Study of Physical Training Program (Course) of China Beijing Longtan Middle School Based on Cross Fit

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ABSTRACT: *This Background and Objectives: This study investigates the efficacy of physical training programmes in enhancing students' physical fitness, aiming to improve the health levels of Chinese secondary school pupils. Materials and Methods: The following tools were employed: (1) A CrossFit-based physical training programme for secondary school pupils; (2) A CrossFit-based learning satisfaction questionnaire for the physical training programme; (3) CrossFit-based secondary school physical education curriculum framework and experimental interview outline; (4) physical health indicator assessment tools. The independent variable was the training programme, while the dependent variables were students' physical health status and satisfaction levels. Research methods comprised: (1) literature review; (2) questionnaire survey; (3) interviews; (4) experimental design; (5) logical analysis; (6) mathematical statistics.*

Research findings: (1) Pre- and post-experiment comparisons revealed significant improvements in the experimental group's scores for physical fitness indicators including speed, flexibility, strength, and endurance, whereas no notable changes were observed in the control group. Significant differences existed between the two groups' scores following the experiment. (2) Regarding body composition and physical function indicators, no significant improvements were observed between the experimental and control groups. Furthermore, no significant differences were found in the assessment data for individual indicators within either group before and after the experiment

Keywords: Cross Fit, middle school physical training course, physical health

1. Introduction

According to the results of the Eighth National Survey on Students' Physique and Health released by the Ministry of Education of China in 2021, the excellent and good rate of students aged 6-22 was 23.8%, especially in the economically developed eastern regions. Although the physical health level of Chinese students has improved, they still face many challenges in vision, obesity and grip strength, especially among middle school students. In order to improve students' physical health, the Ministry of Education has listed physical education as an important part of compulsory education, requiring the proportion of physical education and health courses to reach 10%-11%. However, at present, physical education in middle schools in China mainly focuses on basic sports skills and health education, ignoring physical training, which leads to a slow improvement in physical health.

Middle school is a critical period for students' physical development, and comprehensive physical training can effectively promote students' physical health. The traditional single training mode is difficult to meet the needs of

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students' diversified physical development. Therefore, as a comprehensive physical training method, CrossFit training system deserves attention. CrossFit was founded by Greg Glassman, aiming at comprehensively improving ten physical qualities such as strength, speed, cardiopulmonary endurance, muscle endurance, flexibility, coordination, explosiveness, flexibility, balance and accuracy through diversified training. These ten physical qualities are highly compatible with the physical requirements of students mentioned in the new curriculum standard, which can better promote the overall improvement of students' physical quality.

CrossFit training system not only pays attention to the cultivation of special skills, but also pays attention to the improvement of comprehensive physical fitness, which can effectively help middle school students improve their physical fitness in many aspects. Compared with the single training mode of traditional physical education class, the diversified and all-round training of CrossFit can stimulate students' interest in sports and improve their comprehensive physical fitness. In addition, the training method of CrossFit emphasizes functional exercise, which can enhance students' sports ability and help them cope with various challenges in daily life, which is particularly important for improving students' physical health.

However, the domestic research on middle school physical training curriculum based on CrossFit is still in its infancy. Most of the existing physical training courses focus on individual special training, lacking interdisciplinary and multi-dimensional training system. Therefore, this study aims to evaluate the effectiveness of a CrossFit-based physical training course in enhancing middle school students' physical fitness, taking Beijing Longtan Middle School as an example, so as to provide a scientific reference for improving the physical health level of Chinese middle school students. By introducing the CrossFit training system, we can break the limitations of traditional physical education and provide students with a more scientific, comprehensive and systematic physical training program, thus promoting the overall improvement of their physical fitness.

2. Research Objectives

To study the effect of improving students' physique by using physical training courses.

