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Practical Dilemmas and Optimization Paths of Dynamic Hierarchical Teaching in University Badminton Special Courses：A Case Study of Zhaoqing University

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Abstract

To optimize the practice of dynamic hierarchical teaching in the badminton special class of Zhaoqing University, this study conducts a systematic analysis based on teaching scenarios, survey data, and teacher-student interview materials. The results show that the implementation of this teaching model is confronted with four core dilemmas: the imperfect hierarchical evaluation system impedes accurate stratification; the supply-demand mismatch of teaching resources restricts the quality improvement of the advanced-level cohort; the absence of an inter-level interaction mechanism fails to unleash synergistic effects; and teachers' insufficient competence in hierarchical teaching leads to low adaptability. Accordingly, this study constructs a four-dimensional coordinated optimization path of "Evaluation-Resource-Interaction-Teacher", which specifically involves improving the multi-dimensional dynamic evaluation system, balancing the allocation of hierarchical teaching resources, establishing a regular inter-level interaction mechanism, and enhancing teachers' specialized teaching capabilities. With strong pertinence and operability, this path provides practical references for the hierarchical teaching of physical education special courses in Zhaoqing University and other local colleges and universities. In the future, tracking the implementation effects for dynamic optimization will help promote the quality of physical education teaching in universities.

Keywords

Universities; Badminton; Dynamic hierarchical teaching; Optimization paths

1. Introduction

The National Standards for Teaching Quality of Undergraduate Majors in Institutions of Higher Education (Physical Education Discipline) explicitly stipulates that physical education specialized courses should "be grounded in students'

individual differences and establish a differentiated teaching system", which defines the core direction for the reform of university badminton specialized courses [1]. In the transition period of higher education quality improvement, students enrolled in badminton specialized courses exhibit multi-dimensional heterogeneity in terms of technical foundation, learning ability, and development demands. The traditional homogeneous teaching model not only leads to insufficient sense of achievement among students with weak foundations but also fails to meet the development needs of high-level students, thus becoming a key bottleneck that restricts teaching quality and the cultivation of students' core physical education literacy.Supported by differentiated teaching theory and constructivist learning theory, dynamic hierarchical teaching takes "students' differences as the logical starting point and dynamic adjustment of teaching elements as the core approach" as its essential tenet. Its advantages in optimizing teaching adaptability and stimulating learning motivation have been verified in various physical education courses. Nevertheless, in the context of badminton specialized courses, it still faces common challenges such as inaccurate hierarchical evaluation, unbalanced resource allocation, and inadequate teacher competence.As a local comprehensive application-oriented university in Guangdong Province, Zhaoqing University’s practice of dynamic hierarchical teaching in badminton specialized courses is both representative and typical. Taking this university as a case study, this research systematically analyzes practical dilemmas and constructs optimization paths. It not only provides an operable teaching reform plan for Zhaoqing University but also offers a replicable practical paradigm for peer institutions. Meanwhile, it enriches the empirical results of differentiated teaching theory in physical education specialized courses, refines its application rules in application-oriented universities, and provides theoretical support for improving the framework of differentiated teaching in physical education.

2. Research Objects and Methods

2.1. Research Objects

A total of 100 students taking the badminton specialized course from Grade 2022 and Grade 2023 of Zhaoqing University were selected as the core research objects, including 74 males and 28 females. These students were divided into two levels: the elementary level (with weak foundations, 52 students) and the advanced level (with intermediate or above proficiency, 48 students). All research objects had fully participated in dynamic hierarchical teaching for one complete semester. Meanwhile, 2 course instructors were selected as interviewees, consisting of 1 associate professor and 1 lecturer. Both instructors had over 3 years of teaching experience in badminton specialized courses and were familiar with the implementation process of dynamic hierarchical teaching.

2.2. Research Methods

2.2.1. Questionnaire Survey Method

Questionnaires were distributed to the 100 students, and 95 valid questionnaires were retrieved, resulting in an effective recovery rate of 95%. A pre-survey was conducted among 30 students to verify the reliability and validity of the questionnaire. The results showed that the Cronbach's α coefficient was 0.81 and the KMO value was 0.77, which are in line with academic research norms, indicating good reliability and validity of the questionnaire.

