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Original Paper

Research on the Influence of Ultimate Frisbee on the Health-Related Physical Fitness of Middle School Students

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Abstract

Objective: *This article explores the influence of ultimate frisbee teaching in middle school physical education classes on the health-related physical fitness of middle school students, and provides suggestions for improving the effectiveness of middle school physical education teaching, enriching physical education curriculum content, and promoting the all-round development of middle school students' physical and mental health.* ***Methods:*** *Ninety middle school students in grade eight of Nanning Foreign Language School were divided into an experimental class (N=45)and a control class (N=45). The experimental class carried out ultimate frisbee teaching for 12 weeks, and the control class carried out regular physical education curriculum teaching for 12 weeks. A round of tests on various indicators of students in the two classes was conducted before the experimental intervention, and another test was conducted after 12 weeks of experimental intervention to compare the changes in related indicators such as body shape, cardiopulmonary fitness, muscle fitness, and flexibility fitness of students before and after the experiment.* ***Results:*** *(1)After 12 weeks of intervention, the height, vital capacity, sit-up and standing long jump scores of students in the experimental class significantly increased ($P < 0.05$), and the increase was better than that of the control class. (2)There was no significant difference in the changes of body weight, BMI value and sit-and-reach scores of students in the experimental class and the control class ($P > 0.05$), but the increase in the stretching distance of sit-and-reach of students in the experimental class before and after the experiment was greater than that of students in the control class.* ***Conclusion:*** *Ultimate frisbee can significantly improve the cardiopulmonary fitness and muscle fitness of middle school students and promote the height development of middle school students. Therefore, middle school students can adopt long-term regular*

ultimate frisbee in their future study and life to achieve the purpose of promoting growth and development and improving health-related physical fitness.

Keywords

ultimate frisbee, physical fitness, middle school students

1. Introduction

On 24th July 2021, the General Office of the CPC Central Committee and the General Office of the State Council issued the Opinions on Further Reducing the Burden of Homework and Out-of-School Training for Students in Compulsory Education Stage (built as the 'Double Reduction' policy), which aims to reduce the burden of homework and training for students and build a good learning environment for them to grow up healthily. In this context, school sports should optimise the practice strategies in teaching concepts and methods, curriculum and content, school sports activities and competitions, etc., so as to build a good education pattern and promote the healthy development of students' body and mind to lay a foundation, which is linked to the "how to teach physical education classes well, how to design a more distinctive physical education curriculum". This has become a hot topic for discussion and research by many scholars (Group of Experts, 2021). Ultimate Frisbee is a fast-paced, non-contact, self-refereeing team sport (Deng Jie, Wu Cairong, & Yu Peng, 2014), which is a very interesting emerging sports, the project can be a good way to trigger the interest of secondary school students in sports, increase the enthusiasm of secondary school students to take the initiative to participate in sports and physical exercise, and also cultivate good sports habits and lifelong awareness of sports. 2021 National Physical Education and Sports Association of China (NPEAC) has established a National Physical Education Programme (NPE). In 2021, the Social Sports Centre of the State General Administration of Sports issued the 'National Discsports Competition Rules (Trial)' and 'National Discsports Refereeing Laws (Trial)', which made the development of the project more standardised, and in April 2022, the Ministry of Education issued the 'Compulsory Education Curriculum and Curriculum Standards (2022 Edition) Notice', which explicitly listed discsports as an emerging sports project. The official inclusion of Frisbee in the compulsory education curriculum not only reflects the importance that the state attaches to the development of Frisbee, but also lays a solid foundation for the promotion of the sport on campus (Wei, 2022). Chen Hailong et al. believe that, according to the rules of Frisbee, the sport can exercise the ability of participating students to deal with interpersonal relationships, cultivate their positive attitude towards life, shape their honesty, and cultivate the spirit of teamwork, which is very conducive to improving the social adaptability of students (Chen & Wang, 2017). Although there are a few studies on the effects of Ultimate Frisbee on physical and mental health of secondary school students, there is still a lack of empirical studies on the effects of Ultimate Frisbee on the health and fitness of secondary school students from a practical point of view. Given that the Ministry of Education of China is strongly advocating the policy of 'Double Reduction' and the national awareness of sports has been generally improved, and considering the

