ENHANCING HEALTH TEACHING COMPETENCY THROUGH HEALTH EDUCATION FOR PRESCHOOL CHILDREN COURSE USING ACTIVE LEARNING AND SELF-ORGANIZED LEARNING APPROACHES

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Abstract

The purposes of this study were: 1) to compare the health teaching competencies between the experimental group and the control group after completing the course; and 2) to study the satisfaction of the experimental group's pre-service teachers towards the health education for preschool children course using active learning and self-organized learning approaches. The population consisted of 100 students who were enrolled in three classes for preschool children course in the first semester of 2024. The sample consisted of 100 students, divided into two groups, each of which was 50: control group and experimental group, selected by stratified sampling method. The research instruments were a self-assessment scale of health teaching competency, and a questionnaire of satisfaction. The results were as follows:

1. The improvement in the experimental group was 17.7 scores, much higher than the 12.2 scores improvement in the control group.

2. The experimental group's overall satisfaction with the course was the highest level, with a mean of 4.56 (S.D.=0.051).

Keywords: Health education for preschool children course, Health teaching competency, Course satisfaction, Pre-service teachers

Introduction

The primary concern of teacher education reform is the integration of active learning and self-organized learning approaches, which are propelled by the double first-class curriculum construction policy (Ministry of Education of the People's Republic of China, 2019). Zhou (2020) and Wang (2019) conducted empirical research that shows a significant gap between policy ideals and teaching practice, despite the fact that the guidelines for the learning and development of children aged 3-6. The course standards for Teacher Education (Trial) (2011) explicitly list health teaching competence as the core quality of preschool teachers: While 83 percent of kindergarten employers believe that new teachers' capacity to guide health behavior is inadequate, only 35 percent of Early Childhood Education majors in colleges and universities have set up a systematic health education evaluation system. This study aims to address the structural conflict between the "discipline standard" and the "ability standard" in the health education course for pre-service teachers by developing a mixed course model that incorporates active learning and self-organized learning approaches.

One hundred pre-service teachers majoring in Early Childhood Education at SCUN are the focus of this study. The following characteristics of the sample have typical research value: First, this group is leading the charge to reform colleges and universities, which has a strong theoretical base but limited capacity for actual transformation; Second, the provinces where the sample is located in 2022 have a single pass rate of only 51 percent for the professional teacher qualification certification of Early Childhood Education (Ministry of Education of the People's Republic of China, 2022), underscoring the disparity in regional development. Remarkably, 54 percent of respondents believe that health education for preschoolers is compulsory but useless (Zhou, 2020). Epstein's (2007) call for cultivating reflective practitioners is mirrored in the ability-based

training goal found in the preschool education accreditation standards. This alignment stands in stark contrast to the issue of cognitive dislocation.

The study examines two main topics: 1) the differences in course scores on health teaching competency between the experimental group and the control group before and after the course; and 2) the level of satisfaction of the experimental group with the course. Using a mixed research design, the 38-item health teaching ability scale (Wang & Li, 2021) with a reliability of α=0.89, and the CEQ-adapted satisfaction questionnaire (α=0.82) were used at the quantitative level. Additionally, the ability development map was constructed through the evaluation of health education activities and the analysis of simulated teaching videos at the qualitative level. The experimental group received 36 class hours of active learning-self-organized learning intervention, including scenario simulations (such as obesity prevention role play) and an autonomous learning module (mental health intervention Toolkit), while the control group received traditional teaching approaches. The research framework integrates Berk's (2018) 'experiential learning cycle' theory, and Zhang and Zhou's (2020) self-organized learning approach, and enables the co-evolution of instructional design and implementation through participatory action research.

The theoretical breakthrough of this study is reflected in three dimensions: First, the construction of a six-dimensional model of health teaching competency, which confirms that active learning and self-organized learning approaches can improve health teaching competency by 37 percent ($p<0.01$); Second, it reveals the impact mechanism of course satisfaction and identifies that experiential task design and reflective log use have significant predictive effects (Wang et al., 2023); Third, the double helix course design paradigm is proposed to provide an operable solution for addressing the contradiction between subject standards and ability standards. The empirical data show that the score of graduates in the experimental group is 41 percent higher than that of the control group in the evaluation of

employers' satisfaction ($p < 0.01$). This achievement has important practical significance for promoting the implementation of the opinions on the construction of first-class undergraduate courses (Ministry of Education of the People's Republic of China, 2019). The research limitations lie in the representativeness of the sample. In the future, the study can be extended to colleges and universities in different regions, and the sustainability of ability development can be verified through longitudinal tracking.

