

Theoretical Analysis and Effect Evaluation Exploration of the Practical Application of Physical Education Teaching from the Perspective of Embodied Cognition

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Abstract: The theory of embodied cognition breaks through the shackles of the traditional disembodied cognition paradigm, establishes the organic unity of the body, environment and cognition, and provides a new theoretical support for the reform of physical education teaching. Physical education teaching inherently possesses the core characteristic of embodiment, and the active participation of the body and the generation of sports experience are the key carriers for the realization of teaching objectives. Based on the core essence of the embodied cognition theory, this paper deeply analyzes its internal logical consistency with physical education teaching, systematically explores the practical paths of physical education teaching from the perspective of embodied cognition, and constructs a scientific and perfect effect evaluation system, so as to provide theoretical reference and practical guidance for improving the quality of physical education teaching and promoting the all-round physical and mental development of students.

Keywords: Embodied Cognition; Physical Education Teaching; Practical Paths

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1 Introduction

Under the background of the advancement of quality-oriented education and the implementation of the Healthy China 2030 Plan Outline, the core goal of physical education teaching has transformed from a single skill teaching to the coordinated development of students in multiple aspects. However, the current practice of physical education teaching is facing multiple dilemmas: first, the teaching model is rigid, adopting the one-way transmission model, ignoring students' subjective experience and personalized needs; second, the teaching content has structural defects, which are disconnected from students' reality and interests; third, the evaluation mechanism is imperfect, with a single dimension, focusing on skill quantification, and insufficient evaluation at the qualitative level. These problems restrict the educational value of physical education teaching and have a gap with the requirements of the new era reform. The theory of embodied cognition breaks the traditional research paradigm and emphasizes that cognition is a product of the interaction between the body and the situation. Physical education teaching takes physical activity as the core, which is consistent with the theory of embodied cognition. Integrating this theory into physical education teaching can solve the dilemmas of traditional teaching and promote all-round innovation. Therefore, this research is of great significance for enriching the theory of physical education teaching, improving the quality of practice, and promoting the development of students' core physical education literacy.

2 Core Connotation of Embodied Cognition Theory and Its Internal Consistency with Physical Education Teaching

2.1 Core Connotation of Embodied Cognition Theory

Originating in the field of cognitive science in the 1980s, the theory of embodied cognition is based on Merleau-Ponty's phenomenology and Dewey's pragmatist philosophy. It is a profound criticism and fundamental transcendence of the disembodied tendency of traditional cognitive science. Traditional cognitive science regards cognition as an isolated function of the brain, analogous to the computer information processing model, one-sidedly emphasizing the abstractness and logic of cognition, while ignoring the key role of physical structure, experience and environmental factors. In contrast, the theory of embodied cognition holds that cognition is not an abstract existence separated from the body, but a dynamic generative process of collaborative interaction between the body, environment and brain. Its core essence is reflected in three aspects: first, the body is the basic carrier of cognition. The generation and development of cognition depend on the coordinated operation of the body's perception, movement and nervous system. The body's physiological structure, sensory functions and practical experience directly determine the content, form and development direction of cognition. Second, the situation is the generative field of cognition. Cognition arises and develops in specific physical and socio-cultural environments. Environmental factors are transformed into an important part of cognition through physical perception and action intervention. Cognition divorced from the situation is only a rigid theoretical symbol and has no practical value. Third, interaction is the driving force for cognitive development. The essence of cognitive development is a process of continuous interaction between the body, the environment and others. Through active action practice, collaborative communication and environmental adaptation, cognition is enriched, deepened and reconstructed.

2.2 Internal Consistency between Embodied Cognition and Physical Education Teaching

Physical education teaching is an educational activity that takes physical activity as the main means and aims at promoting the all-round physical and mental development of students. Its essential characteristics have a high degree of internal logical consistency with the theory of embodied cognition, which is mainly reflected in the following three aspects:

First, the core carriers are consistent. One of the core viewpoints of the embodied cognition theory is to regard the body as the core

carrier of cognition, and cognition divorced from the body loses the foundation for generation and development. The core characteristic of physical education teaching is to take physical activity as the main means, and the development of the teaching process and the realization of goals are premised on students' physical participation. Whether it is the skill learning of track and field, ball games, gymnastics and other projects, or the cultivation of basic motor ability, students need to complete it through sensory perception, physical practice and experience accumulation. In physical activities, students not only improve their physical quality, but also form an intuitive cognition of sports skills and precise control of their physical state, which is highly consistent with the core viewpoint of the embodied cognition theory.

Second, the situation dependence is unified. The theory of embodied cognition emphasizes the decisive role of the situation in the generation and development of cognition, and cognition divorced from a specific situation has no practical value. Physical education teaching itself is highly situational. Teaching activities need to rely on specific venues, equipment and group environments, and different sports projects need to be matched with exclusive situations. In specific teaching situations, students can more intuitively and deeply understand sports rules, master skills and form practically meaningful sports cognition through interaction between the body, the environment and peers, which is completely consistent with the situational requirements of the embodied cognition theory.

