



## Development of Management Strategies to Enhance Health Education Knowledge and Practice of Student Teacher Major in Physical Education Program

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### Abstract

**Background and Aim:** The actual situation of cultivating the health education ability of students majoring in physical education has not achieved the implementation effect that was in line with policy requirements, and there were no courses related to health care, infectious disease prevention, and treatment specifically designed for the health education system. Therefore, this research aimed to develop management strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program.

**Materials and Methods:** This research was a mixed-methods study, which combined quantitative and qualitative research. The researcher conducted a survey of 296 fourth-year students in 13 universities within Yunnan Province, interviewed 9 primary and secondary physical education teachers, 9 university instructors, and 9 university leaders. The validity of the questionnaire and interview form was validated by five experts. The IOC of the student questionnaire was 0.95 (0.60-1.00). The IOC of the interviewing form for teachers was 0.96 (0.80-1.00), the IOC of the interviewing form for university instructors was 0.96 (0.80-1.00), and the IOC of the interviewing form for university leaders was 0.96 (0.80-1.00). The information obtained from the questionnaires and interviews was used to develop management strategies to improve health education knowledge and practice among physical education students under the scope of management function (POLC). The content of the management strategy was distributed to 19 experts for consensus by the Delphi method for two rounds. The management strategy was adjusted by the researcher and confirmed by the focus group discussion. The questionnaire data were analyzed by mean and standard deviation. Consensus data by the Delphi method were analyzed by median and interquartile range, with the criterion set at a median of  $\geq 3.50$  and an interquartile range of  $\leq 1.50$ .

**Results:** Fourth-grade students had poor practical abilities in health education, and they had a greater need for improvement in skills and operations. To solve these problems, management strategies were developed with hierarchical concepts, which include four first-level elements, namely, policies, curriculum, extracurricular activities, and competency certification, 13 second-level elements, and 56 third-level elements.

**Conclusion:** The management strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program should focus on four sets of strategies, 13 subsets, and 56 indicators. These management strategies were confirmed and accepted by experts to be appropriate, practical, and feasible strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program.

**Keywords:** Health Education; Student Teacher; Physical Education Program; Management Strategies

### Introduction

Physical education teachers in China's primary and secondary schools are primarily trained through university programs specializing in physical education. Due to the teachers who teach physical education in schools lacking formal qualifications or specialized training in physical education, the cultivation of students' health education abilities in physical education majors has a profound impact on the smooth development of school health education. The undergraduate stage, as a pre-employment education stage for students, plays a crucial role in cultivating their health education abilities. The "Outline of the Plan" requires "to increase the efforts of school health education, cultivate health education teachers, and incorporate health education into the preservice and post service training content of physical education teachers". In 2018, the "Opinions on Comprehensively Deepening the Reform of Teacher Team Construction in the New Era" pointed out that "it is necessary to continuously improve the professional quality and ability of teachers", in the context of the "Healthy China" strategy and the "Health First" education concept, strengthening pre-service education and improving the health education ability of students majoring in





physical education have become the mission and responsibility entrusted to universities by the times (Peng and Gao, 2021). Therefore, it can be seen that the development of health education knowledge and practice of student teachers majoring in physical education is necessary and consistent with China's health policy.

However, the actual situation of cultivating the health education ability of students majoring in physical education has not achieved the implementation effect that is in line with policy requirements. The cause is due to universities often lack faculty members who specialize in both physical education and health education, making it difficult to provide students with in-depth training in health promotion, many physical education students do not receive sufficient opportunities to practice health education in real-world settings, and many physical education programs focus heavily on sports skills and coaching but do not adequately incorporate health education topics such as nutrition, mental health, or chronic disease prevention. Before 2018, the curriculum system of physical education majors included biology-related courses such as sports anatomy, sports physiology, and sports health care, which served the learning of sports skills. However, there were no courses related to health care, infectious disease prevention, and treatment specifically designed for the health education system from the perspective of preventive medicine. This means that the preservice training process of physical education teachers did not include specialized health education content. In 2018, the National Standards for Teaching Quality of Undergraduate Majors in Physical Education in Higher Education Institutions made health education a compulsory course for physical education majors and officially included it in the curriculum system. However, according to research conducted by researchers, the course content did not fully match the content requirements proposed in the "Guidelines for Health Education in Primary and Secondary Schools". The problems are that insufficient efforts in cultivating students' health education abilities, inadequate training mechanisms, and incomplete training content urgently need to be addressed (Cao and Ge, 2022).

This study will investigate the current implementation status of health education in physical education and health courses in primary and secondary schools in Yunnan Province, the implementation status of health education courses for students majoring in physical education in universities in Yunnan Province, and the health education ability of students majoring in physical education. Analyze the gap between social needs and students' abilities, sort out the problems in the cultivation of health education ability in preservice training of physical education teachers, draw on foreign experience, propose management strategies, and provide reference for constructing a model suitable for the cultivation and development of health education ability of physical education students in Yunnan Province.

## Objectives

1. To develop management strategies to enhance health education knowledge and practice of students majoring in the physical education program.
2. To confirm the management strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program.

## Literature Review

### *1. The goals and contents of health education in primary and secondary schools*

In 2008, the Ministry of Education issued the "Guiding Outline for Health Education in Primary and Secondary Schools" (hereinafter referred to as the "Guiding Outline"), which stipulated the specific goals and basic content of health education in primary and secondary schools. It pointed out that health education is centered on promoting health. Through planned school health education, students' health awareness and public health awareness are cultivated, and necessary health knowledge and skills are mastered, promoting students to consciously adopt and maintain healthy behaviors and lifestyles, reduce or eliminate risk factors that affect health, and lay a solid foundation for lifelong health. The content of health education in primary and secondary schools includes five areas: healthy behavior and lifestyle, disease prevention, mental health, growth and development, adolescent health, safety, emergency, and risk avoidance (Ministry of Education of the People's Republic of China, 2008).





