



Research on the intervention mechanism of sustainable physical exercise on obesity among vocational college students

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ABSTRACT

Adolescent obesity is worsening globally, and the obesity rate among Chinese college students keeps rising, which has become the leading cause of their failure in physical fitness assessments and also triggers psychological issues like inferiority and depression. To tackle this problem, this study constructs a multidimensional, integrated theoretical framework for sustainable physical exercise intervention based on physical-mental synergy, and designs a systematic intervention mechanism focusing on energy metabolism and mental health regulation. It further proposes implementation strategies under the tripartite synergy of universities, teachers and students, explores diverse exercise models, and innovatively develops a "vocational education-integrated" model suitable for higher vocational education with clear campus implementation paths. This research provides a scientific and feasible solution for alleviating college students' obesity and improving their physical and mental health.

1. INTRODUCTION

According to the 《2024 World Obesity Report》, if no obesity interventions are implemented globally, the number of overweight or obese adolescents (aged 5-19) is projected to rise from 435 million (22% of the global population in this age group) to 770 million by 2035. Among them, 27 million will develop high blood sugar, and 69 million will suffer from hypertension, primarily concentrated in middle-income countries. The National College Student Physical Fitness and Health Survey indicates a continuous increase in obesity rates among Chinese university students. The 2021 findings from the Eighth National Student Physical Fitness and Health Survey, released by the Ministry of Education, reveal that by 2020, approximately 30% of university students failed to meet physical fitness standards. Obesity has become the primary reason for failing these standards, as it not only affects students' appearance but also directly or indirectly leads to psychological issues such as low self-esteem and depression. Data from the 《National College Student Health Survey Report (2024)》 show that anxiety detection rates among university students reached

23.5%, while depression detection rates stood at 19.2%. Additionally, obesity poses a severe threat to students' health, which is one of the reasons why the pass rate for physical fitness tests remains stagnant.

1. Analysis of the Current Obesity Status Among Vocational College Students

1.1. Analysis of the Current Obesity Situation

1.1.1. Imbalanced Diet and Lack of Knowledge

The daily dietary patterns of college students exhibit a notably unhealthy tendency, characterized by the following key features: Severe dietary imbalances, predominantly marked by excessive caloric intake. According to a survey by 《China Urban News》, college students face structural issues such as overconsumption of meat, eggs, cooking oil, and salt, while inadequately consuming vegetables, fruits, dairy, and fish. Generally low nutritional knowledge levels, accompanied by a significant "disconnect between knowledge and behavior." Widespread irregular eating habits,

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including frequent skipping of breakfast, late-night snacking, and heavy consumption of sugary beverages. These behavioral factors have become the primary drivers of obesity among college students. A Shanghai-based study revealed that 91.43% of respondents agreed that "irregular eating and binge eating" are the main causes of obesity, creating a striking "cognitive-behavioral" contradiction with their 77% self-consciousness about body shape.

1.1.2. Insufficient Physical Activity and Excessive Screen Time

Physical inactivity is a prominent issue currently faced by college students, rooted in the "systemic lack of opportunities for exercise." This phenomenon manifests specifically as a coexistence of insufficient active exercise and a sedentary lifestyle. Survey data from Sun Guiju's team in Nanjing, Jiangsu Province, reveals that although 60.1% of college students engage in at least 10 minutes of high-intensity exercise weekly, their average daily screen time (including computer and mobile phone usage) reaches as high as 9.24 hours. The extended screen time is primarily attributed to academic tasks and digital entertainment activities, which have become a norm in campus life and severely encroach upon students' time for active physical exercise.

1.1.3. Disordered sleep patterns and psychological stress

College students generally face problems of insufficient sleep and poor sleep quality. According to a survey conducted by Sun Guiju's team, the average sleep duration of this group is 7.3 hours, with 13.3% of students sleeping less than 6 hours, and as many as 44.9% of students experiencing various sleep problems. The important triggers behind it are psychological factors such as academic pressure and employment anxiety, which can lead to disrupted sleep patterns and subsequently lower sleep quality. In addition, research has confirmed that frequent mental health issues such as depression and stress are significantly associated with weight changes. Data shows that over 80% of students have the phenomenon of staying up late (only 19.29% have a regular schedule). In summary, the combination of unhealthy diets, widespread sleep disorders, and sedentary professional learning patterns creates a high-risk breeding ground for obesity.

