Design of Early Selection and Training System for Elite Athletes in Secondary Vocational College Physical Education

Wang Mu and Tajularipin Sulaiman

***Abstract*—Based on the positioning of physical education in secondary and vocational colleges and combined with the talent training practice of sports vocational colleges in recent years, this paper focuses on the construction path of the early selection and training system for elite athletes. By analyzing the realistic foundation, core dilemmas and theoretical support of current selection and training work, the paper designs a system framework from three aspects: selection dimensions, training modes and guarantee mechanisms, and proposes implementation strategies of scientific talent selection, integration of learning and training, and diversified guarantees. The purpose is to provide reference for secondary and vocational colleges to tap sports reserve talents, improve the integration of sports and education training mechanism, help cultivate compound sports talents with both competitive sports ability and cultural literacy, and serve the construction of a sports power.**

***Keywords*—Secondary/Vocational College Physical Education; Elite Athletes; Early Selection; Training System; Integration of Sports and Education**

I. INTRODUCTION

Under the background of deepening the integration of sports and education policies, physical education in secondary and vocational colleges has become an important position for the early training of elite athletes. Such colleges have both vocational education attributes and sports training advantages, which can not only consolidate athletes' cultural foundation but also carry out professional training. At present, many sports vocational colleges in various regions have transported a large number of outstanding talents to provincial teams and national teams through scientific talent selection and systematic training, but there are still problems such as vague selection standards and single training modes. Constructing a sound selection and training system is of great significance for improving the quality of reserve talents and extending athletes' sports career, and it is also the core starting point for secondary and vocational college physical education to empower the high-quality development of sports.

Wang Mu, Kuala Lumpur University of Science & Technology/Sichuan Sports College (Email address: 112206470@qq.com)
Tajularipin Sulaiman, Universiti Putra Malaysia, (Email address: tajulas@upm.edu.my)

II. REALISTIC FOUNDATION OF EARLY SELECTION AND TRAINING OF ELITE ATHLETES IN SECONDARY/VOCATIONAL COLLEGES

Policy Support Provides Guarantee for System Construction

In recent years, the state has continuously introduced policies for the integration of sports and education, providing a clear direction for secondary and vocational colleges to participate in the training of elite athletes. Documents such as "Opinions on Deepening the Integration of Sports and Education to Promote the

Healthy Development of Adolescents" encourage vocational colleges to cooperate with sports departments and professional teams to establish reserve talent training bases. Local governments have actively responded. For example, Hubei Sports Vocational College, relying on policy support, has set up a professional working group and established a full-process mechanism of "enrollment - test - review - admission", ensuring the fairness and impartiality of talent selection through triple audits. Qiannan Prefecture has implemented a "3+4" secondary-undergraduate connection training mode, lowering the admission threshold for sports special students and broadening the further study and development channels for elite athletes. Policy dividends have not only broken the departmental barriers of traditional sports talent training but also promoted secondary and vocational colleges to become the core carriers of sports reserve talent training, laying an institutional foundation for system construction.

Practical Exploration Has Accumulated Mature Experience

Many secondary and vocational colleges in China have carried out practical exploration on the selection and training of elite athletes and accumulated replicable experience. Hubei Sports Vocational College has set up four modules: physical examination, special test, physical quality test and cultural course examination, formulated quantitative scoring standards, covering 16 sports specialties in talent selection, and has trained 19 professional athletes for provincial teams in the past four years. Qitaihe Short Track Speed Skating Sports School has constructed an integrated mode of "accommodation, meals, study and training", enrolled students nationwide, established a hierarchical training system of "potential class - improvement class - champion class", and relied on a team of gold medal coaches to provide all-round support from basic training to professional competitions. Through scientific talent selection, hierarchical training and diversified transportation, these colleges have formed a closed-loop mechanism of "selection - training -

transportation", verifying the feasibility of carrying out early training of elite athletes in secondary and vocational colleges and providing practical support for system optimization.