2.2.2. Interview Method

A semi-structured interview outline was designed. Focusing on core issues such as hierarchical evaluation criteria, teaching resource allocation, teachers' instructional competence, and dynamic adjustment mechanisms, one-on-one in-depth interviews were conducted with the 2 teachers and 15 student representatives (8 from the elementary level and 7 from the advanced level). Each interview lasted 15–20 minutes. The entire interview process was recorded and transcribed into textual materials, from which key viewpoints and core information were extracted.

2.2.3. Data Statistics Method

Excel was used to conduct percentage statistics on the questionnaire data, sorting out the perceptions and feedback of students at different levels and teachers regarding dynamic hierarchical teaching. Combined with the interview materials, inductive refinement and cross-validation were carried out, providing solid empirical support for identifying practical dilemmas and constructing optimization paths.

3. Current Situation and Effectiveness of Dynamic Hierarchical Teaching Practice in the Badminton Special Class of Zhaoqing University

3.1. Current Situation

Table 1. Student Feedback on Current Situation

First-Level Dimensions	Specific Content	Elementary Level (n=52)	Advanced Level (n=43)	Overall (n=95)
Hierarchical Implementation Process	Pre-hierarchical evaluation adopts "technical test + learning willingness questionnaire"	43 （82.7%）	35 （81.4%）	78 （82.1%）
	Perceive that hierarchical results match their own level	40 （76.9%）	31 （71.3%）	71 （74.7%）
Adaptability of Teaching Content and Methods	Perceive that the difficulty of teaching content at their respective levels is appropriate	44 （84.6%）	33 （77.1%）	77 （81.1%）
	Recognize the effectiveness of teaching methods at their respective levels	43 （82.7%）	32 （74.4%）	75 （78.9%）
Resource Allocation	Basic training resources (rackets, venues, etc.) can meet needs	37 （69.2%）	28 （65.1%）	65 （68.4%）

	Advanced training resources (tactical analysis tools, etc.) are highly accessible	21 （40.4%）	19 （44.2%）	40 （42.1%）
Dynamic Adjustment Mechanism	Recognize the current adjustment cycle based on "semester"	34 （65.4%）	26 （60.5%）	60 （63.2%）
	Hope to shorten the hierarchical adjustment cycle	13 （25.0%）	12 （27.9%）	25 （26.3%）

As can be seen from Table 1, overall, among the 95 surveyed students, 78 (82.1%) reported that the pre-hierarchical evaluation adopted the method of "technical test + learning willingness questionnaire", and 71 (74.7%) recognized that the hierarchical results matched their own level. These findings indicate that the hierarchical evaluation process of the badminton special class in Zhaoqing University has high feasibility and acceptance, laying a solid foundation for the orderly advancement of dynamic hierarchical teaching. However, the overall proportion of students who perceived high accessibility of advanced training resources was only 42.1% (40 students), the lowest among all indicators. This data reveals the core shortcoming of insufficient supply of advanced competitive teaching resources in the current practice.From the perspective of hierarchical comparison, the recognition rates of elementary-level students (n=52) for the adaptability of teaching content difficulty (84.6%, 44 students) and the effectiveness of teaching methods (82.7%, 43 students) were significantly higher than those of advanced-level students (n=43), which stood at 77.1% and 74.4% respectively. This difference stemmed from the fact that elementary-level students focused on basic skill acquisition, and the teaching strategy of "demonstration and explanation + repetitive practice" accurately matched their learning needs, resulting in a stronger perception of adaptability. In contrast, advanced-level students emphasized the improvement of advanced skills and tactics, but the advancement of existing teaching content and methods failed to fully meet their needs, leading to relatively lower recognition rates.There were obvious differences between the two groups in feedback on resource allocation and dynamic adjustment mechanisms. In the dimension of resource allocation, the satisfaction rate of elementary-level students with basic training resources was 69.2% (37 students), slightly higher than that of advanced-level students (65.1%, 28 students). Meanwhile, the recognition rate of advanced-level students for advanced training resources reached 44.2% (19 students), slightly higher than that of elementary-level students (40.4%, 21 students). This phenomenon verified the multi-dimensional heterogeneity of students' needs: elementary-level students focused on basic resource guarantee, while advanced-level students paid more attention to competitive resource support. In the dimension of dynamic adjustment, compared with elementary-level students, the proportion of advanced-level students who hoped to shorten the hierarchical adjustment cycle was slightly higher (27.9% vs. 25.0%). This reflects that advanced-level students have a faster pace of technical improvement and a more urgent demand for timeliness of hierarchical adjustment, and the current

adjustment cycle based on "semester" has been difficult to fully meet their advanced learning needs.