In 2022, the "Physical Education and Health Curriculum Standards (2022 Edition)" issued by the Ministry of Education clearly defined the nature of the "Physical Education and Health" curriculum: the "Physical Education and Health" curriculum mainly uses physical exercise as the main means, sports and health knowledge, skills and methods as the main learning content, with the main purpose of developing students' core literacy and improving their physical and mental health, which is fundamental and fitness oriented. The characteristics of practicality and comprehensiveness are important components of school education. This course aims to cultivate students' core physical education literacy, which means that they gradually develop correct values, essential qualities, and key abilities through the study of physical education and health courses, including sports ability, healthy behavior, and sports ethics. Based on this purpose, the overall goal of the course has been established as follows: (1) Master and apply physical fitness and sports skills. Students can enjoy sports fun, master various physical fitness learning and training methods, actively participate in various physical fitness exercises, meet the corresponding requirements of the National Student Physical Health Standards (2014 Revision), improve their physique, and maintain good physical posture. Mastering 1-2 sports skills based on learning and practicing various sports techniques and tactics, as well as participating in exhibitions or competitions; Understand the importance of developing physical fitness and motor skills, master the basic knowledge and principles of the learned sports projects, and understand and apply the rules of the learned sports projects. Regularly watch sports competitions and be able to briefly analyze phenomena and problems in sports competitions. Develop a positive attitude towards sports and improve the ability to analyze and solve problems. (2) Learn to apply the knowledge and skills of health and safety to form a healthy lifestyle. Students can understand the importance of physical exercise for their health, actively participate in physical exercise both on and off campus, and gradually develop awareness and habits of physical exercise. Master the knowledge and methods of personal health care, nutritional diet, adolescent growth and development, prevention of common diseases and sports injuries, and safety avoidance, and apply them in learning and daily life; Understand and experience the positive impact of sports activities on mental health, learn to regulate one's emotions, actively respond to setbacks and failures, and maintain a good mindset. Actively communicate and cooperate with others, know the methods and precautions for physical exercise in different environments, and gradually adapt to the natural and social environment. (3) Actively participate in sports activities and cultivate good physical character. Students can understand the importance of participating in physical training, exhibitions, or competitions in shaping personal character. Actively participate in sports activities, overcome difficulties or challenge one's physical limits while ensuring safety, persevere to the end, and work hard with peers. Adhere to the rules of sports games, exhibitions, or competitions, respect each other, be honest and trustworthy, and have a sense of and behavior of fair competition. Full of confidence, willing to help others, demonstrating good etiquette, taking on different roles and conscientiously fulfilling responsibilities, and treating success or failure correctly. Be able to transfer the good sports ethics developed in sports to daily learning and life (Ministry of Education of the People's Republic of China, 2022). Therefore, core physical education literacy is a multidimensional concept that goes beyond just physical fitness. It integrates physical, cognitive, social, and emotional elements to foster a well-rounded individual who values and participates in physical activity throughout life.

In conclusion, the "Physical Education and Health" curriculum integrates physical exercise, health knowledge, and skills to develop students' core literacy, improve physical and mental health, and foster lifelong healthy habits. The curriculum aims to enhance students' sports abilities, encourage healthy lifestyles, and build positive physical character. Students are expected to master fitness techniques, understand the importance of exercise, apply health and safety knowledge, develop emotional resilience, and practice good sportsmanship, with the ultimate goal of shaping well-rounded, health-conscious individuals.

## 2. Health promotion in schools

In 1998, the World Health Organization (WHO) published the book "Health Promotion Universities: Concepts, Experiences, and Action Framework" based on the experience of the University of Lancaster in



the UK. This book provides a wide range of concepts and practical methods for any university to integrate health promotion programs into its institutions. In 2021, WHO and UNESCO jointly released a series of publications titled "Making Every School a Health Promoting School" and the "World Health Organization Guidelines for School Health Services". The former includes three publications: "Global Standards and Indicators", "Implementation Guidelines", and "Country Case Studies".

The Global Standards and Indicators propose eight global standards for sustainable health promotion schools, namely: government policies and resources, school policies and resources, school governance and leadership, partnerships between schools and communities, school curriculum, school social emotional environment, school physical environment, and school health services, aiming to form a health promotion school system. The Implementation Guidelines refine the above 8 standards into 13 implementation areas and strategies and propose 5 steps for the implementation cycle of health promotion schools. The 13 implementation areas are: strengthening coordination between government departments and multiple stakeholders, formulating or updating policies, strengthening school leadership and governance practices, allocating resources, adopting evidence-based practices, strengthening partnerships between schools and communities, investing in school infrastructure, developing curriculum and related resources and ensuring their implementation, ensuring that teachers receive training and professional learning, ensuring access to comprehensive school health services, and involving students Engage parents, caregivers, and local communities in monitoring and evaluation (WHO, 2021).

Building upon this initiative, the AUN Healthy University Framework aligns with the broader global efforts to promote health within educational institutions. In this context, the Global Standards and Indicators outline eight key standards for establishing sustainable health promotion schools, providing a comprehensive framework for implementation. In 2023, ASEAN University Network – Health Promotion Network (AUN–HPN) constructed the AUN Healthy University Framework by WHO's Health Promotion School Policy. The framework of a healthy university consists of two types of activities: (1) in the fields of systems and infrastructure, covering the basic procedures or services required for implementing the healthy university plan; (2) Theme areas are behaviors or practices that affect health, including areas to avoid (such as smoking or drinking) and areas to promote (physical activity, healthy eating, etc.). The implementation framework includes four key areas: policy, awareness and action, behavior, and operational structure (ASEAN University Network – Health Promotion Network, 2023).