trend of diversification of physical education in secondary schools in Nanning City, the author took 90 secondary school students in Nanning Foreign Language School as the experimental subjects of the study, and arranged them into two classes, i.e., the experimental class and the control class, for a 12-week teaching period. The experimental class was taught Ultimate Frisbee and the control class was taught regular physical education. After 12 weeks, the effect of Ultimate Frisbee on the health and fitness of secondary school students was judged according to the results of the tests and compared with the effect of regular physical education.

2. Research Objects and Methods

2.1 Research Objects

The effects of Ultimate Frisbee on the health and fitness of secondary school students were studied. Ninety students in the eighth grade of Nanning Foreign Language School were randomly divided into the experimental class (N=45) and the control class (N=45). In order to minimise the interference of other factors on the experimental results, the 90 students were all boarding students, who lived and ate in the school, and did not enrol in other extracurricular sports training after school hours or on weekends. Secondly, all the students were healthy, free of injury or illness, informed of the precautions, potential risks and contingency plans of the experiment, and signed an informed consent form to participate in the study.

2.2 Experimental Methodology

2.2.1 Experimental Design and Intervention Programme

Firstly, a pre-test was conducted for the students of the experimental class and the control class and the results were recorded before the teaching experiment was carried out. Before the test, the instructor explained the method of each test item to the students, so as to avoid the errors caused by the students' lack of understanding of the rules or the operation errors, and the detailed measurement methods were referred to the “Implementation of Physical Education Measurement and Evaluation” (Yuan & Huang, 2011). Subsequently, a 12-week teaching experiment was conducted for both classes. Both the experimental and control classes used the teaching time specified in the Physical Education and Health Curriculum Standards (2022 edition), i.e., three teaching interventions were conducted every week, each lasting about 40 minutes. The experimental class was taught basic Ultimate Frisbee skills, tactical exercises and instructional games. The control class was taught the regular physical education curriculum in accordance with the requirements of our regular Level IV. At the end of the 12-week experiment, the students in the experimental and control classes were tested a second time and the results were recorded according to the previously tested indicators. In order to better control the experimental variables, the research team carefully recorded the attendance of each student, strictly followed the semester teaching plan of the school and the teaching plan of the Ultimate Frisbee experimental course designed by the research team, and ensured that the content of each lesson was effectively completed and the intensity of the exercises was appropriate. In addition, the extracurricular

training and other activities of the experimental class and the control class were monitored and controlled to avoid affecting the accuracy of the experimental results.

2.2.2 Test Indicators and Test Methods

Health fitness consists of body shape, cardiorespiratory fitness, flexibility fitness and muscular fitness. With reference to the indexes of physical education examination and the feasibility and scientificity of the experiment, the following indexes were selected as the standard for testing in this study. In the physical form part, height and weight were chosen as the test indicators and BMI was calculated; lung capacity was used to measure students' cardiorespiratory function; flexibility fitness was chosen as the test indicator of forward bending (seated position); and muscular fitness included two aspects of muscular endurance and muscular strength, which were chosen as the test indicators of sit-ups and standing long jump respectively.

Body shape test

Height: Before and after the experiment, the height of the students was measured with the help of the school's Standard Height and Weight Intelligent Measuring Instrument, during the measurement, the instrument was placed on the flat and smooth ground, and the subjects were barefooted, with their backs to the instrument, standing on the instrument with their torsos naturally straight and their eyes flatly in front of them, and then the instrument was read out and the recorders recorded the values shown on the instrument of the height of the subjects.

Weight: The same as above using the height and weight intelligent measuring instrument to measure the student's weight before and after the experiment, the subject in an empty stomach state for measurement, take off heavy clothing light clothing, keep the body stable during the measurement, barefoot, naturally stand on the scale, the recorder to check and record the values displayed by the instrument.