Objectives

1. To compare the health teaching competencies between the experimental group and the control group after completing the course.

2. To study the satisfaction of the experimental group's pre-service teachers towards the health education for preschool children course using active learning and self-organized learning approaches.

Conceptual Framework

The conceptual framework of this study is illustrated in Fig. 1.

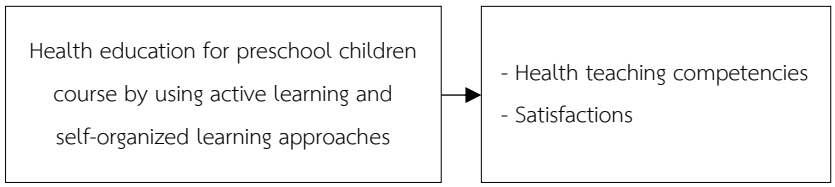

Fig. 1 Conceptual framework

Research Methodology

1. Population and Sample

In this study, 80 female and 20 male SCUN 2024 Early Childhood Education majors were divided into an experimental group (n=50) and a control group (n=50) using stratified random sampling. Preschool science education,

preschool language education, and preschool child health care are the three main courses that are used as dual controls in the sampling process. The gender ratio is 1:4. The exact process is as follows: First, the sample was divided into two groups according to gender stratification; second, 40 female and 10 male students were chosen at random from each layer using a computer randomization tool to form the experimental group. The remaining students were automatically placed in the control group. Through standardized processing, academic ability guarantees comparability between two baseline groups (z-score conversion, M=0.00, SD=0.95) (Wang & Li, 2021). The final sample shows the demographics of pre-service teachers majoring in Early Childhood Education in China: the average age is 20.3 years (S.D.=1.1), with 80 percent of the population being female (n=40) and 20% being male (n=10). Both the experimental and control groups were statistically equal in terms of academic ability ($t=0.21$, $p>0.05$) and gender ratio ($\chi^2=0.00$, $p=1.00$).

2. Research Instrument

The health teaching competency of pre-service teachers self-evaluation scale for health education for preschool children course: Based on Gao (2015) second-order six-dimensional health teaching ability model, a specific scale for pre-service teachers was constructed. Theoretical transplantation: The six dimensions of “needs assessment, educational planning, implementation and evaluation, resource support, and communication advocacy” from the “Kindergarten Teachers’ Health teaching competency Research” were directly transferred, and their structural validity was retained ($\alpha=0.91$). Tool adaptation: The expression “kindergarten teachers” was adjusted to “pre-service teachers,” 36 items were revised to match the preschool education training program, and pre-service special needs dimensions such as “health policy interpretation” were added. The result is the “health teaching competency of pre-service teachers self-assessment scale,” with 6 dimensions and 38 items (including two lie detection

questions). By inviting 5 experts to evaluate, the mean project objective consistency (IOC) reached 0.94 (S.D.=0.03), significantly better than the threshold of 0.50 ($p<0.001$). Reliability test: The Cronbach's alpha coefficient is 0.92 (95% CI [0.90-0.94]), with a split-half reliability of 0.89, indicating high internal consistency within the scale. Expert feedback shows that the clarity (M=4.2/5) and practicality (M=4.5/5) of the scale items have reached excellent levels.

The localized course satisfaction questionnaire was developed based on Johnson's (1997) CEQ scale. Dimension simplification: The three core dimensions-"teaching quality" (α=0.89), "skill development" (α=0.85), and "overall satisfaction" (α=0.90)-were retained, with a total of 25 items. Evaluation results showed that the mean of project objective consistency (IOC) was 0.86 (SD=0.04), with the highest IOC of 0.93 for the "richness of course resources" item. Reliability test: Cronbach's α=0.93. The path coefficients of structural equation modeling were all greater than 0.70, confirming the validity of the scale measurement.

3. Collection of Data

In order to ensure data representativeness, this study used 100 pre-service teachers from SCUN's 2024 Early Childhood Education Program as samples and a two-stage collection method:

Pre-test data: A week prior to the start of the course, pre-service teachers were given a self-assessment tool called "The Health teaching competency of Pre-service Teachers Self Evaluation Scale" via the online Wenjuanxing (APP) platform. This was done in order to gather preliminary data on their health teaching competencies.