At present, China's policies on the construction of health promotion schools are mainly applicable to primary and secondary schools, including the "Health Promotion School Standards" issued by the National Health and Family Planning Commission of the People's Republic of China in 2016, which stipulates the construction principles and basic framework content of health promotion schools, as well as policy support, organizational guarantee, environmental creation, community cooperation, health skill cultivation Requirements for health services and evaluation of health promotion schools. In 2018, the "National Health Commission UNICEF Youth Health and Development Project Health Promotion School Evaluation Standards (2018 Trial)" was introduced, which includes 7 primary indicators: policy support, school health policy, school material environment, school social environment, school community family relationship, personal health skills, and school health services. The standards include 30 secondary indicators and 95 tertiary indicators (Lou, 2019).

Moreover, one of the factors for health promotion in school is teachers, to become a physical education teacher in primary and secondary schools, one must first have a bachelor's degree or above in terms of educational background, and secondly, in terms of professional qualifications, one must have a teacher qualification certificate in the corresponding teaching subject of "Sports and Health", which is the basic requirement for recruiting physical education teachers in primary and secondary schools. On this basis, to become a qualified physical education teacher, one also needs to possess some professional qualities as a physical education teacher. The factors of the professional ability of middle school physical education teachers, proposing that the professional ability of middle school physical education teachers should include educational and teaching ability, curriculum resource development and utilization ability,







extracurricular physical activity organization ability, extracurricular physical training and competition ability, scientific research and innovation ability (Guo, 2020) Fan (2022) constructed a professional ability evaluation index system for junior high school physical education teachers, based on the core literacy of the physical education discipline, consisting of six primary indicators: moral education ability, sports ability, teaching ability, extracurricular sports management ability, teaching and research ability, communication and cooperation ability. Teacher qualification serves as the primary certification for teacher competence in China. As a subset of this competence, the health education proficiency of physical education teachers is inherently linked to the teacher qualification certification process. However, current pre-service teacher competency assessments, such as the teacher qualification exam and teacher preparation exam, do not include content specifically related to health education competence.

### 3. Health education teaching and learning in the physical education major

The undergraduate health education series of courses is the main way for students majoring in physical education to systematically learn health education knowledge before entering the workforce. At present, universities mainly cultivate students' health education abilities within and outside of class, and the curriculum can be divided into basic knowledge courses and practical skills courses. The health education courses offered by universities for students majoring in physical education can be divided into basic knowledge courses and practical skills courses. Basic knowledge courses mainly include "Sports Anatomy", "Sports Physiology", "Health Education", "Sports Nutrition", "Physical Fitness Measurement and Evaluation", "Sports Psychology", etc. Most higher sports colleges and comprehensive university sports departments have already offered such courses. Among them, "Health Education" has the highest compatibility with the content of health education in primary and secondary schools (Kong and Wang, 2020).

However, university curricula for physical education majors lack sufficient health education courses, with most offered only as electives. The focus is overly placed on sports skills, neglecting the development of teaching abilities. To address this, the curriculum should be restructured by defining compulsory courses, expanding elective options, and increasing teacher education courses, ensuring a balanced approach between practical skills and pedagogy for comprehensive student development (Yan, 2006). Zhen (2013) identified three primary components for health curricula in physical education, the three components are as follows: (1) Basic Medicine. This component emphasizes foundational medical knowledge essential for understanding human health and physiology; (2) Health Knowledge. This includes information on nutrition, mental health, and lifestyle choices that contribute to overall well-being; (3) Sports Health Integration. This focuses on combining sports science with health education to promote safe and effective physical activity. In addition, he suggests that a comprehensive health curriculum in higher physical education should encompass these three areas to effectively prepare students for promoting health and wellness.

There is no doubt about the foundational and important importance of systematic curriculum learning in cultivating the health education ability of students majoring in physical education. However, extracurricular practical activities are also essential, as they are an important channel for cultivating students' practical abilities in health education teaching. At present, extracurricular activities aimed at improving the practical ability of health promotion for students majoring in physical education in universities are mainly educational internships, which usually last for 3-4 months. The internship units are primary and secondary schools, and the main methods are to undertake the teaching tasks of physical education and health courses and serve as class teachers (Dong, 2014). Li (2019) proposed the view of increasing health education practice in a spiral manner in "Research on the Cultivation of Health Education Ability of Physical Education Teachers in China" and suggested that normal universities adopt a spiral education internship form: firstly, increasing the duration of education internships in a spiral manner. Study at two universities in Australia (the University of Queensland and the University of Sydney), conduct educational internships at the end of each semester, and spend a few hours summarizing practical problems at the beginning of the next semester. Continuously grow by integrating theory with practice and turning practice into theory. Spiral increase in health education practice time. Secondly, a spiral increase in



educational internship content. School health education can draw inspiration from the best-developed hospital health education at present. When organizing health education internships for students majoring in physical education, it is recommended not to be limited to the content of school health education internships, but to arrange for students to have multiple exposure to the practical content of health education abilities, learn from the strengths of various families, and enhance the health education abilities of prospective physical education teachers.