Third, the interactive generativity is collaborative. The theory of embodied cognition holds that the driving force for cognitive development comes from the continuous interaction between the body, the environment and others, and cognition is continuously enriched and deepened in dynamic interaction. The essence of physical education teaching is a multi-dimensional interactive process, covering multi-dimensional interactions between teachers and students, between students, between students and equipment, and between students and the environment. These interactions are intertwined, jointly promoting the deepening of students' sports cognition and the improvement of skills, which is highly collaborative with the interactive generative characteristics of the embodied cognition theory.

3 Practical Application Paths of Physical Education Teaching from the Perspective of Embodied Cognition

Based on the core essence of the embodied cognition theory and its internal logical consistency with physical education teaching, combined with the current teaching dilemmas such as single goal, content divorced from situation, rigid methods and insufficient environmental interaction, this paper systematically explores the practical paths of physical education teaching from the perspective of embodied cognition from four core dimensions: teaching goals, content, methods and environment, and constructs an integrated teaching implementation system of goal guidance - content support - method innovation - environment guarantee.

3.1 Reconstructing Teaching Goals: Highlighting the Development Orientation of the Unity of Body and Mind

Traditional physical education teaching goals focus on the mastery of sports skills and the improvement of physical quality, ignoring the development of cognitive and emotional aspects. Physical education teaching from the perspective of embodied cognition needs to break the single orientation, reconstruct a diversified goal system of the unity of body and mind, and realize the organic unity of physical development, cognitive improvement and emotional cultivation.

In terms of physical development, we should not only pay attention to the systematic improvement of students' core physical quality such as speed, strength and endurance, but also focus on the refined cultivation of physical perception and motor coordination ability. Through diversified perception training, guide students to accurately perceive their physical movement state and muscle exertion rhythm, proficiently master physical control methods, and improve flexibility, coordination and balance ability. In terms of cognitive improvement, it is necessary to break the tendency of emphasizing skills over cognition, guide students to form in-depth cognition through sports practice, understand the connotation of sports rules, technical principles and tactical logic, and cultivate sports thinking and problem-solving ability. In terms of emotional attitude, it is necessary to pay great attention to students' sports emotional experience, cultivate sports interest, team cooperation awareness, competitive awareness and frustration resistance ability, guide students to establish a correct competitive concept, and cultivate good sports morality.

3.2 Optimizing Teaching Content: Constructing a Situational Content System

Traditional physical education teaching content has problems such as being divorced from students' daily life, insufficient interest and practicality, which is difficult to stimulate learning initiative. Physical education teaching content from the perspective of embodied cognition should be based on students' living situations and cognitive needs, construct a situational system, and enhance the interest, practicality and pertinence of the content.

On the one hand, we should deeply tap the resources of daily physical education, construct a linkage mechanism between daily life situations and physical education teaching, integrate daily sports scenarios and needs into teaching content, and cultivate students' daily sports habits and self-protection ability. On the other hand, according to the physical development characteristics, cognitive level and sports interest preferences of students of different age groups, design teaching content hierarchically: for primary school students, focus on gamified sports projects, emphasizing the cultivation of physical perception ability and sports interest; for middle school students, increase the difficulty of skills and tactical content, and strengthen the cultivation of sports thinking and team cooperation ability. At the same time, integrate regional traditional sports projects to enrich the teaching content system and enhance cultural connotation.

3.3 Innovating Teaching Methods: Adopting Experiential Teaching Modes

Traditional physical education teaching methods mainly rely on teachers' demonstration and students' imitation. Students are in a passive learning state, which makes it difficult to form in-depth cognition and emotional experience. Physical education teaching from the perspective

of embodied cognition should innovate methods and adopt experiential teaching modes to guide students to generate sports cognition through active physical practice and situational interaction.

First, situational simulation teaching method. Construct sports situations according to the teaching content, guide students to carry out practice in the situations, and master skills and understand tactical connotation in interaction. Second, cooperative inquiry teaching method. Organize students to carry out cooperative inquiry in groups, solve problems in sports through practical verification, exchange and discussion, and cultivate cooperative ability and problem-solving ability. Third, sports imagery training method. Guide students to combine physical perception with imagination, and improve the efficiency and quality of action mastery through the process of observing demonstrations, closing eyes to imagine and practical verification.

3.4 Creating Teaching Environment: Building an Interactive Teaching Field

The theory of embodied cognition emphasizes the important role of the situation in cognitive generation. Therefore, physical education teaching from the perspective of embodied cognition should pay attention to the creation of teaching environment, build an interactive teaching field, and provide good supporting conditions for students' physical practice and cognitive generation.