3.2. Practice Effectiveness

Table 2. Student Feedback on Practice Effectiveness

First-Level Dimensions	Specific Content	Elementary Level（n=52）	Advanced Level（n=43）	Overall（n=95）
Improvement of Teaching Pertinence	Perceive that hierarchical teaching matches personal learning needs	45（86.5%）	27（62.8%）	72（75.8%）
Enhancement of Learning Participation	Frequency of taking the initiative to participate in extracurricular training has increased significantly	40（76.9%）	26（60.5%）	66（69.5%）
Improvement of Technical Proficiency	Basic/advanced skills have improved significantly	42（80.8%）	27（62.8%）	69（72.6%）
	Flexibility in technical application (in actual combat/competitions) has been significantly enhanced	38（73.1%）	29（67.4%）	67（70.5%）

The data in Table 2 shows that the practical effectiveness of dynamic hierarchical teaching presents distinct overall characteristics: the overall recognition rates of the three core indicators—improvement of teaching pertinence, enhancement of learning participation, and improvement of technical proficiency—all exceed 69%. Among them, the adaptability of teaching pertinence reaches 75.8% (72 students), and the recognition rate of improved flexibility in technical application stands at 70.5% (67 students). These figures indicate that the practical value of this teaching model has been recognized by most students, which is highly consistent with the implementation goal of "precisely adapting to students' differences and improving teaching quality".From the perspective of hierarchical comparison, the recognition rates of elementary-level students for the core effectiveness indicators are significantly higher than those of advanced-level students. In terms of the adaptability of teaching pertinence, the recognition rate of elementary-level students is 86.5% (45 students), far exceeding that of advanced-level students at 62.8% (27 students). This difference stems from the more prominent predicament of "insufficient sense of learning gain" among elementary-level students under the traditional homogeneous teaching model. Through the provision of basic and targeted teaching content, hierarchical teaching effectively solves the problem of "being unable to keep up", thus fostering a stronger sense of gain and recognition among these students. In the dimension of learning participation, 76.9% (40 students) of elementary-level students reported a significant increase in the frequency of taking the initiative to participate in extracurricular training, which is 16.4% higher than that of advanced-level students (60.5%, 26 students). This reflects that the rapid consolidation of basic skills has significantly boosted the learning confidence and participation enthusiasm of elementary-level students.Notably, in the dimension of technical proficiency improvement, the recognition rates of both groups remain at a relatively high level. A total of 42 elementary-level students (80.8%) acknowledged marked progress in basic skills, which is mainly reflected in the proficient mastery of core fundamental skills such as

serving and clear shots. Meanwhile, 27 advanced-level students (62.8%) recognized the improvement of advanced skills, primarily manifested in the optimization of smash-drop combinations and tactical coordination capabilities. This fully demonstrates the effectiveness of hierarchical teaching in "teaching students in accordance with their aptitude"—designing differentiated teaching content based on the skill foundations of students at different levels can precisely drive the technical advancement of students across all tiers.In addition, 29 advanced-level students (67.4%) recognized the improvement of flexibility in technical application, which confirms the supporting role of the teaching strategy of "simulated confrontation + post-match review" in cultivating the practical combat capabilities of advanced students. This finding is cross-validated with the feedback from teacher interviews that "students in hierarchical teaching classes demonstrate better tactical application capabilities than those in traditional classes".

4. Practical Dilemmas of Dynamic Hierarchical Teaching in the Badminton Special Class of Zhaoqing University

4.1. Imperfection of the Hierarchical Evaluation System

The current hierarchical evaluation system for the badminton special class of Zhaoqing University has the drawbacks of "single-dimensionality of evaluation criteria, rigidity of adjustment mechanisms, and homogeneity of evaluation subjects", making it difficult to achieve the goals of precise stratification and dynamic adaptation. In terms of evaluation dimensions, the binary paradigm of "technical test + learning willingness questionnaire" is adopted, which fails to fully incorporate key dimensions such as learning ability and athletic talent, leading to evaluation deviations. Hierarchical teaching takes students' individual differences as the starting point, and scientific hierarchical standards are the prerequisite for accurately identifying differences. Single-dimensional evaluation tends to ignore personalized needs and deviate from the orientation of teaching students in accordance with their aptitude [2]. Data shows that the recognition rate of advanced-level students regarding hierarchical classification (71.3%) is significantly lower than that of elementary-level students (76.9%). Some students reported that "competitive improvement demands were not considered", which confirms the insufficient adaptability of evaluation dimensions.In terms of dynamic adjustment mechanisms, the "semester-based" cycle is highly rigid. Although 63.2% of students recognized it, 27.9% of advanced-level students demanded a shorter cycle. Dynamicity is the core characteristic of hierarchical teaching, and the adjustment cycle needs to adapt to the rhythm of skill improvement. Lack of flexibility is prone to cause hierarchical solidification [3]. The existing cycle fails to match the technical advancement rhythm of advanced-level students, resulting in the risk of "hierarchical solidification".In terms of evaluation subjects, the current model is centered on one-way judgment by teachers, lacking multi-subject participation such