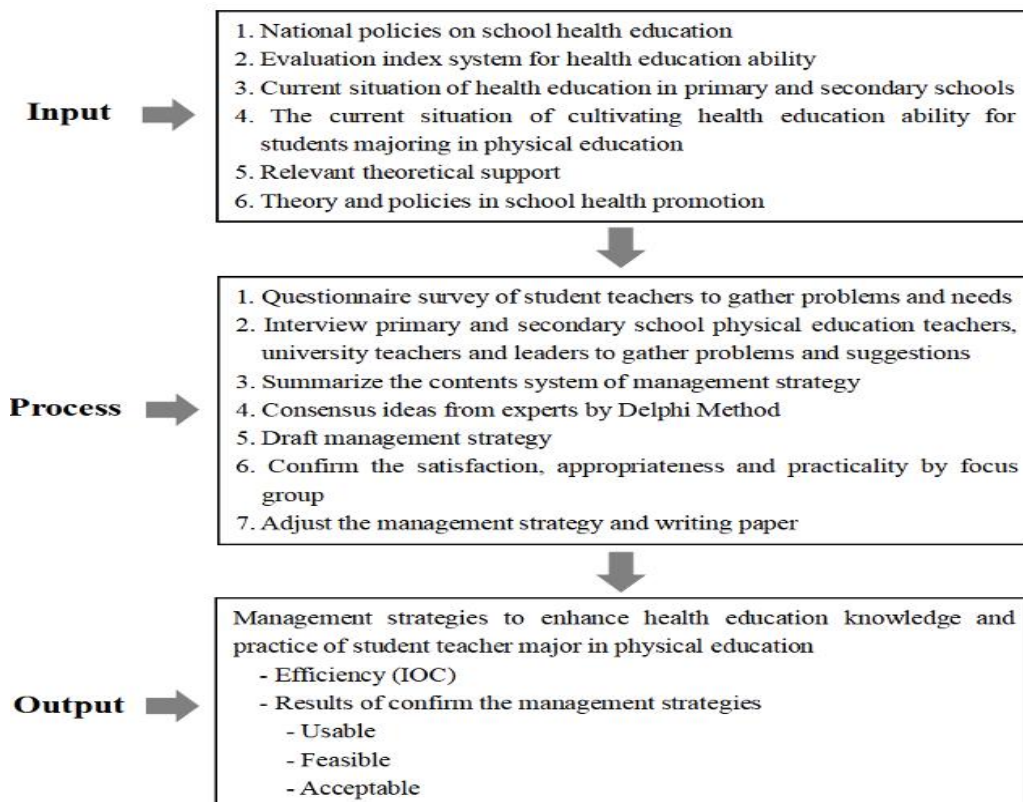
However, the deficiency in health education competence training for physical education teachers is a significant concern. Research indicates that physical education teachers often lack adequate training in health-related professional competencies, which are essential for fostering health awareness and behaviors in students. Addressing this issue requires targeted professional development programs focusing on health education, ensuring that teachers are well-equipped to integrate health concepts into their curricula effectively (Wang, 2018).

#### *Summary*

Health education in primary and secondary schools aims to cultivate students' health awareness, promote healthy behaviors, and lay a foundation for lifelong well-being. The curriculum includes areas such as healthy lifestyles, disease prevention, mental health, growth and development, and safety education. In higher education, physical education programs primarily focus on sports skills, with limited health education courses offered, mostly as electives. Research suggests that PE curricula should integrate health education by restructuring course offerings to balance practical sports training with pedagogical development. The ASEAN University Network – Health Promotion Network (AUN–HPN) and WHO's health promotion frameworks emphasize the need for structured policies, resources, and school-community partnerships to enhance health education. Teacher qualification processes in China currently lack health education competence assessments, highlighting the need for improved certification mechanisms. Furthermore, physical education students develop health education abilities through both coursework covering sports anatomy, physiology, nutrition, and psychology, and practical internships, often at primary and secondary schools. Studies recommend increasing health education practice in a spiral manner, incorporating ongoing internships, and exposing students to diverse health promotion settings to strengthen their ability to teach health education effectively.



## Conceptual Framework



**Figure 1** Conceptual framework

## Methodology

### 1. Research Tools

In this research, the research tools are as follows:

(1) Survey Questionnaire. A survey questionnaire was developed to understand the current level of health education abilities of students majoring in physical education and their self-expectations. The questionnaire adopts a 5-point Likert scale. The average IOC value of the Questionnaire is 0.95 (0.60-1.00), and the Cronbach's Alpha coefficient is 0.883, which indicates that the validity and reliability of the questionnaire are good.

(2) Interview Outline. Create interview forms for university teachers, university leaders, and physical education teachers of primary and secondary schools.

(3) Questionnaire for Delphi. Used to provide the preliminary management strategy content system to experts and seek their consensus. The questionnaire adopts a 5-point Likert scale. The average IOC value of the Questionnaire is 0.84 (0.60-1.00), which indicates that the validity of the questionnaire is good.

(4) Focus Group Recording Form. Used to assess the effectiveness and feasibility of management strategies.

### 2. Population and sample

A total of 1,285 fourth-year physical education majors from universities in Yunnan Province were identified as the population. Using a stratified random sampling method, 296 fourth-year students from 13 universities were selected as the sample group.

The experts to participated in this research were as follows:

1. Nine physical education teachers from primary and secondary schools in 8 regions in Yunnan Province (Kunming, Yuxi, Dali, Qujing, Chuxiong, Baoshan, Wenshan, and Honghe) were selected for



interviews.

2. Nine experienced teachers from the physical education colleges of 13 universities participated in interviews.

3. Nine leaders from the physical education colleges of 13 universities were interviewed.

4. A total of 19 experts evaluated the content system of the management strategy using the Delphi method.

5. Nine experts validated the draft of management strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program through the focus group method.

### 3. Data Collection

1. The student questionnaire was distributed to 296 fourth-year students from 13 universities in Yunnan Province and collected electronically using the “Questionnaire Star” platform.