In terms of the construction of physical environment, optimize the configuration of venues and equipment, reasonably arrange venues according to teaching needs to ensure safety and practicality; enrich the types of equipment, set up hierarchical practice areas to meet the needs of students at different levels; equip characteristic sports equipment to enhance the cultural connotation and interest of teaching. In terms of the construction of social environment, build a harmonious relationship between teachers and students and between students, teachers transform into guides and participants, take the initiative to participate in practice and provide targeted guidance; guide students to respect and help each other, forming a good team atmosphere. In addition, use multimedia technology to assist teaching, intuitively display the connotation of skills and tactics through videos and animations, and enhance the interactivity of the teaching environment.

4 Construction of Effect Evaluation System for Physical Education Teaching from the Perspective of Embodied Cognition

The traditional effect evaluation of physical education teaching takes the achievement of sports skills as the core indicator, which has problems such as single dimension and rigid methods, and it is difficult to fully reflect the physical and mental development of students. The evaluation from the perspective of embodied cognition should follow the principles of comprehensiveness, scientificity and objectivity, construct a diversified system covering three dimensions: physical development, cognitive improvement and emotional attitude, and adopt a method combining quantitative and qualitative evaluation to comprehensively and accurately evaluate the teaching effect.

4.1 Determination of Evaluation Dimensions

Physical development dimension. It mainly evaluates the improvement effect of students' physical quality, physical function and sports skills. The core indicators include: physical quality (speed, strength, endurance, sensitivity, etc.), physical function (cardiopulmonary function, muscle endurance, etc.), sports skills (mastery degree and application ability of basic project skills). Conduct standardized tests with professional physical education testing instruments to ensure the objectivity and accuracy of evaluation data.

Cognitive improvement dimension. It mainly evaluates the development of students' sports cognition. The core indicators include: mastery degree of sports knowledge (rules, principles, tactical connotation, etc.), sports thinking ability (tactical judgment, problem-solving, etc.), sports transfer ability (cross-scenario application ability of skills and cognition). Evaluation can be carried out through written tests, situational tests, semi-structured interviews and other methods.

Emotional attitude dimension. It mainly evaluates the changes in students' emotional experience and attitude cultivation. The core indicators include: sports interest (participation enthusiasm, initiative to exercise, etc.), team cooperation awareness (willingness to cooperate, communication ability, etc.), competitive and frustration resistance ability (winning and losing attitude, perseverance, etc.), sports morality (rule awareness, respect for others, etc.). Evaluation can be carried out through standardized questionnaires, classroom observation, growth portfolios and other methods.

4.2 Selection of Evaluation Methods

Quantitative evaluation method. It is suitable for the evaluation of quantifiable indicators, with the characteristics of strong objectivity and intuitive data. In the physical development dimension, professional instruments are used to carry out standardized tests; in the cognitive improvement dimension, quantitative evaluation is carried out through written tests and situational tests; in the emotional attitude dimension, standardized scales are used to carry out questionnaires.

Qualitative evaluation method. It is suitable for the evaluation of indicators that are difficult to quantify, and can fully reflect students' subjective experience and development changes. In the cognitive improvement dimension, understand students' cognitive development through interviews and observations; in the emotional attitude dimension, comprehensively record changes in students' emotional attitude by combining observation methods and growth portfolio methods.

4.3 Design of Evaluation Process

The effect evaluation of physical education teaching from the perspective of embodied cognition should follow the whole process of pre-event - in-event - post-event to ensure the comprehensiveness and accuracy of the evaluation. Pre-event evaluation focuses on students' initial state, providing benchmark data for teaching plan design and subsequent evaluation; in-event evaluation runs through the teaching process, timely grasping learning progress and adjusting teaching plans; post-event evaluation carries out comprehensive review, summarizes teaching effects and provides reference for subsequent optimization. At the same time, establish a sound evaluation feedback mechanism,

timely feed back the results to teachers and students, guide students to clarify their shortcomings and stimulate motivation, and help teachers summarize experience and optimize strategies.

5 Conclusion

The theory of embodied cognition is logically consistent with physical education teaching, providing theoretical support for the innovation of physical education teaching. From the perspective of embodied cognition, physical education teaching should reconstruct the goal of the unity of body and mind, optimize situational content, innovate experiential methods, create an interactive environment, and realize the unity of students' physical, cognitive and emotional development. At the same time, construct a multi-dimensional evaluation system with three dimensions, integrate quantitative and qualitative evaluation, and comprehensively and scientifically evaluate the teaching effect. Although the theory of embodied cognition provides guidance for physical education teaching, there are still problems to be explored in practice. Future research can focus on four points: explore the connection points between sports projects and the theory, and design targeted schemes; strengthen the empirical research on teaching models to verify their effectiveness and feasibility; optimize the evaluation system combined with new technologies to improve scientificity and accuracy; explore the application paths of the theory in physical education teaching of special education. With the deepening of research, the theory of embodied cognition will play a greater role in physical education teaching, promoting the improvement of teaching quality and quality-oriented education.

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