1.2. The hazards of obesity among vocational college students

1.2.1. Health risks: comprehensive erosion from physiology to psychology

The harm of obesity to the health of college students manifests as a dual erosion of physiology and psychology, forming a vicious cycle of mutual influence.

At the physiological level, obesity is the pathological basis and initiating factor of various chronic diseases. First, it significantly increases the risk of metabolic syndrome, leading to diabetes, hypertension and dyslipidemia. The traditional concept of "middle-aged and elderly" diseases is showing a trend towards younger age groups, which seriously restricts the healthy lifespan of adults. Secondly, obesity triggers changes in biological factors, with excessive weight continuously increasing the mechanical load on weight-bearing joints such as the knee and ankle joints, accelerating cartilage wear, and subsequently causing osteoarthritis and chronic pain. This not only limits physical activity, but also hinders daily walking. Thirdly, obesity directly damages cardiovascular and pulmonary function, manifested as long-term overload of the heart and decreased lung function reserves, as well as common clinical symptoms such as shortness of breath and severe lack of endurance after physical activity, making it difficult to tolerate sustained physical activity. Fourthly, obesity can lead to dysfunction of the endocrine system, which is closely related to diseases such as polycystic ovary syndrome in women and abnormal estrogen levels in men. In addition, chronic low inflammation often associated with obesity can lead to immune system disorder and increase the risk of infectious diseases.

On a psychological level, the pressure brought by obesity cannot be ignored. In the youth group that highly values appearance, obesity is prone to become a focus of social discrimination, peer ridicule, and self denial, seriously damaging individual self-esteem and becoming an important source of inferiority and depression. The social anxiety caused by body type anxiety, as well as concerns about academic prospects and future development, collectively exacerbate the risk of anxiety and depression. At a deeper level, individuals may experience severe dissatisfaction and cognitive distortion with their body image, which can trigger two extreme behaviors - either excessive dieting or binge



eating, leading to a self reinforcing vicious cycle of "psychological pain behavioral loss control weight gain psychological distress".

1.2.2. Academic and career risks: directly affecting core competitiveness

Obesity has a profound negative impact on vocational college students, directly eroding their academic performance and career development potential. At the academic level, studies have shown that obesity may have adverse effects on neurocognitive function, leading to a decline in core cognitive abilities such as memory, attention, and executive function, which in turn affects learning efficiency and academic performance. Meanwhile, health issues related to obesity, such as fatigue and physical discomfort, can directly lead to an increase in absenteeism rates; Especially in practical courses that emphasize hands-on abilities, students often feel frustrated due to insufficient physical flexibility and difficulty in completing standardized operations, and even avoid class, resulting in a significant decrease in classroom participation.

At the level of career development, its impact is even more severe. Vocational education aims to cultivate high-quality technical and skilled talents in the production, construction, and service front lines. Many corresponding positions (such as mechanical maintenance, CNC operation, cooking, construction, nursing, etc.) have clear requirements for practitioners' physical endurance, strength, agility, and sustained standing ability. Obesity directly leads to insufficient physical reserves in such professions, which constitutes a fundamental obstacle to their ability to perform in future work. In the training environment, delayed response and limited mobility significantly increase the risk of obese students encountering work-related accidents such as mechanical scratches, slips, burns, etc. Ultimately, in the job market, when companies recruit for these frontline positions, they take into account the physical and health conditions of their employees. Obesity may become an "implicit screening criterion," putting students at a disadvantage in interviews and physical fitness tests, directly limiting their employment competitiveness and career prospects.

1.2.3. Social Adaptation and Development Risks: Invisible Deprivation of Opportunities

The negative impact of obesity on vocational college students further extends to their social adaptation and personal development, forming profound comprehensive risks. At the social level, obese students often actively avoid social scenes such as group activities and teamwork due to fear of negative evaluations or limited mobility. This self isolation behavior can easily lead to marginalization, making it difficult to establish and develop a healthy interpersonal network, resulting in innate weakness of college students' social adaptation capital.