Scientific Theories Empower the Upgrade of Selection and Training

The development of modern sports training science and talent evaluation theory has provided technical support for the early selection and training of elite athletes. The traditional experience-based talent selection mode has gradually been replaced by a systematic scientific model, and the selection indicators cover multiple dimensions of biology, psychology and sociology. At the biological level, bone age detection, cardiopulmonary function evaluation and other methods are used to predict athletes' genetic potential and development space. For example, bone age detection can accurately judge the growth potential of adolescents and avoid misjudgment of selection objects. At the psychological level, standardized scales are used to evaluate athletes' traits such as attention and pressure resistance to match the needs of special sports. At the sociological level, factors such as family support and training environment are investigated to ensure the long-term development of athletes. The application of these scientific theories and technical means has promoted the transformation of athlete selection in secondary and vocational colleges from "experience judgment" to "data support", and training from "extensive training" to "precision empowerment".

III. CORE DIMENSION DESIGN OF EARLY SELECTION SYSTEM FOR ELITE ATHLETES IN SECONDARY/VOCATIONAL COLLEGES

Construct a Multi-Dimensional Talent Selection Index System

The talent selection index system should balance comprehensiveness and special adaptability, break the single performance orientation, and realize the combination of quantitative evaluation and qualitative analysis. Body shape and physiological function are basic indicators. Data such as bone age detection, body fat rate and maximum oxygen uptake should be combined to evaluate athletes' innate conditions and sports potential. For example, weightlifting focuses on the proportion of trunk and limbs, while swimming focuses on a streamlined body shape with broad shoulders and narrow waist. Sports quality indicators should be evaluated in stages. For 12-14-year-olds, general qualities such as speed and endurance are mainly inspected; for 15-17-year-olds, special qualities such as change of direction running and vertical jump height are inspected in combination with special events, which is in line with the law of sensitive periods of adolescent quality development. Psychological traits and special adaptability are key indicators. Through reaction time test and simulated competition pressure resistance evaluation, individuals with high task persistence and strong situational adaptability are selected. At the same time, project experts judge the adaptability between individuals and special events through technical diagnosis and simulated actual combat. Cultural course scores are included in the evaluation to avoid "valuing training over learning" and ensure athletes' comprehensive literacy.

Standardize the Full-Process Talent Selection Implementation Mechanism

A standardized implementation mechanism is the core to ensure the fairness and scientificity of talent selection. The target of enrollment should be accurately positioned, focusing on primary and secondary school students with sports foundation in the province. At the same time, regional restrictions should be broken to expand the scope of talent selection. For example, Qitaihe Short Track Speed Skating Sports School enrolls students nationwide to tap good seeds at the grassroots level. The test process should be standardized, with four modules: physical examination, special test, physical quality test and cultural course examination. Quantitative standards are formulated for each module. A team of experts from Grade A tertiary hospitals is invited to carry out refined physical examination, and professional instruments are used to ensure the objectivity of data. Establish a full-process responsibility traceability mechanism, set up a test group, an expert group and a supervision group, sign integrity commitments, implement the system of "who is in charge, who is responsible", and ensure that each link is traceable through triple audits. Improve the follow-up tracking mechanism after talent selection, establish personal files for selected athletes, update physical, training and academic data every 3-6 months, and dynamically adjust the training plan to avoid disconnection after selection.

Establish a Hierarchical and Classified Talent Selection Adaptation Mode

Combined with the characteristics of secondary and vocational college academic stages and the law of athletes' development, a hierarchical and classified talent selection adaptation mode is established. According to age groups, secondary vocational stage focuses on selecting 12-15-year-old adolescents, emphasizing the excavation of general sports quality and innate potential to lay a foundation for special training; vocational college stage focuses on 16-18-year-old athletes, emphasizing the improvement of special ability and the stimulation of competitive potential to meet the transportation needs of provincial teams and national teams. According to sports events, physical fitness events (such as weightlifting and track and field) focus on physiological function and strength quality, skill events (such as short track speed skating and table tennis) focus on neuromuscular coordination and special technology, and team events (such as football and basketball) take into account individual ability and team cooperation awareness. Formulate differentiated standards for athletes of different levels. Athletes at or above the national first-class level are exempted from professional tests and the middle school

entrance examination score line requirements are reduced; for non-level athletes, the thresholds of cultural courses and special tests are strictly controlled to ensure the quality of talent selection, while broadening the talent entrance, realizing the balance between "selecting the best for admission, preferring shortage to inferior quality" and talent inclusion.