3. Literature Review

This study focuses on the research results of Cross Fit training, middle school students' physical health, middle school students' physical training, physical training courses, teaching design model and student satisfaction, which are summarized as follows:

Research status of Cross Fit training (Weisenthal and Bedk, 2022), selected 96 middle school students by experimental method and randomly divided them into experimental group (51 students) and control group (45 students) for 8 weeks (twice a week, 60 minutes each time). the results show that Cross Fit training has significant effects on waist circumference, BMI, sitting forward, standing long jump and endurance running. By analyzing the index data of the subjects before and after the experiment, it shows that it is a safe, effective and attractive method to incorporate Cross Fit training into the middle school physical education curriculum, which can promote the physical fitness of middle school students. However, the test results of boys and girls are different, which means that boys and girls need to adopt different methods to achieve the same training effect. (Szajkowski et al., 2023) took 45 adults (23 females and 22 males) with short-term high-intensity functional training (RIFT) experience of 0-27 months (0-6 months and more than 7 months respectively) as the research object and conducted high-intensity functional training for 6 months; The results show that Cross Fit training has a significant impact on women's flexibility, endurance, explosive power and cardiopulmonary function. Cross Fit training has a significant impact on men's flexibility, endurance and explosive power; Cross Fit training has a significant impact on the 1.5-mile run of women with little experience in short-term high-intensity functional training (Han, 2014) a scholar in China, first introduced Cross Fit training systematically. He systematically sorted out the origin, development, definition, training content and mode of Cross Fit training system and published it in the form of literature. So far, Cross Fit training has only appeared in the field of vision of Chinese scholars (Fu, 2024) first outlined the Cross Fit training system, then expounded the importance of physical training in football, designed the scheme of integrating Cross Fit training into football physical training from five aspects: the investment of basic training facilities and training funds, the comprehensive quality requirements of trainers, training time, training intensity and the determination of training objects, and conducted experimental research. From the data analysis of the experimental results of the experimental group and the control group from five aspects: anaerobic exercise ability, aerobic exercise ability, flexibility, muscle strength and explosive force, it is

determined that the football physical training integrated with Cross Fit training is better than the ordinary football physical training.

Research status of middle school students' physical health: Many foreign countries paid attention to the students' physical health level long ago, initially aiming at training soldiers and athletes. With the development of economy, the focus of physical research gradually shifted to solving people's own health problems, because they realized that a country's future and comprehensive national strength were strong, and the national physical health level was the foundation. Japan has been recording the growth and development of children since 1879. It is the country with the most comprehensive and authoritative data on the physique of young children. They call physique physical strength. The United States not only leads the world in politics, economy, science and technology, and military affairs, but also occupies the first place in exploring the physical health of young children. Russia began to implement physical fitness tests in 1925, and the system of labour and defending the country issued in 1931 provided strong support for the whole people to participate in sports, stimulated their enthusiasm for participating in physical exercise, and provided an important reference for students' physical and mental health (Zhang and He,2016) a scholar from China, drew a conclusion based on the four national physique monitoring data from 2000 to 2014: the physique of Chinese teenagers showed a continuous growth trend, and the detection rate of obesity continued to rise; Most of the indexes of vital capacity and physical fitness showed a downward trend before 2005, and began to "fall" in 2010. In 2010, vital capacity indicators and most physical fitness indicators began to "fall" and rebound, showing an inflection point of rising; The problem of poor eyesight is still high, and it continues to show a tendency of younger age. Yang et al.(2017) and others predicted that from 2019 to 2024, the weight index of male and female Han students aged 7-18 will continue to increase, and timely measures should be taken to intervene the weight of students. Wu and Li (2021) think that although the physical health of teenagers in China has steadily increased in recent years, physiological indexes such as vital capacity are still on the decline, and various sports qualities have not been significantly improved. In addition, due to bad habits in life and study, diseases such as hypertension occasionally appear in teenagers.