BMI: BMI is a body mass index that is recognised and widely used in the world to reflect whether the human body is healthy or not, with the formula: weight (kg) ÷ height (m squared); i.e., BMI = weight (kg) / [height (m)].2 BMI was calculated together with the height and weight data of the students after they had been recorded.

Measurement of cardiopulmonary fitness

Lung capacity is a commonly used indicator of cardiorespiratory fitness and the test procedure is easy to operate, which fully reflects the body's cardiorespiratory function (Han J, Park S, Kim Y, et al., 2016), so the classic lung capacity seat assessment indicator was chosen for the cardiorespiratory fitness in the present study, and the spirometer held by the school was used to conduct the test. Before the test, the staff explained the main points of the test to the subjects. During the test, the subjects held a disposable expiratory cup tube in their hands, inhaled deeply and then exhaled slowly until they could not exhale, and the value shown on the display screen was the value of their lung capacity.

Determination of Flexibility

Flexibility was measured by using a forward bending tester, which is normally used in the school, placed on a flat surface. The tester was placed on a flat surface. During the test, the subject was in a sitting position, facing the tester with both legs together and straight on the footrest of the tester. Hands parallel to the two thumbs together, palms facing down, the body bent forward and stretched horizontally. Push the scale with the fingertips slowly and evenly until it cannot be pushed forward. A positive value is recorded when the scale exceeds '0' and a negative value when it does not.

Determination of muscular fitness

Muscular endurance was selected for sit-up index test, with a staff and a student to form a group of two people to help each other, the test students in the staff to help fix the lower limbs and carry out the test, the staff to observe the testers whether the movement is standardised and calculate the number of tests, timing one minute. Muscle strength was measured by the standing long jump index, using the existing standing long jump field in the school. During the test, the test subject separated his/her feet slightly wider than shoulder width, stood behind the jumping line, swung his/her hands from up to down and backward, and jumped out with both feet upward and forward at the same time. After the test, the staff will measure and record the distance.

2.3 Mathematical Statistics

The data obtained from the test were analysed by using Excel and SPSS 26.0 to organize the obtained data, and the test results of each index of the experimental subjects and the change values of the test results before and after the two tests were presented in the form of mean±standard deviation, and repeated-measurement analysis of variance (ANOVA) was used to measure the difference of the data, with $P<0.05$ as significant difference, $P>0.05$ as non-significant difference, and $P<P<0.01$ was considered as highly significant difference.

3. Research Results

3.1 Comparison of Body Morphology before and after the Experiment

3.1.1 Height Comparison

Table 1. Comparison of Height before and after the Experiment between the Experimental and Control Classes (cm)

		N	Pre-test	Post-test	Change value
Height (cm)	experimental class	45	164.030±7.484	164.507±7.539	0.47763±0.384
	control class	45	163.137±7.368	164.325±7.409	0.188±0.179

Table 2. Analysis of Variance (ANOVA) Table for Repeated Measures of Height

	F	P
times	73.758	0.000
intergroup	0.291	0.592
Time* intergroup	13.912	0.000

The data in Tables 1 and 2 show that after repeated measures analysis of variance, it was found that the effect between groups was not significant, and the data showed homogeneity, (F=0.291, P>0.05), indicating that there was no significant difference in height between the two classes of students before the experiment. The effect of teaching time was significant, (F=73.758, P<0.01), indicating that the height of students would increase significantly as the teaching programme progressed. There was a significant interaction between teaching time and group, (F=13.912, P＜0.01), and then by observing the height change values of the two groups, it can be found that there is a tendency of height increase in both experimental and control classes, but the tendency of increase in the experimental class is more significant. Therefore, the effect of the experimental intervention of Ultimate Frisbee is better than that of the regular physical education class in promoting the height growth of students.