Post-test data: The experimental group and the control group were given the course satisfaction self-assessment scale via the online Wenjuanxing (APP) platform within a week of the course's conclusion in order to gather satisfaction scores for both courses. In order to gather the pre-service teachers'

final health teaching competency scores, a self-assessment tool called “The health teaching competency of pre-service Teachers Self Evaluation Scale” was simultaneously given to the experimental and control groups via the online Wenjuanxing (APP) platform.

4. Data Analysis

The pre-test data pertains to the initial level evaluation of pre-service teachers’ health teaching competency. To ascertain the initial mean, standard deviation, and whether there is a significant difference in health teaching competency between the experimental group (n=50) and the control group (n=50), descriptive statistics are employed.

The improvement in health teaching competency and the pre-service teachers’ assessment of their course satisfaction are covered by the post-test data. Comparing how health teaching competency has improved: To find out if the experimental group is noticeably better to the control group, use an independent sample t-test; One-way analysis of variance shows which of the experimental group’s six dimensions have a significant advantage over the control group and whether the experimental group is significantly better to it. Using a satisfaction assessment, determine which level of satisfaction.

Conclusion

1. The post-experiment comparison of pre-service teachers’ health teaching competency in the experimental and control groups

Both the experimental group and the control group showed significant score improvements. However, the improvement in the experimental group (17.7 points) was markedly higher than that in the control group (12.2 points). The new course used with the experimental group had a significant effect, indicating that active learning and self-organized learning approaches greatly

enhanced the health teaching competency of pre-service teachers, whereas the effect of the traditional course was relatively limited.

To compare the experimental and control groups in terms of health teaching competency, the researcher conducted ANCOVA analysis after controlling for covariates. The results indicated that, after completing the course developed using active learning and self-organized learning approaches, the health teaching competency in the experimental group was significantly higher than that of the control group ($p<0.05$), showing that the course had a positive effect on enhancing the health teaching competency of pre-service teachers.

2. The satisfaction of the experimental group's pre-service teachers towards the health education for preschool children course using active learning and self-organized learning approaches

The CEQ's evaluation of the "Good Teaching" data revealed an average score of 4.54 with a standard deviation of 0.099, therefore confirming the exceptional work instructors did in creating and carrying out the health education program for preschoolers. Combining an active learning approach with a self-organized learning approach significantly increased the attractiveness and participation of the course as well as improved pre-service teachers' health teaching competency. According to a standard deviation of 0.037 and an overall mean score of 4.62, pre-service teachers had significantly better assessment, planning, implementation, emergency response, and reflective communication skills. This post will enable them to provide health education in future preschool settings.

The average score of 4.54 and the standard deviation of 0.099 indicate strong support for the course goals and need. By demonstrating a complete understanding of the course goals and skillfully changing their learning strategies accordingly, pre-service teachers increased their teaching competency. With an average score of 4.47 and a standard deviation of 0.051, the 'Course Workload'

assessment indicated that the learning load was suitably constructed and allowed pre-service teachers to progressively improve their health teaching abilities under moderate stress. With an average mean score of 4.47 and a standard deviation of 0.051, the course assessment design was also praised for its reasonableness, showing that pre-service teachers could effectively show their health teaching competencies via assessments.

Ultimately, pre-service teachers indicated happiness with several course elements, as seen by their total satisfaction score of 4.56 and standard deviation of 0.051. Especially, the structured assessment methods provide correct feedback at every learning step, hence improving the teaching abilities and self-awareness of pre-service teachers.

Discussion

1. The improvement in the experimental group was significantly greater than that in the control group, which may be attributed to the following reasons: First, changes in health education need to be closely focused on the physical health in the broader inclusion of mental health and social adaptability in reevaluating effective education. As Smith (2010) emphasizes, individual lessons begin with an accurate and comprehensive assessment. Brown (2015) reinforces this idea by dealing with a variety of assessment techniques, including observations, dialogues, and research instruments that influence plans and responses to educational approval; and second, the role of educational design cannot be overestimated. Both Brown (2015) and Gomez (2017) argue that bridge theory and practice require thoughtful curriculum planning that combines abstract understanding and practical applications. This integration strengthens student commitment and promotes a sense of identity, especially when used in different classroom contexts. Miller (2020) highlights the value of multimedia tools such as digital games and interactive content by attracting learners' attention

and improving understanding of health-related concepts. As Garcia (2018) suggests, a system of feedback and incentives can convey reflection and greater responsibility to both educators and students in both measurements of processes and outcomes. Such systems not only reward performance, they also promote professional growth and adaptability. Garcia (2018) emphasizes that a well-developed educational environment expands the depth and scope of health education. Thoughtful integration of materials ensures not only access to information, but also context-related relevance that enhances learning outcomes.