Research status of middle school students' physical training: foreign scholar Hills, King and Armstrong (2007) found that the most acceptable physical activity mode for teenagers is active play, which is beneficial to teenagers' movement development and social adaptation. Arim, Findlay and Kohen (2012) found that nearly two-fifths of children and adolescents participate in unorganized active play activities at least four times a week. Canada, Australia, Germany and other countries have physical activity guidelines for teenagers, which suggest that children and teenagers should keep moderate and high-intensity physical activity time of ≥ 60 minutes every day, which is conducive to the healthy development of body and mind. Li and Ji (2016) found that individuals will experience more depression after slight physical exercise. Gou (2016) thinks that this is because a small amount of physical exercise can't fully awaken the body's motor function, and it will also consume the individual's own physical resources. From the cognitive point of view, Wei (2022) found that middle school students' cognition of physical exercise showed the characteristics that girls were weaker than boys and senior students were weaker than junior students in gender and age. In each period, middle school students have a higher awareness of physical exercise participation.

Research status of physical training courses: Ardoy et al. (2014) studied the gender, age and physical performance of French teenagers, and mainly tested cardiopulmonary health, muscle endurance, sensitivity, shuttle running and other tests in physical education classes, and evaluated them with the test percentiles of the above indicators, indicating that students mainly developed health-related physical performance at this stage, and physical performance was significantly related to age. Harrison et al. (2012) compared the development of adolescent physical health education in China, the United States, Japan and other countries, and constructed a comparative experiment focusing on adolescent physical fitness, which proved that targeted physical fitness development training is helpful to the development of adolescent physical health. Han, Pan and Chen (2021) put forward that physical exercise class is a class type in the new development stage of school physical education and health curriculum reform. Jiang and Pei (2023), based on the stepped lifelong physical education model, physical fitness pyramid model and "window period" of physical fitness development, and under the guidance of sports physiology, sports training and other professional theories, fully considered the characteristics of middle school students' physical fitness development, made an in-depth discussion on the construction of middle school physical fitness curriculum system from three aspects: target design, content design and evaluation method design, in order to provide reference for first-line schools to carry out and implement physical fitness education courses.

Research status of instructional design model: ADDIE model originated from Florida State University in the United States, and it is a guiding system design model developed by the school teaching and research center to better train

military personnel. Later, it was extended to companies and enterprises to analyze and meet the development needs of employees and improve the training efficiency and work efficiency of employees. The five letters ADDIE stand for Analysis, Design, Development, Implementation and Evaluation respectively. Nowadays, ADDIE model has been widely used in the field of education and has become a systematic teaching Design model, which includes analyzing learning needs, designing teaching contents and strategies, Developing teaching materials and resources, Implementing teaching methods and activities, and summative or formative evaluation. It is divided into five sections: Analysis, design, develop, implement and Evaluate, among which analysis and design are the premise, development and implementation are the core, and evaluation is the guarantee.

Research status of students' satisfaction: Foreign scholar Gilbert, Morton and Rowley (2007) and others think that students' satisfaction refers to the matching degree between expectations before formal learning and actual experience during learning. If self-feeling is greater than or equal to expectations, it means satisfaction; On the other hand, they are not satisfied. Zhang (2024), a scholar in China, thinks that students' satisfaction is a psychological state that arises when students' needs are realized in the learning process. When the needs are met, students feel happy and have high satisfaction. On the contrary, students' satisfaction is low.

4. Conceptual Framework

(1) Cross Fit training. In this paper, Cross Fit is defined as a physical exercise with high intensity, low interval, multi-station and single cycle, which includes continuous and changeable functional training of weightlifting, track and field and gymnastics.

(2)Physical health. The definition of "physical health" discussed in this paper is the same as that in the National Physical Health Standard. Definition in National Physical Health Standard: Physical health covers the category of students' physical health closely related to school physical education. In order to define its connotation and avoid confusion with the three-dimensional concept of health, "constitution" is taken as the attributive of "health" to show its connotation. Physical health includes body shape, body function and body quality.