IV. IMPLEMENTATION PATH OF EARLY TRAINING SYSTEM FOR ELITE ATHLETES IN SECONDARY/VOCATIONAL COLLEGES

Construct an "Integration of Learning and Training" Training Mode

With the core goal of "excellence in both learning and training, and comprehensive literacy", construct an integration of learning and training mode suitable for the characteristics of secondary and vocational college academic stages and the growth law of athletes, solving the pain points of traditional "valuing training over learning" or "disconnection between learning and training". In the reconstruction of the curriculum system, break the separation between cultural courses and training courses, implement small-class hierarchical teaching, dynamically adjust the class schedule according to athletes' training schedules, reasonably allocate the time ratio between cultural learning and special training, and ensure that training tasks do not occupy academic progress. Qitaihe Short Track Speed Skating Sports School has innovatively implemented a dual-track parallel system of "cultural courses + training courses". During external training and competitions, mobile classrooms are set up, full-time cultural course teachers are assigned to teach with the team, and an online learning platform is built simultaneously to ensure the continuous progress of athletes' academic performance. In recent years, the pass rate of cultural courses for athletes in the school has remained above 95%. The teaching implementation adopts a three-stage training path of "consolidating general ability - practicing in industrial colleges - internships in enterprises". In the secondary vocational stage, focus on strengthening basic cultural courses such as Chinese and mathematics and basic sports skill training to lay a solid foundation for physical and mental development; in the vocational college stage, combined with professional directions such as sports operation and physical fitness guidance, arrange athletes to participate in practical projects such as event planning and execution, youth physical fitness course development, and sports rehabilitation assistance to improve professional adaptability. Students in the craftsman class of Hubei Sports Vocational College have deeply participated in the research and development of enterprise cooperation projects, and 3 physical fitness training programs have been officially adopted by sports institutions, realizing the precise connection between learning, training and professional needs. At the same time, tailor-made personalized training plans for each athlete, combined with their sports talent, technical shortcomings, physical development characteristics and academic foundation, assign a three-dimensional guidance team of "technical mentor + academic mentor + psychological mentor" to be responsible for special technical improvement, academic counselling and psychological counselling, helping late-starting athletes quickly integrate into the training and learning rhythm, and scientifically adjusting training intensity and load according to the critical period of adolescent development, avoiding sports injuries or shortened sports career caused by early specialization training, and realizing the synchronous improvement of competitive ability and comprehensive literacy.

Improve the "Integration of Science, Training, Medicine and Management" Integrated Support

Relying on the resource integration advantages of secondary and vocational colleges, link multiple forces such as sports scientific research institutions, medical institutions and enterprises, and construct an all-round support system of "integration of science, training, medicine and management" to provide scientific and professional guarantee for the early training of elite athletes. In terms of scientific research empowerment, establish long-term cooperation mechanisms with professional sports scientific research institutes, introduce professional equipment such as 3D motion capture systems, intelligent heart rate monitors and sports performance analysis platforms, collect real-time motion data and physiological indicators of athletes during training, accurately locate technical shortcomings and training bottlenecks through big data analysis, optimize training plans and load arrangements, greatly improve training pertinence and efficiency, and avoid resource waste caused by blind training. In terms of medical security, establish a full-chain service mechanism of "prevention - diagnosis and treatment - rehabilitation", regularly carry out regular physical examinations and sports injury screenings, assign full-time nutritionists to customize personalized dietary plans according to athletes' training stages and physical conditions, taking into account energy supplement and nutritional balance; cooperate with the sports medicine department of Grade A tertiary hospitals to form an exclusive rehabilitation team, formulate scientific rehabilitation plans for sports injuries, and equip professional rehabilitation equipment and therapists to ensure that athletes can recover quickly after injury and ensure the continuity of training. In terms of management services, implement a closed-loop management of "accommodation, meals, study and training". Standardized apartments are equipped with 24-hour living service personnel and security forces to regulate work and rest arrangements and daily management, cultivating athletes' self-discipline awareness and team cooperation ability. In terms of teacher team construction, improve the "double mentor" system. On-campus mentors are responsible for cultural course teaching and basic training guidance, while enterprise mentors and gold medal coaches are responsible for special technical polishing and practical skills teaching. Strengthen technical inheritance and cooperative cooperation through apprenticeship ceremonies and teacher-student pairing. With the guarantee of this system,