2. Interviews were conducted through face-to-face meetings, phone calls, or email, depending on the actual circumstances. The data was initially recorded using a recording device and later transcribed into text for analysis.

3. 19 experts were invited to conduct two rounds of the Delphi consensus. The Delphi questionnaires were distributed and collected through email in the form of an electronic questionnaire. After the first round of questionnaire collection, the expert scores were statistically analyzed, and the contents were selected to obtain the first round of management strategy indicators. In the second round, the results of the first round of Delphi were sent again to the 19 experts, along with the assessments given by all the experts in the first round of Delphi, so that they could consider revising their ratings. After the second-round questionnaire was collected, statistics and confirmation will be conducted again to obtain a draft management strategy.

4. Nine experts were invited to conduct a focus group discussion. The purpose of the focus group discussion was to solicit opinions and suggestions from experts on the satisfaction, suitability, and practicality of the management strategy.

### 4. Data Analysis

Utilize a software package for data analysis, applying the following statistical methods:

1. Survey questionnaire data were analyzed by calculating PNI values. PNI analysis is a strategic assessment method used in research and organizational evaluations to identify gaps, prioritize needs, and propose improvements. PNI modified values are typically computed using the following formula:

$$PNI = \frac{(I - D)}{D}$$

2. The expert interview was analyzed using content analysis.

3. The Delphi consensus data is analyzed based on the median and interquartile range, with a criterion of a median  $\geq 3.50$  and an interquartile range  $\leq 1.50$ .

4. Focus group discussion was evaluated through content analysis.

## Results

The results of this research are divided into the following four sections:

Part I: Results of the survey on the current situation and demand for health education competencies of students majoring in physical education

Part II: Results of the survey on the demand for health education competence in primary and secondary schools and the current status of the education process in universities

Part III: Results of management strategies to enhance health education knowledge and practice of student teachers

Part IV: Validation results of management strategies to enhance health education knowledge and practice of student teachers



## Part I: Results of the survey on the current situation and demand for health education competencies of students majoring in physical education

To understand the current status of health education competence of university students and their needs, a questionnaire was prepared based on the literature study, which consisted of 4 parts, namely, attitude, knowledge, skills, and operation, with 52 questions. Questionnaires were distributed to 296 fourth-year students majoring in physical education in 13 universities in Yunnan Province, and 296 questionnaires were retrieved and usable.

**Table 1** Analysis of the current status and needs assessment of university students' attitudes towards health education.

No.	A. Attitude	Expectation (I)		Current (D)		PNI	Rank
		M	SD	M	SD		
a. Professional Identity							
1	Aa1. Believe that physical education and health courses are the main courses for schools to promote health education	4.88	0.32	4.79	0.41	0.02	3
2	Aa2. Believed that physical education teachers should combine teaching health knowledge with teaching sports skills	4.89	0.32	4.83	0.38	0.01	4
b. Self-identification							
3	Ab1. Willing to participate in professional training activities for health education	4.85	0.36	4.60	0.49	0.05	2
4	Ab2. Willing to showcase and demonstrate health promoting behaviors in classroom and workplace actions	4.68	0.47	4.11	0.32	0.14	1

Table 1 showed that the samples strongly agree that physical education teachers should take responsibility for health education. However, they are less likely to actively demonstrate health-promoting behaviors in the classroom and workplace. This suggests that students need to improve their ability to practice these behaviors. When looking at their self-expectations, students expressed the greatest need for increasing their awareness of demonstrating health-promoting behaviors in both classroom and workplace settings (PNI = 0.14).

**Table 2** Analysis of the current status and needs assessment of health education knowledge for university students.

No.	B. Knowledge	Expectation (I)		Current (D)		PNI	Rank
		M	SD	M	SD		
a. General Knowledge of Health							
1	Ba1. Familiar with the connotation of health and twelve commonly used indicators for individual health assessment	4.52	0.50	2.96	0.19	0.52	1
2	Ba2. Understand the various factors that affect human health	4.74	0.45	3.53	0.50	0.34	5
3	Ba3. Understand basic physiological hygiene knowledge and basic healthcare skills	4.63	0.50	3.26	0.44	0.42	4
4	Ba4. Understand healthy lifestyles and behaviors	4.76	0.43	3.55	0.50	0.34	6
5	Ba5. Master common health promotion methods	4.65	0.48	3.13	0.33	0.49	2
6	Ba6. Understand scientific sports knowledge	4.87	0.34	3.36	0.48	0.45	3
b. Health Education Knowledge							
1	Bb1. Understand common unhealthy lifestyles and behaviors among adolescents, as well as methods for cultivating healthy behaviors	4.65	0.48	3.39	0.49	0.37	7
2	Bb2. Understand the characteristics of adolescent psychological development and methods for promoting mental health	4.48	0.50	2.27	0.44	0.98	3
3	Bb3. Understand the causes and preventive measures of common and infectious diseases	4.51	0.50	2.78	0.42	0.62	4
4	Bb4. Understand the knowledge of reasonable dietary nutrition	4.80	0.40	3.57	0.50	0.35	8
5	Bb5. Understand the types and causes of safety accidents, as well as emergency and risk avoidance knowledge	4.15	0.36	2.60	0.49	0.60	5
6	Bb6. Understand the relevant laws, regulations, and policy provisions on the survival, development, and protection of minors	3.54	0.65	1.11	0.31	2.20	1
7	Bb7. Understand the policies related to school health education	3.67	0.47	2.50	0.50	0.47	6
8	Bb8. Understand the standards for physical education and health curriculum	4.65	0.48	3.80	0.40	0.22	9
9	Bb9. Understand the relevant theories that promote healthy behavior	3.27	0.45	1.43	0.50	1.29	2

From the perspective of students' expectations for themselves, they have a strong willingness to improve on the content they lack mastery of. Among them, in terms of general knowledge of health, students hope to make significant improvements in the twelve commonly used indicators of health connotation and individual health evaluation (PNI=0.52), followed by commonly used health promotion methods (PNI=0.49). In terms of health education knowledge, they hope to have a significant improvement in the relevant laws and regulations for the protection of minors (PNI=2.20) and the theory of promoting healthy behavior (PNI=1.29).

