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Research on the Reform of Physical Education from the Perspective of "Health Quotient" Development

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Absrtact: Health Quotient is a new health concept put forward by health knowledge and medical concept, which includes the comprehensive elements of individual health awareness, health knowledge, and their own health skills and abilities. It can reflect people's health intelligence level. Health Quotient, emotional quotient, and intelligence quotient are all important qualities to measure human beings. Based on the "healthy China 2030 plan outline" in the new era, this paper interprets the concept and related background of the concept of health business, studies the development direction of physical education reform in the new era based on the concept of health business, and gives the development countermeasures of physical education reform combined with the concept of health business.

Keywords: Health quotient; physical education; College Students

Contemporary university students constitute the main force for the future development of our country, with their health serving as a crucial guarantee for their comprehensive advancement and as a fundamental task in talent cultivation. China attaches great importance to the health issues of young people, as evidenced by the government's formulation of the "Healthy China 2030 Plan" and the "13th Five-Year Plan for Health and Hygiene," both integrated into the trajectories of educational and social development. The concept of "health literacy" has emerged as a frequent topic of discussion within the realm of health initiatives. Framed as a comprehensive, novel, and scientifically grounded notion of human health, health literacy holds profound significance for the reform of physical education in Chinese universities. Present-day physical education in universities stands as a vital educational component in fostering students' healthy development. Effective physical education can help instill in university students a lifelong perspective on physical health, greatly contributing to the cultivation of good exercise habits, the forging of robust physique, and the nurturing of high health literacy.

1. The Interpretation of Health Literacy Concept

Since its inception by American medical doctor Professor She Hua Zhen in 2001, the concept of health literacy has been extensively substantiated from

various perspectives including health, psychology, emotions, spirituality, and social environment. The academic community has reached a consensus on the constituents of health literacy, identifying self-care, health knowledge, lifestyle, mental state, and life skills as its five key elements.

Over the course of the 40 years of economic development since the reform and opening-up, significant improvements have been witnessed in both economic income and quality of life. High-quality living conditions have become the primary aspiration, leading to heightened attention towards personal health, a concern mirrored by the state's increased focus on public health. Simultaneously, irregular lifestyles under the pressures of modern life, coupled with various health and environmental issues, directly threaten people's health. In response to a series of health challenges, the Chinese government introduced the "Healthy China 2030 Plan," which explicitly states that the health of the people is a crucial foundation for the prosperity and strength of the nation. This directive provides guidance for health prevention and control efforts across regions and industries. Unlike emotional and intellectual quotients, genetics exert minimal influence on health literacy, which can be continuously developed and enhanced through postnatal physical training and nurturing.

University physical education stands as the ultimate stage of physical education within the educational system, requiring alignment with the basic needs of modern talent cultivation and the goals of modern health concepts. The quality-oriented physical education in Chinese universities should consistently prioritize health, shaping high-quality individuals with robust physiques. Modern physical education and health education integrate the development of human health with educational progress. As societal ideologies evolve alongside social development, people gradually recognize the direct correlation between physical education and health growth. Reports indicate that contemporary university students commonly exhibit poor athletic abilities and inadequate exercise, underscoring the pressing need to cultivate a lifelong awareness of physical education among current university students, marking a new starting point in health education within university physical education courses.

The concept of health literacy, introduced in the early 21st century, represents a novel developmental concept regarding human health, holding significant implications for enhancing the physical literacy of university students. Initiating timely and reasonable changes in university physical education based on health literacy aligns with the fundamental requirements of modern societal development and educational reform[7]. The ultimate goal of integrating health literacy into university physical education reform is to cultivate and enhance students' health literacy, prompting a reassessment, planning, design, and adjustment of existing physical education curricula, timely discarding traditional teaching methods that restrain physical education, and ultimately realizing the goal of modern university physical health education.

2. Research Subjects and Methodology

The scope of this study encompasses 1500 undergraduate students from the School of Physical Education at Suzhou University, spanning from freshmen to seniors, with a gender distribution of 47% male and 53% female.

