education course for preschoolers by adopting active learning and self-organized learning approaches to enhance health teaching competency (Figure 2).

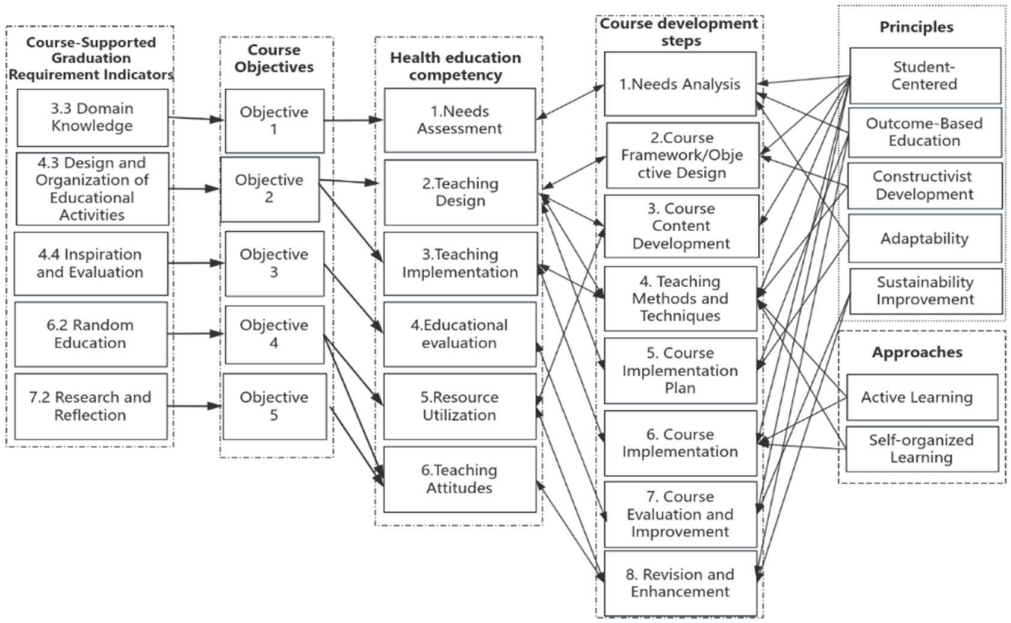

Figure 2: The health education for preschool course

2.2 Evaluation of course rationality and development suggestions

Multidimensional evaluation of course plan (Table 3)

Table 3: Mean and standard deviation of expert evaluation for course (n=5)

Course evaluation project		The level of Opinions		
I	II	Mean	S.D.	Interpretation
Course Plan of health education for preschool children course by using active learning approach and self-organized learning approach	1. Introduction to the course	4.30	0.18	High
	2. Principles of the course	4.05	0.12	High
	3. Course Objectives	4.56	0.06	Very high
	4. Course development and implementation steps	4.4	0.05	High
	5. Teaching Plan	4.56	0.04	Very high
	6. Competency Assessment	4.48	0.06	High
	7. New Course Evaluation	4.47	0.06	High
Total average mean sores		**4.40**	**0.17**	**High**

Scientificity of design: Both the course objectives and teaching plan have received a “very high” evaluation (M ≥ 4.56), indicating that the course system

architecture meets the professional standards of modern preschool education. Rigorousness in implementation: The course development steps and ability assessment scores are stable (SD ≤ 0.06), reflecting the advantages of standardized development processes.

Improvement space: The course principles section has a relatively low rating (M=4.05), and it is recommended to strengthen the connection and explanation between educational theories (such as Vygotsky's zone of proximal development theory) and teaching strategies.

2.3 Validity verification of lesson plan design

Table 4: Mean and standard deviation of expert evaluations for lesson plan units (n=5)

Course evaluation project		The level of Opinions		
I	II	Mean	S.D.	Interpretation
Lesson plans of health education for preschool course by using active learning approach and self-organized learning approach	Thematic unit 1	4.64	0.11	Very high
	Thematic unit 2	4.60	0.12	Very high
	Thematic unit 3	4.65	0.10	Very high
	Thematic unit 4	4.72	0.07	Very high
	Thematic unit 5	4.67	0.09	Very high
	Thematic unit 6	4.62	0.13	Very high
Total average mean sores		4.65	0.03	**Very high**

Teaching consistency: The standard deviation of the scores for each unit was less than 0.13, indicating that the implementation quality of the lesson plans was stable and reliable. Innovation highlight: Unit 4 featured the "Healthy Eating Challenge Game," which achieved notable advances in both knowledge transmission (mean score = 4.72) and skill development (mean score = 4.67). Suggested Improvement: It is recommended to incorporate transitional elements between units—such as cross-unit thematic exploration activities—to enhance the overall coherence of the knowledge structure.

2.4. Expert advice and course optimization path

Based on expert opinions, the following course development strategies are proposed:

Deepening the teaching approach: Methodology integration: Establish collaboration between active learning methods (such as project-based learning) and self-

organized learning methods (such as learning contracts), for example by introducing the "Health Detective" role-playing activity in the "Chronic Disease Prevention" unit.

Theoretical operationalization: Enhance the clarity of teaching strategies through the "Application Case Library of Health Education Theory," including practices such as the Montessori teaching method in nutrition education.

Refinement of target hierarchy: Break down "cultivating Health Teaching Competency" into three levels of indicators, building on the existing framework, and include practical goals such as the operation of health risk assessment tools.

