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Data Empowerment, Process-Oriented: Practice and Reflections on Constructing a New Paradigm of High School Physical Education Through "Smart Running"

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Abstract: To address the difficulty in implementing the requirement of "no less than 2 hours of comprehensive physical activity per day" at the senior high school stage, based on the educational goal of "five-in-one education", our school has systematically promoted the reform of physical education evaluation from a top-level design perspective, with the "Smart Running" program as the pivot. Relying on facial recognition technology, we have built a new physical education system that is deeply integrated with the year-round "APX Excellence League" and formally incorporated into mid-term and final process-based evaluations. Through data-driven and institutional innovation, this system ensures that students' average daily exercise time exceeds 120 minutes, with a participation rate of over 95%, effectively improving students' physical fitness, promoting the cultivation of students' exercise habits, and shaping team spirit. From the perspective of school administrators, this paper systematically expounds the background, design logic, implementation paths and comprehensive effects of this reform. The program has been successfully selected as a provincial-level typical case for "no less than 2 hours of comprehensive physical activity per day", providing a referential solution for physical education reform in primary and secondary schools.

Keywords: Education evaluation reform; Physical education; Smart running; Process-based evaluation; Top-level design

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1. Introduction: Reshaping the value of physical education and returning to the essence of education

As a newly built modern high school park (the "One Park, Three Schools" system of Shenzhen Middle School High School Park includes Mathematics and Science High School of Shenzhen Middle School, Experimental High School of Shenzhen Middle School, and Technology High School of Shenzhen Middle School), we have been thinking about how to break the path dependence of "valuing intellectual education over physical education" in traditional senior high schools and truly implement the concept of "health first". Especially the requirement of "no less than 2 hours of comprehensive physical activity per day" often faces three dilemmas

at the senior high school stage with heavy academic pressure: difficulty in guaranteeing time, difficulty in evaluating effects, and difficulty in sustaining motivation [1,2].

We believe that the core of the problem lies in evaluation. Traditional physical education evaluation is dominated by end-of-term physical fitness tests, which are a kind of "summative evaluation". It cannot take the process into account, is difficult to motivate all students, and is far from the essence of physical education, which is to "cultivate exercise habits" [3]. Therefore, our school decided to take evaluation reform as a breakthrough to systematically reconstruct the physical education system [4]. The "Smart Running" program is the key move under this top-level design. Our goal is not only to make students "move", but also to guide them to truly love sports through scientific evaluation, and to temper their willpower and achieve all-round development through physical education [5].

In specific practice, we found three significant defects in the traditional evaluation method: first, the evaluation content is single, overemphasizing physical fitness indicators while ignoring dimensions such as exercise participation and healthy behaviors; second, the evaluation subject is single, and teachers as the only evaluator cannot fully grasp each student's exercise process; third, the application of evaluation results is insufficient, failing to form an effective connection with students' comprehensive quality evaluation [6]. The existence of these problems makes it difficult to give full play to the educational function of physical education.

2. Top-level design: Systematically building a new paradigm of "promoting education through evaluation"

The "Smart Running" program of our school is by no means a simple technical application or activity innovation, but an educational project that has been carefully considered and systematically planned. Our design follows the following core principles.

2.1. Concept leadership: Paradigm shift from "physical education teaching" to "physical education"

We clearly put forward that the goal of physical education should shift from the classroom orientation of "imparting sports skills" to the educational orientation of "promoting the all-round development of students" [7]. Accordingly, evaluation no longer stays at single results such as "how fast to run, how far to jump", but pays more attention to students' participation process, persistence, progress and sportsmanship in real study and life. When designing the evaluation framework, we align with the core literacy structure emphasized in physical education courses, take "sports ability, healthy behavior, sports morality" as the top reference dimensions, and combine the implementation needs of "no less than 2 hours of comprehensive physical activity per day" at the senior high school stage to further transform them into recordable, comparable and feedback-oriented process indicators, forming a school-level implementation plan [8,9].

Specifically, we set process-based evaluation into three modules: first, "sports ability" (40%), which is mainly reflected in regular participation and the achievement of effective exercise load, with indicators including weekly participation times, effective exercise duration, etc.; second, "healthy behavior" (30%), focusing on students' exercise safety and self-management, such as warm-up activities before exercise, relaxation and finishing after exercise and other key links; third, "sports morality" (30%), focusing on observable behaviors such as teamwork, rule awareness and mutual assistance and encouragement. Through

such a path of “literacy dimension - indexed expression - process feedback”, evaluation has changed from “one test, one score” to “visible process, actionable feedback, and habit formation”, thus serving the goal of physical education [10].