as student feedback and peer evaluation, leading to the failure of evaluation to cover personalized needs. The accuracy of hierarchical evaluation relies on the collaboration of multiple subjects: students' independent feedback can provide practical information, and peer evaluation can make up for the limitations of teachers' perspectives [4], which reveals the defects of the single-subject evaluation model.

4.2. Unbalanced Allocation of Teaching Resources

The supply-demand mismatch and hierarchical imbalance of teaching resources are the core constraints restricting teaching quality, a problem that is prevalent in physical education specialized courses of local colleges and universities. Physical education funding in local institutions mostly focuses on basic resource guarantee, with insufficient investment in advanced competitive training resources, which is likely to lead to a disconnect between supply and hierarchical needs [5]. The practice of Zhaoqing University verifies this perception: the satisfaction rate with basic training resources reaches 68.4%, which can meet the needs of elementary-level students; while the accessibility of advanced training resources is only 42.1%, with the recognition rate of advanced-level students at 44.2%, significantly lower than that of basic resources.Advanced resources are the core guarantee for the technical and tactical advancement of advanced-level students. Advanced teaching of ball sports is highly dependent on resources such as tactical analysis tools, and resource scarcity will limit the depth and quality of teaching [6], becoming a key bottleneck for improving the teaching quality of advanced-level students.In terms of temporal and spatial allocation, there is a misalignment between venue opening hours and extracurricular training needs. Resource allocation has not achieved hierarchical differentiation, resulting in a significant gap in specialized resources for advanced-level students and redundant allocation of basic resources for elementary-level students. In hierarchical teaching, resource allocation needs to adapt to the needs of different levels; the lack of pertinence is likely to cause the coexistence of resource surplus and shortage, reducing resource utilization efficiency.

4.3. Lack of Cross-Level Interaction Mechanism

The current teaching adopts the paradigm of "stratified teaching and independent training", lacking effective cross-level interaction design and failing to fully exert the effectiveness of synergistic education. Cross-level interaction is the core path for students of different levels to complement each other's advantages: it can not only help elementary-level students consolidate their foundations but also enable advanced-level students to strengthen their skills and improve their explanation abilities [7], which highlights the defects of the current "segmented" model—elementary-level students lack experience guidance, while advanced-level students

lose the carrier for technical consolidation.In terms of interaction incentive mechanisms, the existing evaluation system only focuses on individual technical improvement and does not incorporate interaction participation and mutual assistance effectiveness into the indicators, resulting in insufficient internal motivation of students. In hierarchical teaching, overemphasis on individual performance in evaluation tends to weaken the sense of collaboration; incorporating interaction effectiveness into evaluation can establish positive incentives.In terms of interaction content, a small amount of informal interaction is limited to simple technical consultation, failing to form a systematic and regular system. However, cross-level interaction in hierarchical teaching needs to cover multiple dimensions such as technical assistance and establish a normalized mechanism to give full play to the synergistic effect.