At the developmental level, the undergraduate period is a crucial stage for accumulating human capital and social relationships. However, the lack of energy and social withdrawal caused by obesity make it difficult for students to fully participate in extracurricular activities such as clubs, competitions, and social practices. The lack of these key experiences directly hinders the cultivation of non cognitive skills such as organizational coordination, communication expression, and leadership, resulting in limited development of comprehensive qualities.

For vocational college students, obesity is a complex problem that combines health crises, academic obstacles, career bottlenecks, psychological burdens, and social dilemmas. It fundamentally erodes the core competitiveness of vocational college students as "future craftsmen", namely healthy physical fitness and sustainable professional fitness, posing a systematic threat to their personal development and social integration.

2. Exploration of sustainable sports exercise intervention mechanism

2.1. Concept of Sustainable Development

The "environmental" sustainability of intervention mechanisms refers to creating supportive physical and institutional environments for physical exercise. For example, ensuring sufficient sports facilities, open hours, creating a positive campus sports culture atmosphere, and institutionalizing intervention measures such as incorporating them into the curriculum system and credit recognition.

The 'social' sustainability of intervention behavior: its core lies in students' intrinsic motivation and health equity. The



intervention mechanism cannot rely solely on coercion, but should focus on stimulating students' intrinsic interests, such as project interest, sense of belonging to clubs, etc; Satisfy their social and psychological needs, such as companionship support, sense of achievement, etc; Ensure that all students, including obese students, can participate fairly and benefit from it.

The "economic" sustainability of intervention systems refers to the feasibility and long-term viability of intervention programs in terms of resource investment. It should not be a "bonsai project" that consumes huge amounts of money and relies on short-term projects, but should be low-cost, efficient, and easy to promote. For example, utilizing existing faculty and facilities, cultivating student sports backbone, and designing sports programs.

Sustainable physical exercise is a long-term, not a one-time activity. Can integrate into campus daily life and systems, rather than exist in isolation. It can help students transition from passive participation to active persistence, cultivating their lifelong exercise habits and abilities.

2.2.Exploration of Sustainable Sports Exercise Intervention Mechanism

2.2.1. Health Promotion Type

The core objective of this mechanism is to improve students' physical health indicators, with a focus on optimizing physical health parameters such as body fat percentage, blood pressure, and muscle mass. The typical practice form is the "college student health exercise prescription" mechanism, which is based on individual physical health assessment and health risk assessment results, and professional teachers develop personalized and periodic exercise plans, and dynamically adjust them according to the stage assessment results. This mechanism emphasizes the scientific and targeted nature of exercise, and is combined with a digital health management platform to achieve precise monitoring and feedback of the exercise process through technological empowerment.

2.2.2. Interest cultivation type

The fundamental goal of this mechanism is to stimulate students' interest in sports and cultivate long-term exercise habits, emphasizing the emotional experience and intrinsic

motivation cultivation during the process of physical exercise. The approach is to rely on two organizational forms, namely "sports course selection" and "sports clubs", to provide diversified and personalized sports projects including rock climbing, aerobics, tug of war, etc., emphasizing students' autonomy and fun experience in the participation process, rather than solely focusing on skill achievement, thus promoting their transformation from "passive participation" to "active participation".

2.2.3. Integration of Vocational Education (Characteristics of Higher Vocational Education)

This mechanism is an important path to reflect the characteristics of higher vocational education, with the goal of integrating physical exercise with the physical fitness required for students' future careers, and enhancing their physical adaptability to their professional positions. The practical form is to construct a "vocational physical fitness training" system, designing exercise content with "quasi professional" characteristics based on typical job tasks and physical fitness needs corresponding to different professional groups.

2.2.4. Suggestions for the Construction of Sustainable Physical Exercise Intervention Mechanism in Vocational Colleges

Promote systematic integration and build a composite educational ecosystem. We should abandon fragmented and isolated ways of organizing sports activities, and instead systematically integrate the four elements of "clubs, courses, events, and environment" at the top-level design level to build a composite campus sports education ecosystem that is interconnected and functionally complementary. By laying the foundation through courses, deepening interests through clubs, providing exhibition platforms for competitions, and creating a supportive atmosphere in the environment, a collaborative and efficient educational force is formed.