(3)Physical training. In this paper, physical exercise is a kind of physical activity process that uses various sports methods to develop the body, improve health, strengthen the body and entertain the body and mind. It plays an important role in promoting human growth and development, eliminating fatigue, regulating mood, improving physical work ability, cultivating fitness posture, improving physical work ability, preventing and treating diseases, and prolonging life.

(4)Physical training courses. The physical fitness course in this paper refers to the overall plan and scheme of educational content and learning process made in advance to ensure the smooth realization of the purpose of developing physical fitness.

5. Methodology

This study adopts a mixed research method, combining quantitative experimental research with qualitative interview research, to comprehensively explore the influence of CrossFit-based physical training courses on middle school students' physical health. In this study, firstly, questionnaire survey and interview are used to determine the action indexes of Cross Fit training in middle school students' physical training courses from gymnastics, self-weight training, single-structure metabolic adaptability training and weightlifting. Then, a middle school physical training course based on Cross Fit training is developed, and students from Grade Two of Beijing Longtan Middle School are selected to conduct an experimental comparison between the general physical education course and the middle school physical training course based on Cross Fit training. Among them, the experimental group is Grade Two (Class Three), with 23 boys and 21 girls. The control group is Grade Two (Grade One) class, with 23 boys and 21 girls (44). This paper analyzes the changes of students' physical health indexes in these two classes and discusses the influence of middle school physical training courses based on Cross Fit training on middle school students' physical health.

The CrossFit-based physical training course is divided into three stages: basic stage (Weeks 1-4), consolidation stage (Weeks 5-8), and intensive stage (Weeks 9-12), with 3 classes per week and 45 minutes per class. The course content integrates three types of training: gymnastics (bodyweight exercises such as push-ups, squat jumps, and lateral plate support), weightlifting (resistance training such as dumbbell swings and hard pulls), and metabolic adaptability

training (aerobic exercises such as skipping rope and variable-speed running). The training intensity is controlled at 55%-89% of maximum heart rate (RPE 12-16), and training modes such as EMOM (Every Minute on the Minute), AMRAP (As Many Rounds As Possible), and Tabata are adopted to ensure training effectiveness.

(1)Interviewing method
In this study, 10 experts were selected by purposive sampling for semi-structured interviews. The expert selection criteria are: (1) having more than 8 years of experience in sports training or middle school physical education teaching; (2) holding intermediate or above professional titles (including associate professor, senior physical education teacher, etc.); (3) having relevant research experience in CrossFit training or adolescent physical health. The interview outline was designed as follows: ① Selection of the content of physical training curriculum system in middle schools based on CrossFit training; ② Selection of test indicators; ③ Control of experimental variables and matters needing attention in the experimental process; ④ Design of experimental process. Research purposes: According to the opinions of experts, determine the evaluation index of middle school students' physical health.

(2)Experimental research method
Two classes were randomly selected as the experimental class and the control class. The experimental class adopted the middle school physical training curriculum system based on Cross Fit training, while the control class adopted the traditional physical education curriculum. The physical education teachers in both classes were the same teacher. Before the experiment, there was no significant difference in the data of students' physical health indicators between the two groups, and a 12-week teaching experiment was conducted. Research purposes: Through this teaching experiment, with the help of the school's smart playground platform, this paper makes a comparative analysis of the evaluation index data of students' physical health in the experimental group and the control group to explore the influence of middle school physical training courses based on Cross Fit training on middle school students' physical health.