The investigative process entailed the collection of domestic and international research materials on health literacy through the China National Knowledge Infrastructure (CNKI), serving as the theoretical underpinning for this study. Expert consultation within the domains of physical education and health was sought regarding specialized issues such as survey design, target demographic, and survey metrics, ultimately refining the scope and direction of the investigation. Drawing from the content of this study, a preliminary questionnaire assessing the health literacy levels of modern university students was formulated, which underwent revisions and adaptations based on the questionnaire designed by Professor She Hua Zhen, aiming to enhance the scientific rigor of the survey instrument. Consequently, the survey questionnaire assessing the health literacy levels of Suzhou University students was finalized. The questionnaire delineated a total of 10 scoring indicators for health literacy levels. The detailed scoring criteria are presented in the **Table 1** below:

Table 1. Scoring Criteria for Health Literacy Levels

Score Range	Explanation of Score
9-10 points	Excellent
6-8.99points	Good
3-5.99points	Fair
0-2.99points	Poor

Employing the Delphi method to assess the validity of the survey questionnaire's content and structure, the confirmation rates of all indicators in the questionnaire reached 84%, after which weaker correlations were purged, finalizing the questionnaire's structure and content. Subsequent examination of questionnaire reliability through experimental investigation involved selecting a random 50% sample of questionnaire data for reanalysis approximately two weeks after questionnaire completion, ultimately yielding a correlation coefficient (R) of 0.871 between the two survey administrations, indicative of a high level of questionnaire reliability.

A total of 1500 questionnaires were distributed for this survey, with 1487 questionnaires returned, yielding a response rate of 99.13%. Following analysis, 1350 questionnaires were deemed valid, resulting in an effective questionnaire rate of 90%. In the analysis of questionnaire survey results, the SPSS 22.0 software was utilized to establish the raw database of the survey on undergraduate students' health literacy levels. This entailed employing survey data to compute means, standard deviations, and conducting independent sample T-tests, alongside employing a factorial analysis of variance to facilitate statistical analysis.

3. Sample Results Analysis

3.1 Overall Structure and Distribution of Health Literacy Levels among University Students

The overall health literacy score among Suzhou University School of Physical Education students, who participated in the questionnaire survey, amounted to 6.472 points, placing them generally within the realm of good health literacy. The scores for the five factors among university students surveyed in the questionnaire are illustrated in **Figure 1** below.

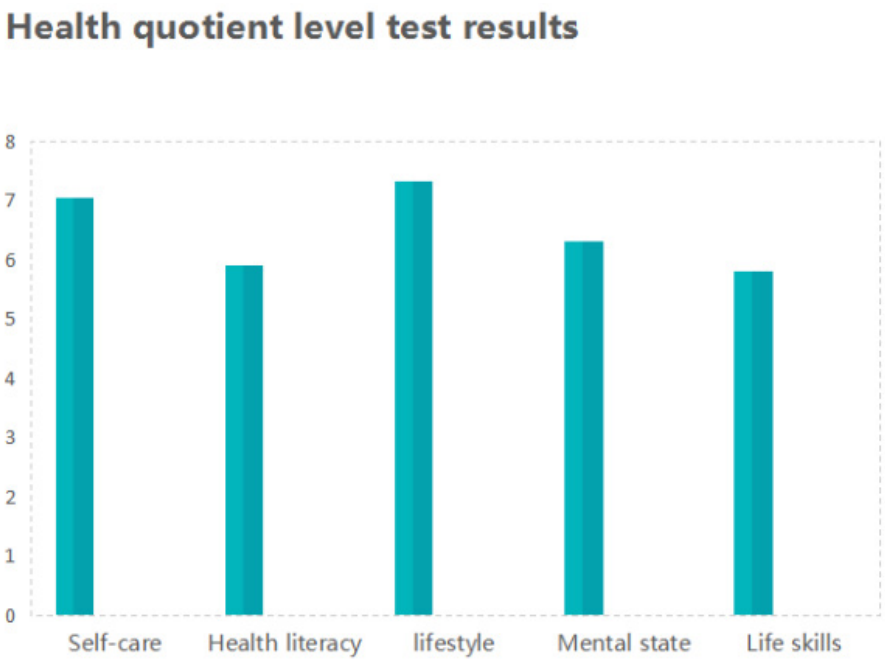

Figure 1. Health Literacy Test Results of Suzhou University School of Physical Education Students

As depicted in the above figure, the self-care (7.05), lifestyle (7.32), and mental state (6.31) of Suzhou University School of Physical Education students are in a relatively ideal state, with particularly high scores in self-care and lifestyle factors, placing them above the overall average level. However, health knowledge (5.89) and life skills (5.79) among university students are notably lower than the overall average score, indicating a level of concern. A deficiency in health knowledge and life skills is detrimental to the healthy development of university students, warranting particular attention.