4.4. Insufficiency in Teachers' Hierarchical Teaching Capabilities

There is a significant gap between teachers' professional capabilities in hierarchical teaching and the actual implementation needs, which constitutes a core shortcoming restricting teaching quality. As the core subject of hierarchical teaching, teachers' hierarchical teaching capabilities directly determine the effectiveness of implementation—these capabilities mainly include key competencies such as differentiated teaching design. The lack of such capabilities will lead to hierarchical teaching becoming a mere formality [7], highlighting that teachers' abilities fail to meet the requirements of dynamic hierarchical teaching.In terms of differentiated teaching design capabilities, although teachers can complete basic stratified teaching, they have shortcomings in differentiated content construction and teaching method innovation. The teaching content for advanced technical and tactical training of advanced-level students is insufficient, resulting in a recognition rate of only 77.1% for teaching advancement among these students. The design of hierarchical teaching for ball sports is professional; the teaching design for advanced-level students needs to focus on advanced technical and tactical training. If teachers lack corresponding capabilities, they will struggle to meet the advanced learning needs of students [5].In terms of hierarchical teaching evaluation capabilities, teachers still adopt the traditional "unified standard" paradigm and have not established a differentiated evaluation system, making it difficult to accurately measure the progress and improvement of students at different levels. Hierarchical teaching evaluation must follow the principle of "differentiated adaptation"—a single standard cannot match differences in starting points and development goals. Only by constructing a differentiated evaluation system can we accurately measure progress and exert a guiding role [4].In terms of professional development support, the university lacks specialized training on hierarchical teaching, preventing teachers from systematically mastering core skills. Systematic training is a key path to improving capabilities; its absence means teachers struggle

to grasp the core logic of hierarchical teaching.

5. Optimization Paths of Dynamic Hierarchical Teaching in the Badminton Special Class of Zhaoqing University

5.1. Improve the Hierarchical Evaluation System to Achieve Precise Stratification

Guided by the core principles of "multi-dimensional adaptation, dynamic adjustment, and multi-subject collaboration", efforts are made to address the problems of single-dimensionality, rigidity, and homogeneity in the hierarchical evaluation system. In terms of expanding evaluation dimensions, a comprehensive four-dimensional evaluation index system, namely "technical foundation + learning ability + athletic talent + development demands", is constructed. Technical foundation is quantified through standardized tests; learning ability and athletic talent are comprehensively determined by integrating classroom performance observation and phased training feedback; development demands are accurately captured via structured interviews, so as to ensure that the basis for stratification fully covers individual differences among students. Meanwhile, quantitative scoring standards for each dimension are formulated, and the weight assignment method is adopted to calculate comprehensive scores, thereby enhancing the objectivity and accuracy of evaluation results.In terms of optimizing the dynamic adjustment mechanism, a flexible cycle mechanism of "monthly monitoring + quarterly adjustment" is established. Monthly monitoring of students' development status is conducted based on data such as classroom performance and skill improvement amplitude; quarterly hierarchical adjustment is implemented by combining students' applications with teachers' evaluation results, which caters to the demand of advanced-level students for rapid technical advancement. A feedback mechanism for adjustment results is established to clarify the adjustment basis and improvement suggestions to students, so as to enhance the recognition of hierarchical adjustment.Regarding the collaboration of evaluation subjects, a multi-evaluation model characterized by "teacher-led, student self-evaluation, and peer evaluation" is established. Teachers are responsible for the quantitative evaluation of core indicators; students convey their learning experience and development demands through self-evaluation reports; peer evaluation focuses on dimensions such as technical collaboration ability and learning attitude. Through the perspective complementarity of multiple subjects, the comprehensiveness of evaluation results is effectively improved.

5.2. Balance the Allocation of Teaching Resources and Strengthen Guarantee Support

Adhering to the principles of "hierarchical adaptation, precise supply and efficient utilization", efforts are made to resolve the problems of resource supply-demand

mismatch and hierarchical imbalance. In terms of differentiated resource supply, an allocation mechanism of "basic resource guarantee + advanced resource inclination" is established. For elementary-level students, sufficient supply of basic resources such as badminton rackets, standardized courts and basic training shuttlecocks is ensured to meet their needs for basic skill acquisition. For advanced-level students, advanced resources including tactical analysis software, professional confrontation courts and competitive-grade training equipment are added, and specialized equipment managers are assigned to coordinate resources, so as to guarantee the accessibility of advanced resources. Meanwhile, a resource demand survey mechanism is built to collect feedback on resource needs from students of different levels every semester, so as to dynamically optimize the structure of resource allocation.In optimizing temporal and spatial allocation, the opening hours of venues are adjusted, and special after-class training periods (17:00-19:00) are added to give priority to meeting the needs of advanced-level students for tactical confrontation and advanced skill training. A venue usage mode of "hierarchical staggered peaks + flexible reservations" is adopted: fixed basic training periods are arranged for elementary-level students, while advanced-level students can reserve special venues through an online system, which improves the efficiency of venue utilization.In constructing the resource guarantee mechanism, efforts are made to strive for special fund support, which is mainly invested in the purchase of advanced training resources and venue upgrading. A resource management account is established to conduct regular maintenance and renewal of resources, and clear norms for resource use and division of responsibilities are defined, so as to ensure the stability and sustainability of resource supply.