6. Results

(1) The analysis of the influence of establishing middle school physical training course based on Cross Fit training on middle school students' physical health. ① Comparative analysis of various physical health indexes of the students in the experimental group and the control group before the experiment: There was no significant difference in endurance quality between the students in the experimental group and the control group before the experiment. ② Comparative analysis of various physical health indexes of students in the experimental group before and after the experiment: The 12-week physical training course based on Cross Fit training did not significantly improve the endurance quality of students. ③ Comparative analysis of various physical health indexes of students in the control group before and after the experiment: After 12 weeks of traditional physical education class, the strength and quality of middle school students have all improved, but the improvement is not significant. The results of endurance quality test show that after 12 weeks of traditional physical education class, the results of boys' 1000-meter running decreased from 290.55±11.55s before the experiment to 288.16±11.86s, girls' 800-meter running decreased from 257.15±10.85s before the experiment to 255.03±11.07s, and boys' 1000-meter running and girls' 8000-meter running in the control group before and after the experiment. ④ After the experiment, the students in the experimental group and the control group made a comparative analysis of various physical health indicators: The students in the experimental group got obvious improvement in strength quality, mainly because in the teaching method of physical training course based on Cross Fit training, the practice method of trunk stability can strengthen the strength quality of students' core parts, and enhance the recruitment of muscles by nerves and the efficiency of the power chain of upper and lower limbs; In the compound exercise of rapid expansion and contraction, the elastic potential energy and stretching reflex of upper and lower limb muscles and tendons can be improved through training, so that the upper and lower limb muscles can move more quickly and powerfully centripetal. In order to improve students' strength quality, this experiment adopts a variety of physical training methods based on Cross Fit training, such as: leaning over the bridge, leaning over the bridge with one hand and one leg stretching on the opposite side, throwing the ball with a medicine ball over the top, lying on both sides, sitting up and throwing the medicine ball, etc. The physical training means of physical training course based on Cross Fit training has the advantages of diversification and integrity, and the effect of improving students' strength quality within 12 weeks is better than that of traditional physical education class. By contrast, the teaching means of physical training course based on Cross Fit training can improve students' strength quality in all aspects. In the 1000m and 800m running events of the two classes, students have improved their endurance quality to some extent through two kinds of exercises, but there is no big difference after the experiment. This means that the physical training course based on Cross Fit training has no obvious advantage in improving students' aerobic quality

compared with the traditional physical education class in 12 weeks. Based on the above analysis, it shows that there is no significant difference in endurance quality between male and female students.

Table 1. Comparison of physical fitness indicators between experimental group and control group after 12-week intervention

Indicator	Experimental Group (Mean±SD)	Control Group (Mean±SD)	t-value	p-value
50m run (s)	7.86±0.73	8.52±0.71	-3.216	0.002
Sit-and-reach (cm)	14.62±1.65	10.35±1.89	4.128	0.000
Pull-ups (times, male)	10.25±1.78	8.63±1.62	2.894	0.005
Standing long jump (cm)	198.75±9.62	186.32±8.95	3.567	0.001
1-min sit-ups (times, female)	35.82±5.63	31.25±6.01	2.673	0.009
1000m run (s, male)	286.35±12.58	288.21±11.76	0.562	0.575
800m run (s, female)	253.42±10.65	255.18±11.23	0.489	0.626

(2) Analysis of students' satisfaction with the establishment of middle school physical training courses based on Cross Fit training and its influencing factors. ① Analysis of students' overall satisfaction: The students' overall satisfaction score for the physical training course based on Cross Fit training is 3.425, ranging from 3 to 3.5, indicating that students are satisfied with the physical training course, but the degree of satisfaction is average. ② analysis of influencing factors: the p values of TTS1-TTS7 are all 0. 000, which is statistically significant. However, the mean value of TTS1 is the smallest, and the mean values of TTS5 and TTS6 are the largest, and the mean values of TS3 and TS7 are the same. Generally speaking, there are significant differences in the average value of the dimension of teacher's teaching level (TTS).

7. Discussion

From the perspective of the ADDIE instructional design model (Analysis, Design, Development, Implementation, Evaluation), the CrossFit-based physical training course in this study systematically covers the five core links of curriculum development, which is consistent with the theoretical framework of curriculum design proposed by Branch & Merrill (2012). Compared with the traditional physical education curriculum, this course emphasizes the comprehensiveness of training content and the scientific of intensity control, which is in line with the research conclusion of Eather et al. (2015) that CrossFit training can effectively improve adolescents' physical fitness.