Based on the questionnaire survey results, a distribution chart of health literacy levels among Suzhou University School of Physical Education students was constructed, with detailed findings illustrated in **Figure 2**.

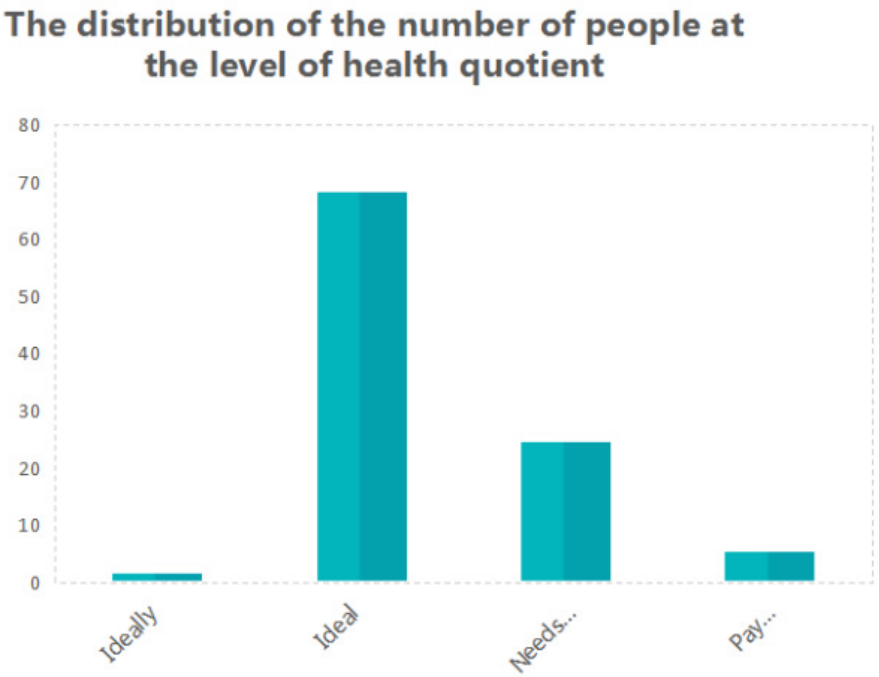

Figure 2. Distribution of Health Literacy Levels among Suzhou University School of Physical Education Students

As illustrated in the above figure, the distribution of health literacy levels among university students generally exhibits a pattern of predominance in the middle range, with fewer individuals at the extremes. The majority of students, comprising 68.2%, fall within the "good" level, followed by 24.7% at the "needs attention" level, 5.46% at the "requires special attention" level, and 1.64% at the "excellent" level. Suzhou University School of Physical Education students, overall, demonstrate a relatively favorable health literacy level falling within the range of 6-8.99 points, indicating a commendable practical engagement with the five key elements of health literacy. However, for those students whose scores fall below 6 points, special attention is required to address deficiencies in their health practices. This outcome also underscores the significant room for improvement among university students in this aspect, suggesting ample opportunities for reform and development in university physical education programs.

3.2 Comparative Analysis of Health Literacy Test Indices among University Students of Different Genders

Table 2 presents the scores of the five major health literacy factors for university students of different genders at Suzhou University School of Physical Education.

Table 2. Comparative Analysis of Health Literacy Indices among University Students of Different Genders at Suzhou University School of Physical Education

	Males $X \pm SD$	Females $X \pm SD$
Self-care	7.01±0.99	7.11±0.98
Health knowledge	6.72±1.03	6.54+1.06
Lifestyle	6.92±1.11*	7.31±0.95
Mental state	6.54±0.91*	6.11±0.99
Life skills	5.52±0.97	5.92±0.85

Note: * indicates statistically significant difference compared to females at $p < 0.05$.

The data presented in the table above indicate significant differences between male and female university students in terms of lifestyle and mental state factors. A comparative analysis of health literacy

scores between male and female students reveals that male students exhibit relatively lower scores in the lifestyle index. This index reflects a lack of regularity in the lifestyles of male university students, indicating a failure to establish healthy living habits and dietary hygiene practices, which may inevitably impact their overall health development. On the other hand, female university students demonstrate relatively lower scores in the mental state index. This data suggests that females lack confidence in their daily lives and studies, indicating weaker psychological resilience compared to males. Addressing these deficiencies in mental state, it is imperative to actively guide female students towards cultivating robust psychological resilience and to delineate clear developmental paths for their personal and academic growth.