3.1.2 Weight Comparison

Table 3 Comparison of Body Weight before and after the Experiment between the Experimental and Control Classes (kg)

		N	**Pre-test**	**Post-test**	**Change value**
Weight (kg)	experimental class	45	52.547±6.999	52.677±7.260	0.130±0.763
	control class	45	53.747±8.546	53.943±8.690	0.196±0.350

Table 4. Body Repeated Measures ANOVA Table

	F	P
times	4.538	0.037
intergroup	0.365	0.548
Time* intergroup	0.189	0.665

The data in Tables 3 and 4 showed that the effect between groups was not significant, the data showed homogeneity, (F=0.365, P>0.05), and there was no significant difference in the weight of the students in the two classes before the experiment. The effect of teaching time was significant (F=4.538,P<0.05), indicating that after 12 weeks of instruction, the weight of the students in the experimental and control classes increased. There was no significant interaction between teaching time and group (F=0.189,P＞0.05), indicating that there was a tendency for the weight of the students in the control class and the

experimental class to increase at the same time, but the difference between the two was not obvious. Therefore, there was no significant effect of Ultimate Frisbee exercise on the students' weight change.

3.1.3 Comparison of BMI

Table 5. Comparison of BMI before and after the Experiment between the Experimental and Control Classes

		N	**Pre-test**	**Post-test**	**Change value**
BMI	experimental class	45	19.438±1.422	19.383±1.435	-0.055±0.235
	control class	45	20.113±2.244	20.133±2.206	0.020±0.126

Table 6. ANOVA Table for Repeated Measures of BMI

	F	P
times	0.521	0.473
intergroup	2.182	0.145
Time* intergroup	2.343	0.131

The data in Tables 5 and 6 showed that the between-group effect was not significant, and the data showed homogeneity, ($F=2.182$, $P>0.05$), indicating that there was no significant difference in the BMI levels of students in the two classes before the experiment. The time effect was not significant, the data showed homogeneity, ($F=0.521$, $P>0.05$), indicating that there was no significant change in the BMI of the students in the experimental class and the control class after 12 weeks of instruction. There was no significant interaction between time and group, ($F=2.343$, $P>0.05$), which indicated that there was also no significant difference in BMI changes between the experimental and control classes. Therefore, there was no significant effect of Ultimate Frisbee exercise on the BMI changes of the students.

3.2 Comparison of Lung Capacity

Table 7 Comparison of Lung Capacity before and after the Experiment between the Experimental and Control Classes

		N	**Pre-test**	**Post-test**	**Change value**
spirometry	experimental class	45	2764±554.378	2931.6±549.725	167.6±74.531
	control class	45	2844.33±525.670	2900.4±558.991	56.07±49.956

Table 8. ANOVA Table for Repeated Measures of Spirometry

	F	P
times	186.426	0.000
intergroup	0.03	0.862
Time* intergroup	46.357	0.000

The data in Tables 7 and 8 showed that the effect between groups was not significant, the data showed homogeneity, (F=0.03, P>0.05), and there was no significant difference in the spirometry levels of the students in the two classes before the experiment. The time effect was significant, (F=186.426, P<0.01), indicating that after 12 weeks of instruction, there was a significant increase in the spirometry of the students in both groups. There was a significant interaction between time and group, (F=46.357, P<0.01), and by observing the change values of lung capacity in the two classes, it could be found that the lung capacity of students in the experimental class and the control class had increased, but the trend of the students in the experimental class had increased more significantly. Therefore, the effect of the experimental intervention of Ultimate Frisbee is better than that of the regular physical education class in improving students' cardiorespiratory fitness.

3.3 Comparison of Flexibility Fitness

Table 9. Comparison of Seated forward Bending before and after the Experiment between the Ultimate Frisbee Class and the Control Class

		N	**Pre-test**	**Post-test**	**Change value**
Forward body flexion (cm)	experimental class	45	5.530±6.551	5.535±6.553	0.005±0.020
	control class	45	4.590±5.666	4.593±5.667	0.003±0.005