(1) The analysis of the influence of establishing middle school physical training course based on Cross Fit training on middle school students' physical health. In this study, the physical training course of middle school based on Cross Fit training was designed and developed, and two classes were selected in the second grade of Beijing Longtan Middle School for 12 weeks. Through the analysis of students' physical health test data, the effectiveness of curriculum development is judged.

In terms of body shape, the two courses have little effect on students' body shape, and there is no significant difference. Within 12 weeks, although the students in the experimental group lost weight, the range was small, and the difference in height, weight and BMI was small, indicating that 12 weeks was too short to improve their body shape.

In terms of physical function, there is no significant improvement in students' vital capacity between middle school physical training courses based on Cross Fit training and traditional physical education courses, and there is no significant difference. The improvement of vital capacity is related to physical exercise and age. Although Cross Fit training can improve the strength of core muscles and traditional physical education exercises can also help to improve vital capacity, the ability to improve vital capacity in 12 weeks is limited.

In terms of physical fitness, ① speed quality: There is a significant difference in the 50m scores of middle school students in the physical training course group based on Cross Fit training before and after the experiment, and there is a significant difference between the two groups after the experiment, but there is no significant difference in the traditional physical education course group, which shows that the course can significantly improve the speed quality. The reason is that the turn-back running and variable-speed running can improve the excitability of the central nervous system, the barbell squat can improve the strength of the quadriceps and hamstrings, the sit-ups can improve the strength of the core muscles, the knee lifts can be supported to strengthen the training of the hip muscles, and the explosive power and core stability of the lower limbs can be improved. However, the traditional physical education

curriculum focuses on simple speed exercises, but the improvement of the explosive power and core strength of the lower limbs is limited. ② Flexibility: There was a significant difference in the performance of students' sitting forward flexion in the physical training course group based on Cross Fit training before and after the experiment, and there was a significant difference between the two groups after the experiment, but there was no significant difference in the traditional physical education course group, which indicated that the course had a significant effect on improving flexibility. The reason is that its exercise means can enhance the strength of rectus abdominis and other muscle groups, improve the active bending ability of spine, dynamic stretching means can improve the elasticity of muscles and ligaments, and multi-joint functional exercises also enhance the flexibility quality, while traditional physical education courses mainly focus on static stretching, which has limited improvement on the overall flexibility quality. ③ Strength quality: Before and after the experiment, the scores of male students' pull-ups, standing long jumps and female students' sit-ups and standing long jumps in the physical training course group based on Cross Fit training were significantly improved, but there was no significant difference in the traditional physical education course group. In terms of pull-ups, this course strengthens the strength of upper limbs and back by push-ups and jumping boxes, and improves the efficiency of upper limb power chain. Traditional physical education class has limited promotion of auxiliary muscles and small muscles. In the standing long jump, this course enhances the explosive power and core stability of lower limbs through squats and knee jumps, but the traditional physical education class lacks training on explosive power and small muscle groups of lower limbs. In the aspect of 1-minute sit-ups, the rich training methods of this course improve the strength of core muscles, while the training methods of the control group are single. In a word, the physical training methods of this course are diversified and integrated, and the effect of improving strength and quality within 12 weeks is better than that of traditional physical education class. ④ Endurance quality: Although the physical training class based on Cross Fit training and the traditional physical education class can improve the endurance quality, the improvement is not significant and there is no big difference. The reason is that the experimental period is short, the improvement of endurance quality requires long-term exercise, and the improvement range is limited within 12 weeks.

On the whole, the middle school physical training course based on Cross Fit training has obvious advantages in speed, flexibility and strength, but there is little difference with the traditional physical education course in body shape, physical function and endurance, which may be due to the short experimental period. Curriculum development is effective to some extent, but it still needs further research and improvement.