3.3 Comparative Analysis of Health Literacy Test Indices among University Students of Different Academic Years

Table 3 presents the analysis of variance for the five factors of health literacy among students of different academic years at Suzhou University School of Physical Education. The detailed contents are as follows.

Table 3. Comparative Analysis of Health Literacy Indices among Students of Different Academic Years at Suzhou University School of Physical Education

	Freshmen$X \pm SD$	Sophomores$X \pm SD$	Juniors$X \pm SD$	Seniors$X \pm SD$
Self-care	7.06±1.01	7.62±0.89	7.01±0.84	7.06±0.99
Health knowledge	6.23±1.02	6.97±1.11	6.26±1.04	6.28±0.99
Lifestyle	7.11±0.94	7.33±0.99	7.15±0.96	7.17±1.11
Mental state	6.11±0.93	6.42±0.98	6.17±1.03	6.19±1.12
Life skills	5.89±0.94	5.91±0.96	5.72±1.14	5.90±1.03

The results of the indices obtained from the table above clearly indicate significant differences among university students of different academic years at the School of Physical Education. Particularly notable is the significant difference observed between sophomore students and those in the other three academic years. Sophomore students exhibit notably higher scores in the indices of self-care and health knowledge. This is particularly evident during the sophomore year, which marks a pivotal stage in the growth and development of university students. During this period, students' cognitive abilities and knowledge acquisition skills are continuously improving, as they adapt to the fundamental aspects of university life. Sophomore students typically experience less pressure as they have not yet reached their final year, and they often enjoy a vibrant university life with diverse interests and hobbies, leading them to prioritize self-care and health knowledge. The indices in the table reflect relatively lower overall health literacy levels among students in their third and fourth years of study[9]. This data suggests that current physical education efforts in universities tend to focus more on the educational content for freshmen and sophomores, possibly neglecting the needs of students in their third and fourth years. Physical education activities for students in their third and fourth years are evidently insufficient to meet their basic physical education requirements. As senior students face not only immense academic pressures but also complex social and professional pressures, their health literacy levels are inevitably affected by the multifaceted stressors they encounter.

4. Conclusion and Recommendations

4.1 Conclusion

(1) Overall, the health literacy levels of modern university students tend to be relatively low, particularly in terms of life skills and health knowledge factors, which fail to reach an optimal state. This poses challenges to the holistic development of university students' health. Analysis across genders, academic years, and majors reveals significant disparities in health literacy levels among university students[10].

(2) Modern university students generally recognize the importance of health literacy, as indicated by survey results showing that the majority of them consider self-care influencing factors to be crucial for their physical and mental health development. However, overall, the health literacy levels of modern university students are not high, indicating a lack of

comprehensive understanding of the importance of the five health literacy influencing factors and a deficiency in necessary cultivation methods within physical education learning.

(3) Due to inadequate physical education and sports activities, modern university students commonly exhibit unhealthy habits such as improper dietary structures and lack of exercise, which negatively impact their physical and mental health development[11]. While schools can somewhat improve students' mental well-being through physical education efforts, the overall effect is limited. Therefore, schools should focus on addressing the lowest-scoring life skills index in health literacy through targeted educational interventions.

4.2 Recommendations

(1) Establishing a New Concept of Health Literacy Education

The concept of health literacy is a systematic response to physical health issues, with health literacy levels reflecting the quality of health literacy. Enhancing the health literacy levels of university students is conducive to improving their understanding of health knowledge and holistic physical education. In the reform of modern university physical education, health literacy should be placed at a pivotal position. While constructing the concept of health literacy, efforts should be made to help students understand and master fundamental knowledge related to physical health, enhance their interest in physical activities, and encourage them to actively engage in learning health knowledge and participating in physical activities. Educational reforms in universities should not only focus on the application of students' physical skills and the conduct of physical activities but also utilize health literacy thinking to analyze the actual effects of physical skills and activities[12]. All types of physical education reform activities should be centered on improving the health literacy levels of university students, enhancing the quality of physical and health education, abandoning theoretical content in traditional physical education that contradicts health literacy, and focusing on the development of students' physical and health conditions.