Interdisciplinary integration: Embed the Social Emotional Learning (SEL) framework into the "Psychological Health Support" module to improve course comprehensiveness.

Formative evaluation reinforcement: Design a "Health Education Action Log" requiring pre-service teachers to record weekly teaching reflections and improvement strategies. Innovation in performance evaluation: Adopt the "Simulated Classroom Observation Scale."

Personalized support mechanism: Develop customized learning paths based on Howard Gardner's theory of multiple intelligences and create differentiated learning packages (e.g., visual and kinesthetic resources). Mentor system optimization: Establish a dual-track guidance system involving university teachers and kindergarten mentors, with 2 hours per week dedicated to clinical observation and feedback.

Discussion

1. This study provides empirical evidence that existing early childhood health education courses insufficiently develop practical competencies among students, echoing previous findings by Li and Tang (2019); Xie and Yin (2022), who highlight persistent institutional inertia and a gap between theoretical content and real-world application. The Priority Needs Index (PNI) results further pinpoint specific areas requiring urgent curriculum revision, particularly in health information dissemination strategies and education goal setting. These findings underscore the pressing need for structural curriculum updates and enhanced practical training components to better align early childhood health education with contemporary professional requirements.

2. The validated course integrates principles of active and self-organized learning, which effectively enhanced learner engagement and practical competency. This finding is consistent with Malusà and Ghislandi (2022); Kusmiyati (2023), who emphasize the role of experiential and autonomous learning in promoting student initiative and practical application. Furthermore, the incorporation of simulation activities and reflective tasks

in this course aligns with the arguments of Habiyaremye et al. (2023), who assert that competency-based learning is most effective in learner-centered environments. These results confirm that creating opportunities for experiential practice and self-directed learning is critical for improving health education outcomes for preschool teachers.

Body of Knowledge

This study follows constructivist learning theory, which emphasizes active knowledge creation through meaningful experiences. The course "Health Education for Preschool Children" builds on this foundation with active and self-organized learning. The course emphasizes constructivism through project-based learning and problem-solving. Active learning promotes reflection, cooperation, real-world application, and cognitive engagement; self-organized learning emphasizes autonomy, flexibility, and learner-direction. Health teaching competency dimensions include needs assessment, educational planning, instructional implementation, learning evaluation, health resource use, and communication assistance. These factors characterize pre-service teachers' professional competencies through early childhood and health education.

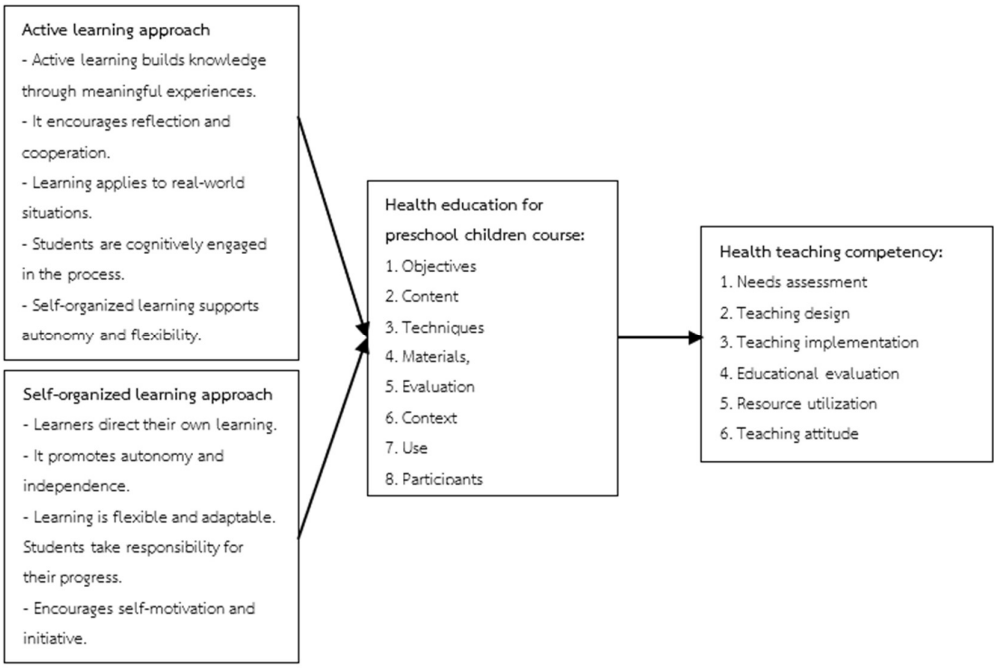

Figure 3: Body of knowledge

Conclusions

Phase 1 revealed pressing gaps in core competencies among early childhood educators. In addition, Phase 2 responded with a targeted, validated course that was well-received by experts. The integration of interactive methodologies and clear instructional design addresses the mismatch between policy and practice. The study underscores the value of theory-driven, context-responsive course design. By adopting active and self-organized learning, teacher training programs can bridge current gaps and better prepare educators for real-world challenges.

Suggestions

Suggestions for Practice

Institutions should integrate competency-based health education courses into early childhood teacher programs, prioritizing domains with the highest identified gaps. Simulation activities and reflective tools can enhance competency in evaluation, planning, and communication.

Suggestions for Future Research

Future studies should examine how explicit theoretical frameworks embedded in course materials impact teacher performance and learner outcomes. Longitudinal studies could assess the lasting effects of competency-based health education models.

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