Deepen the integration of vocational education and strengthen the development of internal drive. Different from ordinary universities, vocational colleges should vigorously develop and promote the "vocational education integration" physical exercise mode, closely combining physical training with the specific physical literacy required for students' future careers. This model transforms physical exercise into



an effective way to enhance professional competence, which can significantly stimulate students' motivation to participate and achieve a cognitive transformation from 'I want to exercise' to 'I want to exercise'.

Promote technological empowerment, achieve precise management and incentives. We should actively introduce digital tools such as intelligent mobile applications and wearable devices to alleviate the relative shortage of professional physical education teachers. Through technological means, personalized tracking, data-driven analysis, and real-time feedback of students' exercise process can be achieved, improving the level of refined management and providing visual progress incentives for students. Improve incentive feedback mechanisms to meet diverse needs. Build a diversified incentive system that includes institutional incentives, data feedback, and spiritual honor. Incorporate physical exercise into credit recognition, generate personalized exercise reports through digital platforms, and establish various sports honors and awards to meet students' different needs in achievement recognition, ability proof, and social respect, and continuously consolidate their exercise behavior.

3. Principle of intervention mechanism

3.1. Aerobic exercise regulation intervention

3.1.1. Principles of Energy Metabolism Regulation

The core mechanism of this principle is to establish a sustained negative energy balance through scientific exercise intervention, thereby directly promoting fat consumption. The specific pathways of action include:

Direct fat oxidation during exercise: In moderate to low-intensity, long-term aerobic exercise, the body oxidizes and decomposes fat as the main energy source under sufficient oxygen supply conditions, effectively reducing body fat storage;

Excessive oxygen consumption after exercise: After exercise, the body maintains a high oxygen consumption rate to restore internal homeostasis, continuously burning calories and fat. This phenomenon is called "excessive oxygen consumption after exercise", which helps to increase 24-hour total energy expenditure and fat consumption;

Improvement of basal metabolic rate: Long term regular

aerobic exercise can help increase lean body mass, improve mitochondrial structure and function, and moderately increase resting metabolic rate, enhancing energy expenditure ability in non exercise states.

3.1.2. Principles of Endocrine and Metabolic Regulation

The core of this principle lies in improving the metabolic regulatory environment of the body through exercise, enhancing insulin sensitivity, and optimizing lipid metabolism pathways. The mechanism mainly includes: Enhance insulin sensitivity: aerobic exercise can promote the uptake and utilization of glucose in skeletal muscles, reduce insulin resistance, and play a key role in preventing and improving type II diabetes, especially for obese students;

Regulating lipid metabolism related hormones: Exercise can inhibit the secretion of hormones that promote fat synthesis, while activating hormones that promote fat breakdown, such as catecholamine release, thereby improving body fat metabolism balance.

3.1.3. Principles of cardiovascular and cardiopulmonary function regulation

This principle aims to enhance the efficiency of oxygen delivery and utilization in the body through aerobic exercise, thereby improving overall exercise tolerance. The mechanism mainly includes: enhancing myocardial function, exercise training can improve myocardial contractility, increase cardiac output per stroke, and improve cardiac pumping efficiency; The improvement of aerobic capacity is manifested as an increase in maximum oxygen uptake, which is the standard for evaluating cardiopulmonary function. The increase in maximum oxygen uptake means an increase in oxygen utilization efficiency, a reduction in fatigue during exercise, an improvement in exercise tolerance, and thus contributes to the long-term persistence of physical exercise behavior.

3.1.4. Principles of psychological and behavioral regulation

This principle focuses on the positive impact of physical exercise on the psychological state and behavioral patterns of college students, promoting the formation and



maintenance of exercise habits. The mechanism mainly includes: neuroendocrine regulation, sustained moderate to low intensity aerobic exercise can stimulate the release of endorphins, generate pleasant emotions, relieve stress and anxiety, thereby reducing emotional overeating and eating behavior; Improving self-efficacy, by achieving phased exercise goals such as running distance, energy consumption, etc., students can receive immediate achievement feedback and enhance their self belief in "I can do it", which is the key psychological foundation for persisting in physical exercise; The behavioral habituation mechanism embeds regular aerobic exercise into daily life rhythms, forming stable behavioral patterns that help improve the persistence of physical exercise, promote the automation and long-term persistence of exercise behavior.