**Table 3** Analysis of the current status and needs assessment of health education skills for university students.

No.	C. Skill	Expectation (I)		Current (D)		PNI	Rank
		M	SD	M	SD		
a. Basic Teaching Skills							
1	Ca1. Proficient in using various modern educational technologies	4.51	0.50	3.17	0.37	0.42	1
2	Ca2. Good language organization and presentation skills	4.57	0.50	3.24	0.43	0.41	2
3	Ca3. Being able to reflect on oneself and the teaching process in a timely manner	4.71	0.45	3.40	0.49	0.38	4
4	Ca4. Skilled in observation, timely correction and guidance	4.64	0.49	3.39	0.49	0.37	5
5	Ca5. Mastering the timing and location of demonstrations, with good action demonstrations	4.70	0.46	3.39	0.49	0.39	3
b. Health Education Skills							
1	Cb1. Proficient in operating emergency rescue and nursing procedures for accidental injuries	3.90	0.43	1.20	0.40	2.24	1
2	Cb2. Guide the prevention and health care of common diseases	4.58	0.49	1.77	0.42	1.58	3
3	Cb3. Guide common physical exercise activities (scientific sports knowledge)	4.92	0.27	3.82	0.38	0.29	7
4	Cb4. Engage in basic health checkups and physical fitness monitoring	4.92	0.28	3.14	0.34	0.57	5
5	Cb5. Provide basic mental health counseling services	3.76	0.43	1.30	0.46	1.88	2
6	Cb6. Skilled in acquiring or utilizing health education and hygiene resources	4.29	0.45	2.70	0.46	0.59	4
7	Cb7. Skilled in collaborating with school staff, parents, and other stakeholders to jointly promote student health	4.39	0.49	3.14	0.34	0.40	6
c. Health Education Expansion Capability							
1	Cc1. Ability to self-study health information and health education knowledge	4.48	0.50	3.20	0.40	0.40	3
2	Cc2. Ability to conduct research on health education teaching	3.31	0.46	1.07	0.26	2.09	1
3	Cc3. Capable of innovative teaching in health education courses	3.70	0.46	1.41	0.49	1.62	2

From the perspective of student needs, they have high expectations for improving their weaker abilities. In terms of basic teaching skills, students first hope to have significant improvement in the use of modern educational technology (PNI=0.42), followed by language expression ability (PNI=0.41). In terms of health education skills, students hope to have significant improvements in first aid and nursing for accidental injuries (PNI=2.24), followed by psychological counseling services (PNI=1.88) and prevention and care of common diseases (PNI=1.58). In terms of expanding their ability in health education, students have the greatest demand for improving their research ability in health education teaching (PNI=2.09).

**Table 4** Analysis of the current status and needs assessment of health education operation for university students.

No.	D. Operate	Expectation (I)		Current (D)		PNI	Rank
		M	SD	M	SD		
a. Diagnosis of Educational Objects							
1	Da1. Diagnose the health literacy and physical and mental health status of educational subjects	4.04	0.48	2.63	0.48	0.54	1
2	Da2. Diagnose the health education needs of health education recipients	4.20	0.40	2.80	0.40	0.50	2
b. Intervention Plan Formulation							
1	Db1. Set accurate health education plan goals	3.92	0.28	2.47	0.50	0.59	5
2	Db2. Determine the corresponding health education intervention content	4.05	0.23	2.80	0.40	0.45	6
3	Db3. Design a complete health education classroom teaching plan	4.05	0.23	2.27	0.44	0.79	4
4	Db4. Choose appropriate forms of health education programs	4.07	0.25	2.07	0.25	0.97	2
5	Db5. Develop effective health education intervention strategies	4.06	0.24	2.05	0.23	0.98	1
6	Db6. Design a variety of extracurricular health education activity plans	3.83	0.37	2.04	0.19	0.88	3
c. Health Education Expansion Capability							
1	Dc1. Carry out systematic and targeted health education curriculum teaching	4.08	0.28	2.67	0.47	0.53	5
2	Dc2. Management and organization of extracurricular health education activities implementation	3.64	0.48	1.11	0.31	2.28	2
3	Dc3. Engaged in campus health consultation and health behavior guidance	3.46	0.50	1.03	0.17	2.36	1
4	Dc4. Being able to choose appropriate and diverse teaching methods based on the teaching content	4.15	0.36	2.30	0.46	0.81	4
5	Dc5. Being able to create suitable teaching scenarios for health education	3.91	0.29	1.24	0.43	2.14	3
d. Evaluation of Educational Effectiveness							
1	Dd1. Choose a reasonable evaluation method	4.15	0.36	2.10	0.29	0.98	3
2	Dd2. Design a complete evaluation plan	3.92	0.28	1.74	0.44	1.25	2
3	Dd3. Collect and process evaluation data	4.38	0.49	2.77	0.42	0.58	5
4	Dd4. Accurately analyze and evaluate the results	4.38	0.49	2.64	0.48	0.66	4
5	Dd5. Write corresponding evaluation report	3.67	0.47	1.14	0.35	2.21	1

From the perspective of student needs, the weaker aspects of student performance mentioned earlier are what students hope to improve. In terms of diagnosing educational targets, students have equal demands for two abilities. In terms of intervention plan formulation, the most important areas for students to improve are developing intervention strategies (PNI=0.98), selecting appropriate intervention project forms (PNI=0.97), and designing extracurricular activity plans (PNI=0.88). In terms of educational intervention implementation, students have a high demand for campus health consultation and health behavior guidance (PNI=2.36), management and organization of extracurricular health education activities (PNI=2.28), and



creation of appropriate health education teaching contexts (PNI=2.14). In terms of educational effectiveness evaluation, students hope to receive further training in writing evaluation reports (PNI=2.21) and designing evaluation plans (PNI=1.25).