In actual operation, we particularly emphasize the guiding function of evaluation. Taking the “sports ability” module as an example, we not only look at whether students “participate”, but also pay attention to the sustainability and regularity of their participation. Nearly 20 weeks of continuous tracking data show that students’ participation stability increased from 58% at the initial stage to 86% at the end of the term, indicating that process-based evaluation and a continuous feedback mechanism have a significant role in promoting the formation of exercise habits [11].

2.2. Technology empowerment: Building a hassle-free and reliable data foundation

The “Smart Playground” system we invested in adopts the latest facial recognition technology to realize the automatic collection of exercise data[12]. This system has three prominent characteristics: first, accuracy, the system recognition accuracy rate reaches 99.5%, ensuring that each student’s exercise data can be accurately recorded; second, instantaneity, data collection and processing achieve second-level response, and students can view the exercise data on the fixed large screen in the playground and mobile terminals immediately after running; third, security, all data are encrypted to strictly protect students’ privacy.

In terms of data application, we have developed a multi-level analysis model. The basic level realizes the longitudinal comparison of individual data to help students understand their own progress; the middle level provides horizontal comparison at the class level to provide a basis for teachers to adjust teaching strategies; the top level realizes the macro analysis of school-level data to support school decision-making. This hierarchical application mode maximizes the value of data [13].

2.3. Institutional integration: Deeply embedding “smart running” into the main channel of school education

To ensure the lasting vitality of the reform, we strive to integrate “Smart Running” into the existing educational ecology of the school. First, it is deeply bound with the year-round “APX Excellence League”. We convert personal running data into class league points, and the specific conversion rules are as follows: taking the semester as a unit, the total kilometers of “Smart Running” of each class are ranked in the grade, and the corresponding ranking will obtain corresponding league points. This design not only ensures basic participation but also encourages continuous investment and pursuit of excellence.

Second, we innovatively implement the supervision mechanism of “weekly clearing and monthly summarizing”. Every Monday, the physical education group will generate a running data report of each class in the previous week, including key indicators such as participation rate and average mileage progress, which will be sent to head teachers and grade directors simultaneously. At the end of each month, we will hold a special summary meeting to commend classes with outstanding performance and discuss improvement measures for classes with problems. This mechanism ensures the timeliness and effectiveness of process management.

Most importantly, we have made a key institutional innovation: incorporating “Smart Running” data into the total semester score of physical education with a weight of 30% [14]. This decision has been fully demonstrated and prepared. We first conducted a pilot in some classes, and through comparative research, we found that students in the experimental classes not only had a significantly higher exercise participation rate

than the control classes (23 percentage points higher), but also had obvious advantages in physical fitness test scores (15 percentage points higher in the excellent rate). These data provide strong support for us to fully implement this reform.

3. Implementation effects: Fully demonstrating the value of physical education

After one academic year of practice, the reform effects have been clearly shown, mainly reflected in three levels.

3.1. Physical improvement and habit formation: Exceeding quantitative goals

From September 2025 to January 2026, we continuously tracked students' exercise data. The results show that the participation rate of after-school extracurricular activities of all students in the school steadily increased from 85% at the initial stage to 92%, and the weekly average completion rate of Smart Running always remained above 95%. Especially in the second grade, through the three-stage time integration strategy of "short-break micro-exercise + physical education main activity + afternoon independent running" [15], we successfully achieved the goal that 97% of students had an average daily exercise time of more than 120 minutes.

More encouragingly, students' physical health levels have been significantly improved. The end-of-term physical fitness test data shows that the excellent rate of students' vital capacity increased from 38% to 52%, and the excellent rate of endurance running increased from 45% to 58%. These data fully prove that our reform not only guarantees exercise time, but also effectively improves students' health level.

3.2. Behavioral change and spiritual cultivation: Deep effects of physical education

The change of evaluation mechanism has brought about profound changes in students' behavioral patterns [16]. We observed three significant changes: first, the internalization of exercise motivation, the main reason for students to participate in running gradually changed from "earning points for the class" at the beginning to "enjoying the fun of sports", which was confirmed by 78% of students in interviews; second, the optimization of exercise methods, students began to consciously carry out warm-up before running and relaxation after running, and exercise injuries were greatly reduced; third, the enhancement of team awareness, the phenomenon of students spontaneously organizing running groups to encourage and supervise each other has become increasingly common.

Behind these behavioral changes is the cultivation of sportsmanship [17]. At a summary and commendation meeting of Smart Running activities near the end of this semester, a student named Lan from our school exceeded 1,000 kilometers in total mileage in the semester, and all the students cheered and applauded for him. This scene is a vivid embodiment of the value of physical education.