4. Construction of intervention mechanism

4.1. Construction of Systematic Intervention Mechanism for Aerobic Exercise

The personalized exercise prescription regulation mechanism, as the core link of aerobic exercise systematic regulation intervention, is based on the FITT principle to construct a personalized plan. The specific regulation mechanism is as follows: exercise intensity regulation. To avoid homogenization of exercise intensity, an individualized setting method is adopted, mainly based on the heart rate interval method, such as controlling within 60% -70% of the maximum heart rate, that is, the fat efficient oxidation interval or subjective fatigue sensation scale, to ensure that exercise stimulation is within a safe and effective range. In the early stages of intervention, it is recommended to start with low intensity to reduce the risk of sports injuries and psychological distress. Time and frequency adjustment, according to the "American Physical Activity Guidelines", the initial goal is to exercise 3-5 times a week, each time lasting more than 30 minutes, and support phased accumulation, such as 10 minutes each time, completing 3 times for a total of 30 minutes. With the gradual improvement of students' physical fitness adaptation, the ultimate goal is to accumulate 150 minutes of moderate intensity aerobic exercise per week.

The advanced load regulation module is designed based on the physiological principle of "over recovery", aiming to gradually increase the load, continuously optimize the

training effect, and prevent the occurrence of plateau period. The specific mechanism is to establish a dynamic evaluation and load adjustment mechanism, implement physical fitness assessment every 4-8 weeks, and gradually increase exercise duration, frequency, or intensity based on the assessment results to maintain the fun and effectiveness of exercise stimulation.

The diversified adjustment module for types and scenarios aims to enhance interest and behavioral compliance in sports participation. Through the design of diversified sports types and scenarios, it alleviates the monotony of the exercise process. The specific implementation mechanism includes building an aerobic exercise resource library that covers projects such as campus jogging, brisk walking, swimming, spinning bikes, aerobic fitness exercises, dance, and skipping rope; And combined with the campus physical environment, club organization activities, and technology platforms, enhance the fun and participation appeal of aerobic exercise.

The monitoring and feedback regulation module, based on behavior reinforcement theory, enhances students' exercise motivation through systematic data monitoring and result feedback, and provides empirical evidence for prescription adjustment. The specific mechanism includes: process monitoring, guiding students to use tools such as heart rate wristbands and exercise apps, and systematically recording key indicators such as heart rate, exercise duration, distance, and energy consumption; Consequential feedback: Regularly generate individual exercise health reports, correlate process data with physical indicators, and analyze changes in weight, body fat percentage, waist circumference, and cardiopulmonary function to enable students to intuitively recognize exercise effectiveness and construct a positive stimulation closed-loop system of "behavior data feedback reinforcement".

4.2. Health Behavior Habitation Module

This module is based on the theory of habit formation and aims to promote the automation and long-term maintenance of healthy exercise behavior through systematic behavior design. Specific implementation strategies include:

Execution intention training, physical education teachers guide students to develop "if then" plans, such as "if I feel increased stress and have a desire to eat, then I will take a 10 minute walk", transforming abstract exercise intentions into



automated behavioral responses in specific contexts, enhancing the clarity and immediacy of behavior execution. Habit connection and environmental reconstruction guide students to connect new exercise behaviors with existing daily habits, such as "completing 10 squats immediately after brushing teeth every day", and optimize the external environment in which the behavior occurs, such as "preparing sportswear before bedtime for morning jogging", to reduce the resistance to behavior initiation and promote the effective solidification of new behavior patterns.

Construction of a process oriented incentive system, establishing a non weight centered incentive system with effort and behavior persistence as the core, and strengthening students' positive behavior during exercise through the establishment of honorary titles such as "Full Attendance Participation Award" and "Stage Progress Award", rather than solely relying on weight changes as evaluation criteria, thereby enhancing intrinsic motivation and behavioral sustainability.

4.3. Positive body image construction module

This module aims to improve physical cognition and self acceptance, and alleviate psychological and behavioral disorders caused by physical dissatisfaction through cognitive reconstruction and media critical education

Body function appreciation training, by assigning the task of writing a "body function diary", guides students to record a valuable activity completed by their body every day, such as "successfully completing a three kilometer run", gradually shifting their focus from external physical form to body function and ability, and establishing a sense of respect for the body based on function.