**Table 5** Overall situation of students' health education ability

Items	Current (mean)	Expectation (mean)	PNI (mean)	Rank
Attitude	4.58	4.83	0.06	4
Knowledge	2.88	4.39	0.64	3
Skill	2.62	4.30	0.87	2
Operate	2.10	4.00	1.08	1

Table 5 showed that the students' health education abilities of the samples were relatively high (M=4.58); The mastery of health education knowledge (M=2.88) and skills (M=2.62) is moderate, while the operational ability of health education is poor (M=2.10). This indicates that students lack opportunities to apply theoretical knowledge and skills, resulting in a lack of practical ability.

## Part II: Results of the survey on the demand for health education competence in primary and secondary schools and the current status of the education process in universities

Interviews were conducted with physical education teachers in primary and secondary schools, teachers of health education related courses in physical education faculties, and experts of physical education faculties respectively, to understand the social demand and the current situation of talent cultivation in universities, as well as to collect their opinions and suggestions on the cultivation of health education talents, to provide a basis for the next step of formulating management strategies.

The interview results showed that teachers and experts have proposed various strategies to enhance health education training for physical education majors in universities. In curriculum development, they emphasize practicality, interdisciplinary integration, and a systematic approach, recommending courses on health education evaluation, psychology, big data analysis, and the integration of health education with physical education. Training methods should focus on practical skills through partnerships with schools, enterprises, and health institutions, offering internships, health lectures, simulation teaching, and competitions. Extracurricular activities, such as knowledge contests, skill training, and lifestyle challenges, can further engage students. Policy recommendations include establishing incentive funds, integrating health education into campus culture, and building a strong faculty to encourage participation. For practical experience, collaboration with communities, hospitals, and public welfare organizations is encouraged, alongside accreditation opportunities for certifications like health manager and swimming lifeguard. Additionally, assessment methods should be diversified, incorporating practical exams, achievement demonstrations, and evaluations from educators and industry professionals to comprehensively enhance students' health education competencies.

## Part III: Results of management strategies to enhance health education knowledge and practice of student teachers

19 experts participated in two rounds of Delphi consensus; the opinions of each expert were summarized, and some inconsistent opinions or suggestions were merged and discarded, so that the overall expert opinions converged. By the comments of the first round of Delphi consensus, the revised draft management strategy was sent again to the 19 experts, along with the assessments given by all the experts in the first round of Delphi, so that the experts could consider revising their ratings. The results of the second round of Delphi consensus, 54 elements met the adoption criteria ( $Mdn \geq 3.5$ ,  $IQR \leq 1.5$ ) through reconfirmation by experts in the second round. For the 7 elements that did not meet the adoption criteria in the first round, the experts' opinions in the second round were as follows:

There was 1 element (Item 3 Conduct research to investigate the talent demand for health education in

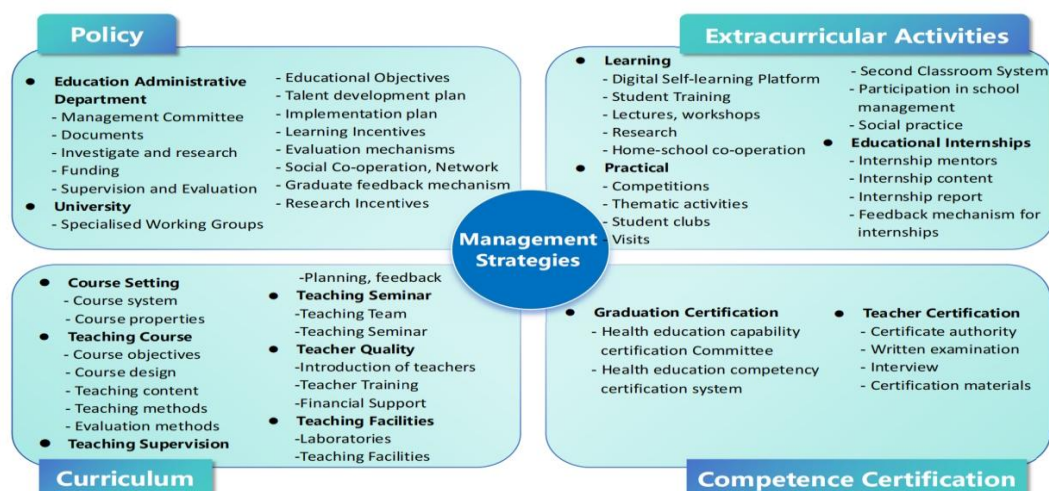
primary and secondary schools) that was agreed to be retained through explanation and clarification with the experts in the second round.

There were 6 elements, the experts still maintained their opinions in the first round, i.e., deletion of 2 elements (Item 26 Establish a Health Education Teaching Supervision Committee and Item 61, Establish reward measures to encourage students to obtain certificates), and merger of 4 elements (Item 18 Offering emerging courses, such as those related to exercise and chronic disease prevention, Item 32 Regularly hold teaching seminars for sports technology courses teachers, Item 35 Enhance the ability of physical education technology course teachers and require them to receive training, and 51 Carry out holiday social practice). For the 1 additional element suggested by the experts in the first round (Item 62 during the nationwide unified teacher qualification certification, students are required to present proof of health education practice), all experts agreed in the second round that it could be retained.