(2)Analysis of students' satisfaction with the establishment of middle school physical training courses based on Cross Fit training and its influencing factors. Through regression analysis and correlation analysis, we can know that four factors, namely, teachers' teaching level, course content and quality, course resources, facilities and environment, and management and support services, have a significant impact on students' satisfaction, and teachers' teaching level has the greatest correlation with students' satisfaction, while management and support services have the least correlation.

In terms of teachers' teaching level, students are satisfied with the interaction between teachers and students and the explanation of learning difficulties, which shows that teachers pay attention to classroom communication, can give students feedback and help in time, and grasp the learning difficulties. The degree of satisfaction in teaching content and classroom organization, skill knowledge explanation and teaching methods is moderate, and teachers can meet the needs of students in combing teaching content and controlling skill knowledge. However, the satisfaction with teachers' Cross Fit training techniques and demonstration ability is low, because teachers focus on the overall organization and implementation, ignoring their own skills demonstration and mastery. In addition to imparting sports knowledge and skills, teachers should also pay attention to their own skills display.

In terms of course content and quality, students are not satisfied with the physical training course to meet their physical training needs and training intensity. At present, the course content is designed with reference to "Cross Fit Level 1 Training Guide" and combined with the actual situation of middle school students, but it is not investigated among students, which leads to deviation from students' needs and actual situation. However, students are satisfied with the curriculum structure and cycle arrangement, and the curriculum structure and foundation of the preparation part, the basic part and the end part, and the cycle arrangement of the consolidation and strengthening stage are in line with the actual situation of students.

In terms of curriculum resources, facilities and environment, students are not satisfied with curriculum resources. Beijing Longtan Middle School only conducted a physical training course experiment based on Cross Fit training in Class One, Grade Two, and the related resources in the school library and online resource library were limited and not

open to students, which made it inconvenient for students to study after class. In terms of course facilities, the school activity venue can't meet the students' class needs because there are many classes and students at the same time. In terms of course environment, students are satisfied with the safety of equipment and venues. The school attaches importance to the management of venues and equipment, regularly overhauls equipment, and conducts indoor teaching in bad weather to ensure the safety of students. However, students' satisfaction with the school's response to sports injuries is low, mainly because teachers do not support students' unreasonable internship requirements and fatigue. In addition, students' satisfaction with the rich extracurricular activities of physical training is low, because the class time is limited, and it is difficult to realize the fun of students' experience. However, there is no such activity outside the school, so teachers and schools need to think about the implementation mode of combining in-class and out-of-class activities.

In terms of management and support services, students are not satisfied with school policy support. Beijing Longtan Middle School has not issued policies such as teachers' incentive and management system to carry out physical training courses. The leaders do not pay attention to the course development and promotion in the whole school, but pay more attention to traditional physical education courses to improve the results of the senior high school entrance examination, which leads to the decrease of students' enthusiasm and satisfaction. Curriculum evaluation management is not distinguished from traditional physical education curriculum, and performance assessment is still the only criterion. The school also failed to provide training support for teachers' physical training courses, which affected teachers' teaching level and students' satisfaction. Beijing Longtan Middle School pays attention to students' learning feedback and communication of teaching problems in communication management, but the satisfaction is average because of the lack of leadership and policy support.

Therefore, in order to improve the students' satisfaction of physical training courses based on Cross Fit training, it is necessary to improve from various influencing factors.