Body image media literacy education aims to help students identify and resist irrational social comparisons by analyzing the constructiveness and unreality of the "ideal body" image in mass media and social platforms, cultivate their understanding and acceptance of body diversity, and reduce the impact of appearance anxiety on sports participation.

5. Reshaping Sustainable Physical Exercise Literacy

The core goal of the implementation strategy for reshaping sustainable physical exercise literacy is to internalize physical exercise from an external mandatory "task" into students' conscious and lifelong "literacy" and "lifestyle".

This requires the collaborative efforts of schools, teachers, and students to form a complete educational ecosystem.

5.1. School level

Top level design and supportive environment shaping, schools are the "engine" and "soil" of this mechanism, responsible for providing institutional, resource, and cultural guarantees. Incorporate 'health first, lifelong sports' into the official development plan of the school to enhance the strategic position of sports work. The school has established a "Healthy Campus Committee": led by school leaders, with the participation of the Sports Department, Student Affairs Office, Academic Affairs Office, Logistics, Medical Office, and various secondary colleges, to break down departmental barriers and coordinate resources. For students: Promote the "Sports Comprehensive Literacy Credit", which not only looks at physical test scores, but also includes attendance rate, progress, participation in clubs and competitions, and sports theory knowledge in the assessment, achieving a combination of process and outcome evaluation. For departments/classes: Incorporate the rate of students' physical health compliance and participation in sports activities into the work assessment of departments and counselors, and form an incentive mechanism.

Resource integration and conditional support strategies are used to create a physical and digital environment for students that is "dynamic, active, and convenient to move". Hardware upgrade and intelligence, adding, updating, and maintaining sports venues and equipment. Introduce the "Smart Playground" system, which automatically records student movement data through facial recognition and IoT devices, and connects with the academic system. Diversified funding support, establishment of special activity funds for sports clubs and reward funds for on campus and off campus sports events, and encouragement of social resources to participate. Micro updates in time and space ensure that venues are fully open during spare time. Set up a "fragmented fitness corner" on campus open space and equip dormitory buildings with simple equipment such as yoga mats.

Cultural creation and brand activity strategies aim to make physical exercise the most trendy cultural symbol on campus. Create a brand sports festival, hold annual events such as "Sports Culture Festival", "Campus Marathon", "Fun Tug of War", "Physical Challenge", etc., and give it a unique sense



of ceremony and honor system. Empower sports clubs, encourage and support students to establish diversified sports clubs such as cycling clubs, street dance clubs, and rock climbing clubs, and provide professional guidance, activity funding, and exhibition platforms to make them a source of vitality for sports culture. Stereoscopic promotion, utilizing campus media, vigorously promoting the stories of "exercise experts" and "progressive stars", and shaping positive role models.

5.2. Teacher level

Role transformation and ability enhancement, teachers are the "catalysts" and "guides" of this mechanism, and need to transform from "command issuers" to "interest motivators, method guides, and growth partners".

Teaching philosophy and role transformation strategy, from "teaching physical education" to "teaching people to achieve health and growth through physical education". Promote a student-centered teaching method, respect individual differences, shift from "command based" teaching to "guided" and "encouraging" teaching, and focus on students' sense of experience, achievement, and learning pleasure. A "sports mentor" is not only a teacher in the classroom, but also a consultant for students' sports life, helping them develop personalized exercise plans and solve the difficulties they encounter in the process of persistence.

Innovative strategies for teaching content and methods to make physical education classes "useful, interesting, and selective". Develop "modular" courses, break the traditional single course model, and offer "weight loss and shaping classes", "physical fitness enhancement classes", "outdoor expansion classes", "fitness and bodybuilding classes", etc., allowing students to choose independently based on their interests and needs.

Deepen the integration of vocational education, cooperate with various majors, and develop targeted "vocational physical training" content, such as neck and lumbar spine health exercises for IT majors, allowing students to intuitively experience the value of physical exercise for future careers.

Integrating health theory education: Systematically teaching knowledge such as sports physiology, nutrition, injury prevention, and sports psychology in physical education classes to cultivate students' "sports and health concepts".