Table 10. ANOVA Table for Repeated Measures of Seated forward Bending

	F	P
times	4.855	0.032
intergroup	0.354	0.554
Time* intergroup	0.070	0.792

The data in Tables 9 and 10 showed that the effect between groups was not significant, the data showed homogeneity, (F=0.354, P>0.05), and there was no significant difference in the level of sitting forward bending of the students in the two classes before the experiment. The time effect was significant, (F=4.855, P<0.05), indicating that after 12 weeks of instruction, there was a significant improvement in the students' performance of sitting prone flexion in both groups. There was no significant interaction between time and group (F=0.070, P＞0.05), indicating that there was a tendency for the students' sitting

forward bending scores to improve in both experimental and control classes, but the difference between them was not obvious. Therefore, both Ultimate Frisbee and regular physical education can significantly improve the students' flexibility fitness, but there is no significant difference between the two effects.

3.4 Muscle Fitness Comparison

3.4.1 Comparison of Sit-ups

Table 11. Comparison of Sit-ups before and after the Experiment between the Experimental and Control Classes

		N	**Pre-test**	**Post-test**	**Change value**
sit-up (physical exercise)	experimental class	45	34.730±7.961	36.470±8.386	1.740±0.868
	control class	45	34.600±6.739	35.830±6.628	1.230±0.935

Table 12. Analysis of Variance (ANOVA) Table for Repeated Measures of Sit-ups

	F	P
times	162.109	0.000
intergroup	0.040	0.843
Time* intergroup	4.605	0.036

The data shown in Tables 11 and 12, the effect between groups was not significant, the data showed homogeneity, ($F=0.040$, $P>0.05$), there was no significant difference between the sit-up levels of the students in the two classes before the experiment. The time effect was significant, ($F=162.109$, $P<0.01$), indicating that after 12 weeks of instruction, there was a significant increase in sit-up performance of students in both groups. There was a significant interaction between time and group, ($F=4.605$, $P<0.05$), and by observing the changes in the sit-up scores of the two classes, it can be found that the sit-up scores of the students in both the experimental class and the control class increased, but the trend of the students in the experimental class increased more significantly. Therefore, the effect of the experimental intervention of Ultimate Frisbee is better than that of the regular physical education class in terms of improving the muscular endurance of the students.

3.4.2 Comparison of standing Long Jump Programmers

Table 13. Comparison of Standing Long Jump Events before and after the Experiment between the Ultimate Frisbee Class and the Control Class

		N	**Pre-test**	**Post-test**	**Change value**
Standing long jump (cm)	experimental class	45	209.470±26.067	210.970±27.006	1.5±1.697
	control class	45	205.470±28.940	205.630±28.895	0.16±0.531

Table 14. Vertical Jump Sitting Repeated Measures ANOVA Table

	F	P
times	26.364	0.000
intergroup	0.424	0.517
Time* intergroup	16.873	0.000

The data in Tables 13 and 14 showed that the effect between groups was not significant, the data showed homogeneity, (F=0.424, P＞0.05), and there was no significant difference in the standing long jump scores of the students in the two classes before the experiment. The time effect was significant, (F=26.364, P＜0.01), indicating that after 12 weeks of instruction, there was a significant improvement in the standing long jump performance of the students in both groups. There was a significant interaction between time and group, (F=16.873, P<0.01), and by observing the changes in the standing long jump scores of the two classes, it can be found that the standing long jump scores of the experimental class and the control class were improved, but the trend of the improvement of the experimental class was more significant. Therefore, the effect of the experimental intervention of Ultimate Frisbee exercise is better than that of the regular physical education class in terms of improving students' muscle strength and explosive power.

4. Analysis and Discussion

4.1 Effects of Ultimate Frisbee on Students' Body Shape

Maintaining an appropriate body shape is an important part of maintaining good health. In addition to individual growth and development, playing sports is closely related to students' body shape. According to the findings of this study, after a 12-week teaching intervention experiment, there was no significant ‘time*between-groups’ interaction effect on students' weight and BMI, except for height. The results of the test also showed that both Ultimate Frisbee and regular physical education were effective in increasing the height of secondary school students, and their weight increased slightly, while BMI showed an upward and downward trend. The results also showed that both Ultimate Frisbee and regular physical education were effective in increasing the height and weight of middle school students. Eighth grade junior high school students are in the golden period of adolescent development, the experimental class and the control class in the 12-week experimental intervention students’ height increased, and the experimental class students’ height growth is greater, on the one hand, because students’ height increases naturally with the development of the students, on the other hand, appropriate physical exercise, students’ height growth has a certain effect, and Ultimate Frisbee exercise is more effective in stimulating the development of students' height, which is extremely important for the development of students. The effect of Ultimate Frisbee on stimulating students’ height development is more obvious, which is most likely because the training content and exercise