the average score of double mentor evaluation in the craftsman class of Hubei Sports Vocational College reaches 96 points, and the enterprise recognition rate is 98%, which effectively improves the training quality and professional adaptability of athletes.

Build Diversified Development and Transportation Channels

Break the single development path of traditional elite athletes' "only competitive transportation", and construct a four-in-one diversified development and transportation channel of "competitive improvement, academic further study, professional employment and social service", taking into account athletes' short-term competitive goals and long-term life planning, and solving athletes' "worries behind". In terms of competitive transportation channels, establish a regular talent docking mechanism with provincial teams, national teams and professional clubs, build a hierarchical event selection platform, and accurately transport outstanding athletes through layers of selection such as on-campus leagues, provincial and municipal championships, and national vocational college sports events. Relying on a sound selection and transportation mechanism, Hubei Sports Vocational College has transported 5 top athletes to the national team in recent years, winning many championships in events such as the National Games and Asian Championships, forming a virtuous cycle of "training - transportation - success". In terms of academic further study channels, optimize the further study policies such as secondary-vocational connection, secondary-undergraduate connection and vocational college independent enrollment, lower the threshold for athletes to further their studies, and connect with well-known sports universities such as Beijing Sport University and Wuhan Sports University to provide academic improvement paths for athletes. In the past three years, 184 students from Qitaihe Short Track Speed Skating Sports School have been admitted to various undergraduate sports colleges, including 32 entering double first-class universities, realizing the dual goals of "shining on the field" and "achieving academic success". In terms of professional employment channels, cooperate with sports enterprises, community sports centers, youth sports training institutions, fitness clubs and other institutions to carry out vocational skills training such as sports coaches, physical fitness guidance, event operations and sports rehabilitation, help athletes obtain vocational qualification certificates such as fitness coaches and social sports instructors, and improve employment competitiveness. The double certificate acquisition rate of the craftsman class of Hubei Sports Vocational College reaches 100%, and the employment rate of graduates remains above 98%. In terms of social service channels, encourage athletes to give play to their professional advantages and participate in activities such as campus sports teaching support, community sports popularization and youth sports public welfare training. World champion Xu Aili regularly carries out public welfare teaching support, spreading sports culture and fighting spirit, which not only broadens the path for athletes to realize their social value but also contributes to the popularization and development of sports.

V. CONCLUSION

Physical education in secondary and vocational colleges has an irreplaceable advantage in the early selection and training of elite athletes. Constructing a scientific and sound system is an inevitable requirement for the in-depth development of the integration of sports and education. The system designed in this paper starts with multi-dimensional talent selection, takes the integration of learning and training as the core, and takes diversified guarantees as the support, covering key links such as selection indicators, implementation mechanisms, training modes, support systems and transportation channels, which is in line with the characteristics of secondary and vocational college academic stages and the law of athletes' development. Practice has proved that this system can effectively improve the accuracy of talent selection and training quality, and realize the coordinated development of athletes' competitive ability, cultural literacy and professional ability. In the future, secondary and vocational colleges need to further optimize the system details, strengthen the collaboration among government, industry and academia, rely on scientific and technological progress and policy support, continuously improve the closed-loop mechanism of "selection - training - transportation - development", and cultivate more outstanding sports reserve talents for the construction of a sports power.

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