5.3. Construct a Cross-Level Interaction Mechanism to Promote Common Progress

With the goals of "synergistic education, complementary advantages, and long-term effectiveness", a systematic cross-level interaction system is built. In terms of interaction content design, a three-dimensional interaction content framework of "technical assistance + tactical confrontation + experience sharing" is constructed. In the technical assistance session, advanced-level students are organized to form "mentorship pairs" with elementary-level students to provide one-on-one basic technical guidance. In the tactical confrontation session, cross-level mixed competitions are held regularly, and the tactical adaptability of both sides is improved through competitive cooperation among students of different levels. In the experience sharing session, thematic salons are set up, where advanced-level students share skill improvement experience and teachers are responsible for guidance and summary, forming a learning atmosphere of mutual assistance and common progress.In establishing the interaction incentive mechanism, the participation degree and mutual assistance effectiveness of cross-level interaction

are incorporated into the students' comprehensive evaluation system. Excellent mutual assistance groups are awarded with incentives such as priority in practical training and convenience in equipment borrowing. For advanced-level students, the effectiveness of guiding elementary-level students is linked to advanced skill assessments to stimulate their internal motivation for interaction participation.In building the interaction platform, fixed interaction periods are set at offline training venues, and an online learning and communication group is established to share training videos, tactical cases and other resources, ensuring the regular development of interaction. Teachers serve as interaction instructors to timely resolve technical differences and cooperation problems arising in the interaction process, so as to improve the quality of interaction.

5.4. Improve Teachers' Hierarchical Teaching Capabilities and Consolidate the Teaching Foundation

Taking "specialized training + teaching research empowerment + assessment incentives" as the core path, efforts are made to address the problems of insufficient teachers' capabilities and lack of development support. In constructing the specialized training system, special training courses on hierarchical teaching are offered, covering core skills such as differentiated teaching design, multi-evaluation methods, and cross-level interaction guidance. Experts with rich practical experience in hierarchical teaching are invited to conduct case-based teaching; teachers are organized to participate in seminars on hierarchical physical education teaching in colleges and universities to learn practical experience from advanced institutions, thereby upgrading their teaching concepts and practical capabilities. Meanwhile, a mentorship mechanism for new teachers by senior ones is established, where experienced teachers guide young teachers in hierarchical teaching practice to accelerate their professional growth.In building the teaching research empowerment platform, a special teaching research group for hierarchical teaching is set up to carry out regular teaching seminars. Collective lesson preparation is conducted focusing on key issues such as differentiated teaching content design and advanced technical and tactical teaching; a teaching case library is established to collect and sort out typical cases and solutions in hierarchical teaching, providing references for teachers' teaching practice.In improving the assessment and incentive mechanism, the effectiveness of hierarchical teaching implementation is incorporated into teachers' performance appraisal system, with emphasis on indicators such as the quality of differentiated teaching design, students' recognition of stratification, and the range of skill improvement. Preferential treatment is given to teachers who have achieved remarkable results in hierarchical teaching practice in professional title evaluation and selection of outstanding teachers, so as to stimulate their initiative and enthusiasm in improving hierarchical teaching capabilities.With the goals of "synergistic education, complementary advantages,

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6. Conclusions and Prospects

Based on the practice, survey data and interview materials of dynamic hierarchical teaching in the badminton special class of Zhaoqing University, this study identifies four core dilemmas in the implementation of this model: the imperfect hierarchical evaluation system hinders precise stratification, the mismatch between supply and demand of teaching resources restricts the quality improvement of advanced-level teaching, the lack of cross-level interaction mechanism fails to release synergistic effectiveness, and the insufficient hierarchical teaching capabilities of teachers lead to low adaptability. Accordingly, a four-dimensional collaborative optimization path of "evaluation-resource-interaction-teachers" is constructed, which can effectively promote the quality and efficiency of the teaching model.This path is in line with teaching practice, featuring both pertinence and operability. It provides practical guidance for the university to improve dynamic hierarchical teaching and also serves as a reference for hierarchical teaching of physical education specialized courses in local colleges and universities. In the future, the implementation effect of the optimization path can be tracked, dynamically adjusted and improved to

enhance the adaptability and sustainability of the model. It will meet the personalized development needs of students at different levels and contribute to the improvement of the quality of specialized physical education teaching in colleges and universities.

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