load of Ultimate Frisbee are more effective in stimulating the development of students' joints. Although some students' body weight decreased, but the overall trend was up, the reason for analysing the results is that students are in the sensitive period of physical development, and the diet and nutrition are sufficient, together with healthy physical exercise, which promotes the digestion and absorption of the endocrine system of the students, so their body weight increased slightly, but the test results showed that all students did not reach the degree of obesity and overweight. BMI results are affected by both height and weight factors, so no specific trend can be found, current scholars, as well as physical fitness teachers and nutrition experts are using BMI as a measure of body shape and the degree of obesity standards, so although it was found that Ultimate Frisbee sports to stimulate the development of students' height is more effective, but to discover the Ultimate Frisbee sports to promote secondary school students' body shape than the conventional physical education programme to work out the effects of exercise better, need for further research to prove.

4.2 Effects of Ultimate Frisbee on Students' Cardiopulmonary Fitness

Cardiorespiratory fitness is a 'vital sign', also known as cardiorespiratory endurance or aerobic endurance, which is the foundation of the body's sustained work and has been described as the most important element of health and fitness (Ma Tao, Yang Lulu, Li Tengfei, et al., 2018), and the American Heart Association has also suggested that cardiorespiratory fitness is a 'vital sign' and an important indicator of life and death, health and disease (Yan Sheng, 2022). Studies have shown that long-term exercise training can promote myocardial blood supply, enhance coronary artery function, and improve the body's energy and oxygen demand during exercise. In this study, the lung capacity and endurance of the students in the experimental class and the control class were significantly higher than those before the experiment after the 12-week training programme. This indicates that 12 weeks of Ultimate Frisbee teaching is more effective than regular physical education in improving the cardiorespiratory fitness of secondary school students. Training for Ultimate Frisbee involves endurance training methods commonly used in other sports and evokes adequate metabolic adaptations (Deng, 2022). When participating in Ultimate Frisbee, because the sport is a combination of running, jumping and throwing, and is characterised by fast consistency, rich technique and tactical flexibility, coaches need to target both aerobic and anaerobic endurance during normal practice, which can effectively improve cardiovascular fitness (canlan Aaron T., Kean Crystal O., Humphries Brendan J., et al., 2015).

4.3 The Effect of Ultimate Frisbee on Students' Flexibility Fitness

Flexibility, which refers to the magnitude of joint movement and the elasticity and stretching ability of tendons, muscles and ligaments in the joints of the human body, is closely related to factors such as gender, age, ambient temperature, and training basis (Tian & Liu, 2012). After this observational study, we learnt that at the end of the 12-week ultimate frisbee teaching experiment, the level of forward bending (sitting position) of the students in the experimental class of ultimate frisbee and the control class had a more obvious improvement compared with that before the experiment, but the magnitude of

improvement of the students in the ultimate frisbee class was not significantly different from that of the students in the control class, which indicated that the effect of ultimate frisbee on the improvement of flexibility and fitness of the students was similar to the effect of the conventional sports teaching, and the effect of ultimate frisbee was different from that of conventional sports teaching. This indicates that the effect of Ultimate Frisbee on improving the flexibility of middle school students is no different from that of regular physical education. In this study, in order to make the students fully active and to better complete the passing and receiving movements in Ultimate Frisbee, the students in the experimental class of Ultimate Frisbee were provided with some targeted stretching and stretching movements, which improved the stretching and flexibility of the students' joints, muscles and ligaments to a certain extent. The students in the control class also warmed up with regular hot hand exercises and stretched their joints and muscles before physical exercise. According to the test results, there was no significant difference between the two exercise methods in improving students' flexibility. The reason for this may be that the stretching and flexibility exercises performed by Ultimate Frisbee are similar to those performed by conventional unarmed stretching, and no additional load is added, so the stimulation of flexibility is basically similar to that of conventional stretching.