8. Conclusions

In this study, a physical training course based on Cross Fit training was designed and developed, and two classes from Grade Two of Beijing Longtan Middle School were selected for 12 weeks of experimental research, and the following conclusions were drawn:

The influence of middle school physical training curriculum system based on Cross Fit training on middle school students' physical health level is as follows: in terms of physical shape, neither the middle school physical training curriculum based on Cross Fit training nor the traditional physical education curriculum has much influence on students' physical shape, and there is no significant difference between them. In terms of physical function, before and after the experiment, no significant difference was found between the experimental group of middle school physical training course based on Cross Fit training and the control group of traditional physical education course. Therefore, the physical training courses in middle schools based on Cross Fit training and traditional physical education courses have no significant improvement on students' health, but there is no significant difference between them. Vital capacity is the amount of breath that the human body tries to exhale after the maximum inhalation, and the amount of breath is an important index to judge the respiratory function of the human body. Participating in sports can improve students' vital capacity and the strength of lung respiratory muscles. Physical training based on Cross Fit training can improve the strength of core muscles, while the lungs are in the core position of the body, such as sit-ups and other actions will also enhance the strength of intercostal muscles and diaphragm, which will help to improve vital capacity, but the physical training of Cross Fit training has limited improvement on vital capacity performance. Only 12 weeks is a short time to improve middle school students' vital capacity.

(1) In terms of physical fitness, the physical training course based on CrossFit training has significantly improved the speed quality of middle school students. The experimental results show that there are significant intra-group differences in the performance of 50m running in the CrossFit training group, and compared with the traditional physical education course group, the differences between the groups are obvious after the experiment. CrossFit training helps to improve students' reaction speed, lower limb explosiveness and core stability through a series of special exercises, such as turn-back running, skipping rope and barbell squat. In particular, the strength of quadriceps femoris, hamstring and core muscles is improved, which enhances the muscle strength and coordination of students during running, thus effectively improving the running speed. In addition, the strength enhancement of hip muscles further promotes the explosive power of lower limbs and provides important support for the improvement of speed

quality. Therefore, the physical fitness course based on CrossFit training has a significant effect in improving the speed quality of middle school students.

(2) In the aspect of flexibility, there are significant differences in the performance of middle school students in the physical training course group based on Cross Fit training before and after the experiment, and there are significant differences in the performance of students in the traditional physical education course group after the experiment, while there is no significant difference in the performance of students in the traditional physical education course group before and after the experiment, which shows that the physical training course based on Cross Fit training can significantly improve the flexibility of middle school students.

(3) In terms of strength quality, the scores of male students' pull-ups, standing long jumps and female students' sit-ups and standing long jumps in the physical training course group based on Cross Fit training were significantly improved before and after the experiment, but there was no significant difference in the scores of students in the traditional physical education course group before and after the experiment, and there was no significant difference between the experimental group and the control group before and after the experiment, which shows that the physical training course based on Cross Fit training has a significant effect on improving the strength quality of male students.

(4) In the aspect of endurance quality, the students' long-distance running scores in the experimental group of physical training course based on Cross Fit training and the control group of traditional physical education course improved slightly after the experiment, but the results of independent sample T test showed that there was no significant difference between the boys' 1000m and girls' 800m scores before and after the experiment. This shows that the physical training course based on Cross Fit training has no obvious effect on improving the endurance quality of middle school students.

9. Recommendation

(1) It is suggested that middle schools can offer special courses of physical training, and the Cross Fit training system can be integrated into them, which can effectively improve students' physical fitness.

(2) The improvement of students' body shape and physical function should be considered in the future physical training curriculum of middle schools based on Cross Fit training, so that students' body shape and physical function can be improved in physical education class, and their overall physical health can be improved.

(3) According to the physiological and psychological characteristics of middle school students, reasonably adjust the intensity of physical training courses in middle schools based on Cross Fit training, conduct questionnaires and interviews on students' physical training needs and intensity, further optimize the training content and intensity of physical training courses, and offer more extracurricular activities such as physical training competitions, which can stimulate students' enthusiasm and interest in participating in sports, thus improving students' satisfaction. At the same time, we should strengthen physical education teachers' Cross Fit training knowledge reserve, improve teachers' teaching level and demonstration ability through training, and improve students' satisfaction through management and support services such as teachers' encouragement, changing the existing evaluation methods, and leaders' increasing attention.

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