Based on the 4 components of management strategies, the researchers mapped a management strategy to enhance health education knowledge and practice of student teachers majoring in the physical education program, as shown in Figure 2.

**Figure 2** Management strategies to enhance health education knowledge and practice of student teachers majoring in the physical education program

**Part IV:** Validation results of management strategies to enhance health education knowledge and practice of student teachers



To verify the satisfaction, appropriateness, and practicality of the management strategy, 9 experts were invited to participate in a focus group discussion. The research found that fourth-year students have weak practical abilities in health education, with a greater need for skill and operational improvements rather than just knowledge. Interviews revealed that universities are actively adjusting their educational policies to align with the New Curriculum Standards by modifying curriculum structures, optimizing teaching content, and increasing practical training. However, challenges remain, such as unclear curriculum objectives, misalignment with new standards, limited teaching methods, insufficient practice opportunities, an overemphasis on theoretical assessments, and a lack of student feedback mechanisms. In response, university teachers and leaders proposed improvements in policy, curriculum, extracurricular activities, practical training, and competency certification. To address these issues, a management strategy was developed using a two-round Delphi method, consisting of 4 primary elements (policy, curriculum, extracurricular activities, and competency accreditation), 13 secondary elements (such as university policy, curriculum teaching, practical activities, and graduation accreditation), and 56 third-level elements. This strategy was validated by focus group experts as both effective and feasible, providing a valuable reference for managing undergraduate education in other regions. Successful implementation will require a focus on teacher training, learning resources, collaboration, teaching arrangements, supervision, and evaluation.



## Conclusion

Management strategy for improving physical education students' knowledge and practice of health education including 4 first level elements of policy, curriculum, extracurricular activities and competency accreditation, 13 second level elements of government policy, university policy, curriculum, curriculum teaching, teaching supervision, teaching seminars, teacher quality, teaching facilities, learning activities, practical activities, educational internships, graduation accreditation, and practitioner accreditation, and 56 third level elements. This management strategy was also confirmed to be useful and feasible, and in line with the current national education policy by 9 experts.

## Discussion

### 1. Policy

In this study, it is proposed to set up a health education teaching management committee, introduce documents to strengthen the health education competence training of physical education majors in colleges and universities, conduct research, give special financial support to colleges and universities, and establish a long-term and effective monitoring and evaluation mechanism. This is consistent with the analyses of Li (2019). Currently, there is a lack of consensus in our documents on the development of the health education capacity of physical education teachers. For health education to be carried out in the physical education classroom, there is a need for targeted documents that set out requirements for the development of health education competence of physical education teachers. At the same time, it is necessary to establish a long-term and effective supervision and evaluation mechanism to conduct special supervision and evaluation of the practical effects of health education competence development.

### 2. Curriculum

It is necessary to reconstruct and improve the curriculum system, clarify the compulsory courses, enrich the elective courses, and increase the proportion of teacher education courses. This can solve the problems raised by Yan (2006) in their study, who found after their research that there are not many courses related to health education in the curriculum of colleges and universities and most of them are presented in the form of electives; in addition, the curriculum of physical education majors focuses excessively on sports skills and ignores the cultivation of teacher education ability. Therefore, it is necessary to establish health education course modules, set up related courses according to the cultivation objectives, clarify the nature of each course, and increase the proportion of teacher education courses, which is also in line with the views of Zhen (2013).

### 3. Extracurricular Activities

Educational internship is the main form of practice for physical education students, and it is also the main way to cultivate the practical ability of physical education students in health education. However, the research found that there is no requirement for "health education" practice in the apprenticeship and internship, and the main requirement is students' physical education practice ability. There is a lack of health education competence training for physical education teachers. This is consistent with the findings of Wang (2018). In this regard, it is proposed to set up health education internship tutors, optimize the content of professional internships, require students to write health education internship reports, and establish a feedback mechanism for internships.

### 4. Competence Certification

Teacher qualification is the main form of teacher competence certification in China at present, and the health education competence of physical education teachers is a kind of competence of physical education teachers, which is inevitably subject to the certification of teacher qualification. However, there is no health education competence-related test content among the pre-service teacher competence tests (e.g., teacher qualification exam, teacher preparation exam), and at the same time, the physical education teacher certification lacks health education-related content. Therefore, this study proposes to establish an on-campus graduation certification mechanism and improve the social certification mechanism. This is consistent with the findings of Fan (2022) in China, where teacher qualification is the primary certification for assessing teacher competence. As an essential aspect of this competence, the health education proficiency of physical education teachers is naturally tied to the teacher qualification certification process.

## Recommendation

### *Recommendation for current research*

[645]

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1. This management strategy has been endorsed by experts and should be considered by education administrations. As a next step, 1-2 universities could be selected to pilot the model, and then help all schools to establish the model after learning from their experiences.

2. To run project events and activities at the outset, it is essential that all organizations and people involved participate in training so that they are clear and understand the concepts and objectives of the management strategy and are committed to working collaboratively to implement the strategy.

3. Implement a robust system to regularly assess the quality of talent development and the effectiveness of the strategy and adjust and improve the strategy based on feedback from teachers, students, and employers.

#### *Recommendation for further research*

1. Implement the management strategy to enhance students' health knowledge and practice for one academic year, conduct surveys and feedback, and analyze the factors affecting the implementation of the management strategy.

2. The geographical area of this study is Yunnan Province, and it can be expanded to other provinces in China as a next step to promote the application of the research findings in a wider area.

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