Collaborative education and attention to individual strategies,

building a sports support network that involves all members. Collaborate with counselors, regularly communicate, and jointly pay attention to the physical exercise and psychological status of special student groups such as obesity and frailty. Train student sports backbone, cultivate "sports committee members" or "sports leaders" in classes and clubs, and play the role of peer education and role models.

5.3. Student level

The cultivation of subject consciousness and behavior, students are the "ultimate subjects" and "practitioners" of this mechanism, and the awakening of their internal motivation and changes in behavior are the fundamental signs of strategic success.

Cognitive arousal and goal management strategies help students transform from passive participants to active planners. Carry out "self diagnosis of sports literacy", through questionnaire surveys and interpretation of physical test data, to enable students to have a clear understanding of their physical condition, exercise ability, and health risks, and stimulate their intrinsic motivation for change. Guide the development of a "personal exercise prescription" and guide students to set clear, measurable, achievable, related, and time limited personalized exercise goals based on the SMART principle, such as "losing 5 pounds through jogging this semester" and "increasing the number of pull ups from 0 to 3".

Strategies for mastering skills and solidifying habits, teaching students the ways and methods of motor skills, and helping them become accustomed to sports behavior. Encourage students to deepen their learning and master at least one sport they truly love during their school years, as a carrier of lifelong exercise. Learn the "micro habit" cultivation method, teach students to start with small goals such as "exercising for 10 minutes every day", lower the threshold for starting exercise, and use the "habit stacking" method to integrate exercise into daily life rhythm. Make good use of digital tools, encourage students to use sports apps to record check-in, join online sports communities, and use the power of technology to obtain guidance, feedback, and social motivation.

Community integration and positive mindset strategies enable students to find a sense of belonging and achievement within the collective. Encourage students to



join a sports club or group based on their interests, using peer pressure and social fun to overcome laziness. Cultivate a 'growth mindset', guide students to view the bottlenecks and setbacks in exercise correctly, shift their focus from 'why am I so fat' to 'I ran one more lap today than yesterday', and celebrate every small progress. Practice 'body function appreciation', reduce anxiety about appearance, and instead appreciate and appreciate every improvement in physical movement ability.

These three levels of strategies are interdependent and mutually reinforcing. Schools create the overall environment and possibilities, with teachers as key guides and enablers, and students as active participants and practitioners, ultimately forming the value endpoint and source of vitality of the entire system. Only through the collaboration of three parties and the formation of a joint force can we truly achieve a deep reshaping of the sustainable physical exercise literacy of vocational college students.

Conclusion

Theoretical framework and mechanism innovation: This study goes beyond the simple initiative of "multi sport" and constructs a multidimensional, integrated, and mind body co-governance sustainable physical exercise intervention theoretical framework. This framework is based on the physiological principle of "energy metabolism regulation" to ensure the scientific and effective intervention; Using "mental health regulation" as an internal engine, by stimulating intrinsic motivation, reconstructing cognition, and cultivating positive body images, we can break through the psychological bottleneck of behavioral persistence; In the end, each link was concretized and systematized through an intervention mechanism that included motivational stimulation, content methods, and support guarantees, ensuring the integrity and operability of the intervention.

Implementation strategy and subject collaboration: To ensure the implementation of the mechanism, this study proposes an implementation strategy driven by the collaboration of three major subjects: schools, teachers, and students. At the school level, a supportive 'big environment' has been constructed through top-level design, resource integration, and cultural creation; At the teacher level, they play a key "catalyst" role through role transformation, teaching innovation, and collaborative education; At the student level, their core position as "active practitioners" has

been established through cognitive awakening, skill mastery, and community integration. These three levels are interconnected, weaving together a three-dimensional network that promotes the reshaping of sustainable physical exercise literacy.

Pattern exploration and path design: The study deeply explores diversified sustainable sports exercise patterns such as community socialization, technological empowerment, event honors, and environmental guidance, and innovatively proposes a "vocational education integration" pattern that fits the characteristics of higher vocational education. On this basis, this study has planned a campus implementation path from top-level design to comprehensive promotion, ultimately achieving normalized operation, providing a clear roadmap for the intervention plan to move from blueprint to reality.

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