(2) Developing New Textbooks Suitable for Physical Education Reform

In the foundational theoretical courses of modern university physical education, health literacy education should take precedence, and the learning content of health literacy knowledge should run through the entire theoretical teaching process. The development of health literacy theory teaching should adhere to the basic principle of gradual progression[13]. Given the varying levels of physical health knowledge mastery among university students in different academic years, this work should adhere to the objective cognitive laws. When compiling theoretical textbooks for physical education reform, educational authorities should insist on combining theoretical knowledge with practical application. In addition to mastering theoretical knowledge, university students should be able to apply what they have learned in practice and demonstrate the practical utility of physical health knowledge. The theoretical courses in physical education reform should aim to cultivate high-quality talents for socialist modernization, allowing contemporary university students to understand health literacy knowledge, master physical and health content, ultimately adopt healthy lifestyles and behavior habits in line with the five health literacy factors, improve their quality of life, and promote their comprehensive physical and mental development.

(3) Enriching the Content of Physical Education Teaching

Traditional physical education teaching content in universities has mainly focused on competitive sports. In physical education reform centered on health literacy, it is essential to prioritize teaching content that fosters health literacy capabilities[14]. Based on the concept of health literacy and the development philosophy of lifelong physical health, university physical education courses should pay attention to individual differences among students. Differences in students' achievements in the same physical activity should be understood, and personalized health literacy cultivation programs should be formulated accordingly. Teaching content should not only cater to students' interests in physical activities but also aim to achieve the goal of physical health development[15]. Under the guidance of health literacy concepts, university physical education should integrate physical fitness activities into physical education courses to promote physical health development while providing entertainment and leisure. It is crucial to recognize that health literacy

physical education teaching differs from traditional competitive sports and places more emphasis on the connection between physical, life, and psychological aspects, aiming to cultivate healthy lifestyle habits.

(4) Enhancing the Content of Physical Education Teaching Courses

The ultimate goal of health literacy physical education reform is the self-development and growth of university students. The curriculum of health literacy physical education should encompass education on physical knowledge, personality development through sports, emotional education through sports, institutionalization of physical education, and training in physical skills. Various physical education courses each have their unique characteristics but are also part of the health literacy physical education curriculum. Through their combined efforts, they can promote the formation of healthy physical habits among students[16]. In the improvement of physical education reform courses, there should be a shift from traditional teaching models to ones with deeper teaching connotations and characterized by diversity and flexibility[17]. Physical education teaching courses aimed at enhancing the health literacy levels of university students should include foundational physical education courses, courses on personal health, courses on appreciating sports skills, training courses, and courses on health education through physical activities, catering to the diverse needs of university students.

(5) Establishing a Comprehensive Evaluation System for Physical Education Teaching Courses

The curriculum evaluation system is a crucial indicator for measuring the quality of physical education teaching work. Through this system, the progress of physical education teaching tasks can be assessed, and based on the evaluation results, targeted adjustments can be made to the content of physical education courses. Under the guidance of health literacy principles, the curriculum evaluation work should be detailed, delving into the actual situations of students participating in physical education reform courses. It should involve quantitative evaluation and propose improvements and adjustments to the curriculum based on the actual evaluation results. Utilizing the quality results of curriculum evaluation, students should be encouraged to grow, ensuring that each student masters the content of physical health knowledge, promotes their comprehensive physical and mental development, and possesses strong self-adjustment capabilities to adapt to changes in society. The curriculum evaluation system should comprise several key points, including students' cognitive understanding of the curriculum, emotional expression, and behavioral habits, ensuring the practical effectiveness of health literacy courses[18].

(6) Strengthening the Health Literacy of Physical Education Teachers

The reform of physical education guided by health literacy principles requires a large number of highly qualified educators with a health literacy culture. Only when physical education teachers possess high health literacy can they fully understand the ideas conveyed by health literacy concepts and apply them comprehensively to physical education teaching work. The modernization of physical education reform in universities should pay special attention to the influence of physical education teachers. Frontline physical education teachers are the ultimate implementers and organizers of health literacy physical education teaching work. Therefore, enhancing the health literacy levels of physical education teachers is crucial. Physical education teachers should also recognize their pivotal role in educational reform work, continuously improve their health literacy and comprehensive abilities, meet the basic requirements of physical education teaching reform, and play a guiding role.

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