4.4 Effects of Ultimate Frisbee on Students' Muscular Fitness

Muscle fitness can be divided into muscle strength and muscle endurance. Muscle strength is the maximum force produced by a muscle group during a single contraction. Muscular endurance is the maximum number of times a muscle or muscle group can repeatedly overcome a specific resistance (Li Yan, 2017). The muscle fitness indexes selected for this test, standing long jump and sit-up, are all evaluation indexes of secondary school students' physical fitness level set by the national education department. According to the results of the experiment, after 12 weeks of teaching intervention, the level of sit-ups and standing long jumps of students in the experimental class and the control class improved, and the improvement of students in the experimental class was more significant. This shows that Ultimate Frisbee can not only promote the muscular endurance of students, but also enhance the explosive power of students' lower limb muscles, which is a perfect choice to improve students' muscular fitness. In addition, Ultimate Frisbee is also a group sport with a fast rhythm of offensive and defensive transitions, as well as aesthetics of spectacle and sports (Wang Si-Peng, 2021), which is a very good choice to meet the age characteristics of secondary school students, such as lively, active, high participation, and high acceptance. It is a good way to meet the age characteristics of secondary school students who are active, active, participatory and receptive, which greatly enhances their motivation to participate in the programme. On the other hand, the reason why the control class students did not show a significant improvement in the muscle fitness indexes as the experimental class students may be due to the control class students' lack of interest in regular physical education, which may lead to the students' negative mindset, and they may not be able to practise the teaching contents and movements efficiently as they may not be able to perform the teaching tasks.

5. Conclusion

The fun nature of Ultimate Frisbee can give students a high level of enthusiasm for the sport, and the diversified movement skills of the sport can fully stimulate students' skills, thus effectively stimulating students' height development, improving students' cardiorespiratory fitness and developing students' muscular fitness. However, there is no obvious difference between the enhancement effect in body shape (BMI) and flexibility fitness and conventional physical education, so if we want to achieve the purpose of improving flexibility in future physical exercise, we need to further improve the teaching content, and not only through Ultimate Frisbee to achieve the effect.

The physical education classroom needs to improve students' ability from the three dimensions of skills, cognition and emotion, while the Ultimate Frisbee sport is rich in content, the movement is not too difficult, the intensity of the movement is moderate, and the requirements for the venue are not too high, so it is very suitable for carrying out all kinds of activities and tournaments in the campus, and the project will produce a certain degree of novel stimulation for secondary school students around 13-14 years old, and the effect of the project is relatively ideal in cultivating the enthusiasm for participation and interest in learning. Ideal. After a period of scientific training, the physical quality and function of secondary school students can be improved to a certain extent, and at the same time, they can enjoy the rich fun of the programme, and help students to establish the spirit of unity and cooperation and perseverance in collective sports, so the programme has rich social and humanistic values in addition to its own entertainment value, competitive value and fitness value (Xu Xinxia, Deng Yunlong, Tan Zhiping, et al., Tan Zhiping, et al., 2016), which shows that the sport meets both the requirements of the new curriculum and the content that students need to obtain in the physical education classroom. Physical education teachers should pay more attention to Frisbee sports, incorporate Ultimate Frisbee into regular sports activities on campus, systematically develop teaching programmes, assessment mechanisms, and actively promote the sport on campus through various tournaments, on the one hand, increase the participation of students in Ultimate Frisbee sports, and at the same time, lay the foundation for students to cultivate lifelong awareness of sports, which is important for the popularity and development of emerging sports in China and for the physical and mental health development of young people. This is of great significance in promoting the popularity and development of the new sports in China as well as promoting the physical and mental health of young people.

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