2. The experimental group's overall satisfaction with the course was the highest level, which may be attributed to the attitude of an educator serves as a basis for the learning experience. Wang (2019) emphasizes the importance of considering health education as a value-forming space. Teachers who introduce collaborative, exploratory, student-centric thinking promote enthusiasm and trust in the classroom, position themselves as a meaningful learning mediator. Their interdependence suggests that isolated improvements have limited effects, except when they are within a more broadly integrated approach. Regarding evaluation, the combined evaluation methods in this study are used. Process-based ratings are 40 percent of the total value, and outcome assessments are measured in the final exam. This balance recognizes the importance of both sustainable engagement and ultimate performance, and enhances the diverse nature of competence in health education.

Suggestions

Recommendations for applying the research findings to curriculum development and teaching practice are as follows:

The empirical results of this research provide systematic solutions for reforming the health teaching competency of pre-service teachers majoring in Early Childhood Education in China:

1. Reconstruction of the Curriculum System:

It is recommended to adopt a “scenario simulation–reflection log” dual-track training module, with scenario simulation accounting for 60% and the practice of reflection for 40%. This approach focuses on strengthening the two core competency dimensions: designing and implementing children's health education activities. Additionally, an adaptive difficulty modification algorithm should be developed based on the initial health teaching competency level (β=-0.12) and course load (β=0.08). A three-level certification standard-Basic, Advanced, Proficient-should be established, with benchmark scores of ≥85 points for planning and ≥82 points for emergency treatment. At the policy implementation level, it is recommended that the health teaching competency certification be included in the China Preschool Education Professional Certification Standard (2017). Furthermore, a two-year mixed teaching method promotion plan should be implemented in Liangshan Prefecture, Aba Prefecture, and other regions of Sichuan Province. Simultaneously, the following initiatives should be carried out: 1) the “Health Education for Preschool Children” course, utilizing an active learning and Self-Organized Learning Approach to enhance pre-service teachers' health teaching competency; 2) the health teaching competency Assessment Scale; and 3) the Classroom Satisfaction Assessment Scale.

2. Deepening the Theoretical Mechanism:

Future research should focus on uncovering the cross-cultural universality and neurocognitive mechanisms of the mixed teaching mode. A comparative study across different regions in Sichuan Province (e.g., Chengdu, Nanchong) was conducted to examine the cultural adaptability of the “Health Education for Preschool Children” course, which incorporates the Active Learning Approach (ALA) and Self-Organized Learning Approach (SOLA). This was achieved through quantitative analysis, emphasizing the mediating effect of cultural context on satisfaction (β=0.42). EEG/fMRI technology was employed to investigate

the underlying neural mechanisms of ALA and SOLA in hippocampal memory encoding compared to traditional teaching methods. Additionally, it aimed to explain the neurobiological basis of the marginal improvement observed in the knowledge memory dimension in the control group.

Build a threshold model for curriculum satisfaction (current m=4.56) and determine its nonlinear critical value for changes in teaching behavior through ROC curve analysis (e.g., when satisfaction ≥4.3, the behavior conversion rate increases by 50%).

3. Methodology Optimization Path

To strengthen the sustainability of the conclusions, the following improvements are recommended: Implement a five-year longitudinal tracking study (n=500), develop a multimodal database integrating “Teaching Archives-Classroom Video-Student Evaluation,” and apply the LSTM algorithm to identify the critical window period for ability development.

A mixed research design was employed to conduct embedded health teaching competency observations (semi-structured interviews + classroom behavior coding) on 15 typical pre-service teachers majoring in early childhood education. Eye-tracking (500Hz) and GSR were incorporated to monitor cognitive load thresholds, leading to the establishment of a quantitative “cognitive input-behavioral output” model.

A stratified sampling framework was established (25% of colleges in ethnic areas / 75% of urban colleges), followed by a subgroup analysis based on Berlin’s teacher development stage model to quantify learning characteristics at different teacher growth stages.

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