3.3. Radiation effects and recognition: Wide influence of reform achievements

The successful practice of this project has produced significant radiation effects. At the teacher level, head teachers found that class cohesion has been enhanced through the league point system, and they take the initiative to migrate this model to other class activities; physical education teachers have achieved more accurate personalized guidance through data analysis. At the parent level, a satisfaction survey shows that 96% of parents support this reform, and 87% of parents said that their children's exercise habits at home have

improved significantly.

Particularly worthy of affirmation is that, due to its outstanding innovation and effectiveness, this case has passed the review of the Shenzhen Municipal Bureau of Education and has been successfully selected as a provincial-level platform for evaluation as a typical experience of "2 hours of comprehensive physical activity per day". This recognition is not only an affirmation of our work, but also proves that the "data empowerment, process-oriented" physical education paradigm has important promotional value.

4. In-depth reflections: Theoretical insights and practical wisdom of reform practice

4.1. Innovative breakthroughs: Three core values of physical education evaluation reform

Our practice has achieved important breakthroughs in three aspects:

(1) The first is the reconstruction of the evaluation concept. We have broken the traditional cognition that "physical education evaluation = physical fitness test", and established a new evaluation concept of "equal emphasis on process and result, coordination between individual and collective, integration of data and culture".

(2) The second is the innovation of the evaluation method. We have explored an operational path of "technology empowerment, data-driven, institutional guarantee", providing replicable experience for similar schools.

(3) The third is the deepening of the evaluation effect. Our reform has not only changed students' exercise behavior, but also affected the educational ecology of the school at a deeper level.

Behind these breakthroughs is our profound grasp of educational laws. We realize that effective evaluation reform must achieve three unifications: the unification of instrumental rationality and value rationality, the unification of science and art, and the unification of short-term effects and long-term impacts [18]. This is also the fundamental driving force for us to continuously promote the reform.

4.2. Problem-oriented: Practical wisdom for continuous improvement

In the process of promoting the reform, we always maintain a problem-oriented awareness and timely adjust and optimize. For example, in the initial stage of implementation, we found that some students tended to "value quantity over quality", so we immediately optimized the evaluation indicators and increased the consideration of "rationality of exercise intensity distribution." When we found that individual classes had the phenomenon of "brushing data", we timely introduced anti-cheating mechanisms such as exercise heart rate monitoring.

The emergence and solution of these problems precisely prove the complexity of process-based evaluation, which requires us to trust technology but not blindly believe in technology [19]; rely on data but go beyond data. This dialectical thinking is an important guarantee for us to continuously move forward in the reform.

4.3. Paradigm transfer: Exploring the path from physical education to holistic education

The success of the "Smart Running" program has opened up a broader vision for us. The "technology-enabled process-based evaluation" model verified by it can be fully transferred to other educational fields. In terms of labor education, we can establish a volunteer service hour certification system to record the whole process of students' participation in social services; in terms of aesthetic education, we can develop art growth manuals to track students' aesthetic development and artistic creation process; in terms of moral education, we can realize process-based evaluation of moral development through daily behavior observation records.

This transfer is not a simple copy, but a creative transformation of ideas and methods [20]. It requires us to accurately grasp the characteristics of different educational fields and design evaluation schemes that not only conform to common laws but also have individual characteristics. This is also the direction of our key exploration in the next step.

5. Conclusion and prospect: Building a future-oriented new ecology of physical education

In Shenzhen Middle School High School Park, "Smart Running" has surpassed a simple physical activity. It is a key carrier for our school to practice "five-in-one education" and deepen education evaluation reform. Through top-level design, technology empowerment and institutional innovation, we have initially built a new paradigm of physical education that can effectively stimulate students' internal motivation and promote their all-round development.

The greatest enlightenment brought by this reform is: the core of evaluation reform is not "evaluation" itself, but the realization of "education" through "evaluation". When evaluation can truly reflect students' growth process, effectively motivate students' willingness to progress, and scientifically guide the direction of education, it will truly exert its educational function.

Looking forward to the future, we will continue to promote the reform from three aspects: first, deepen data mining and develop a more intelligent exercise prescription system; second, improve the evaluation system and establish a more scientific and comprehensive evaluation standard for physical literacy; third, strengthen the radiation of achievements, systematize and curriculumize successful experience, and contribute more wisdom to regional educational development.

We firmly believe that driving the reform of educational methods through evaluation reform is an inevitable trend of future educational development. On this road, Shenzhen Middle School High School Park is willing to continue to explore and innovate, and contribute our strength to cultivating a new generation of young people who can shoulder the mission of national rejuvenation.

Disclosure statement

The author declares no conflict of interest.

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