



Research Article

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Study on the effect of orienteering to improve the physical quality of college students in colleges

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ABSTRACT

Along with the deepening of reform of physical education in Chinese colleges, people realized that the development of intelligence and physical strength are equally important. Orienteering is integrating health and wisdom of popular fitness programs, and gets into college sports classroom in recent years. This thesis takes first-year undergraduate students of Shijiazhuang University of Economics as the research object, studying from the perspective of speed, endurance, strength, power, etc, using the methods of documentary, teaching experiment, mathematical statistics and comparative analysis method, vertical and horizontal contrasting the physical quality indexes of samples before and after the experiment. The study finds the improving effect of directional cross-country class of students' physical quality, and reveals the advantages and disadvantages of it by comparing with the traditional project teaching.

Key words: Orienteering; Physical quality; Contrast; Effect

INTRODUCTION

Directional movement is a smart sport in our country emerging in recent years. International federation of directional movement defines it as a sport, in which participants use maps and ones, choose their own road looking for targets, in the form of hiking trail running, in order to reach several marker on the map and the checkpoint on the ground at the same time, and strive to in the shortest possible time to complete the whole race [1]. In September 2002, No. 2002-13 file of the ministry of education has redefined the university physical education. Directional movement was very similar to the demands of the file in guiding ideology, education goal and course structure that can fully meet the development needs of the contemporary college students personality.

Directional movement develops rapidly in the southern provinces such as Hunan, Zhejiang, Guangdong, etc. Hebei province has large numbers of colleges and universities and the superior geographical environment [2]. However, the promotion and development of directional movement is not optimistic in colleges and universities of Hebei province.

EXPERIMENTAL SECTION

2.1 The object of study

This study chooses first-year undergraduate students of Shijiazhuang University of Economics as the research object.

Teachers randomly select 10 classes by projects after the students' self-elective placement and complete unified school fitness test. Male and female students were randomly selected into five-member experimental group and five-members control group in each class by gender. Boys and girls of orienteering classes were randomly selected as the experimental group of 50 people for each sample. 50 male and female students of other classes were randomly

selected by the project as a control group samples. Due to the independent student elective gender differences, 50 boys of soccer squad and 50 girls of aerobics classes were selected as control samples only. Experimental and control samples selected randomly cover my school 12 Secondary School and 29 majors. Students come from Hebei, Beijing, Xinjiang, Shandong, Jilin, Tianjin, Guangxi, Sichuan, Guangdong, Liaoning and other provinces; the average age of the boys is 19.6 years, and the average age of the girls is 19.2 years old [3-4].

2.2 Research Methods

2.2.1 Literature method

Literature review and research related material which provides theoretical reference and support for this study.

2.2.2 Teaching experimental method

Experimental samples and control samples selected randomly are not in the same class. They study in their classes according to their own curriculum. The sports ministry will arrange teacher according to the teaching task [5]. Each project classes are taught two semesters, 16 weeks per semester teaching a total of 32 weeks, including centralized exam week. Each class teaching time is 90 minutes.

2.2.3 Mathematical statistics method

The experimenter summarized the physical data acquisition and statistically treated with EXCEL 2003 and SPSS 11.5 statistical software.

2.2.4 Comparative analysis method

Through the longitudinal and comparative analysis of the physical data of the experimental sample, to determine the course the student fitness improves the situation [6]. We horizontal compare the physical indicators of the experimental sample and the control sample and the margin of increase in the last of school year, to know the strengths and weaknesses of orienteering course on the development of physical education compared with other projects.

THE RESULTS AND ANALYSIS

3.1 The physical indicators of the experimental sample and a control sample of early school

Table 1. Boys' physical indicators at beginning of the academic year

Teaching classes	Quality index ($\bar{x} \pm S$)			
	50m (S)	1000m (S)	Standing long jump (M)	Bent arm hang (S)
Orienteering	7.29±0.43	236.90±9.34	2.32±0.10	65.8±8.53
Football	7.27±0.30	232.60±10.05	2.36±0.11	65.3±12.28
Basketball	7.24±0.34	235.50±9.97	2.33±0.13	66.2±8.43
Volleyball	7.26±0.35	233.40±10.09	2.30±0.09	64.5±7.22
Fighting skill	7.30±0.39	238.00±10.32	2.38±0.11	70.5±11.84

Note: There is not significantly different among different samples of the same parameters, $P > 0.05$.

Table 2. Girls' physical indicators at beginning of the academic year

Teaching classes	Quality index ($\bar{x} \pm S$)			
	50m (S)	800m (S)	Standing long jump (M)	Bent arm hang (S)
Orienteering	9.22±0.39	245.00±12.12	1.69±0.10	26.2±3.68
Basketball	9.22±0.40	243.30±11.30	1.68±0.08	29.2±3.74
Volleyball	9.19±0.35	241.60±12.08	1.69±0.11	28.4±3.60
Fighting skill	9.17±0.41	243.20±10.92	1.69±0.09	27.0±3.53
Aerobics	9.15±0.42	243.30±8.91	1.68±0.09	29.2±3.55

Note: There is not significantly different among different samples of the same parameters, $P > 0.05$.

By classifying and comparing various indicators of various classes at beginning of the school year, its performance substantially showed normal distribution. Horizontal comparison test results showed no significant difference on different samples of the same indicator that indicated no significant difference in their physique.

3.2 Fitness index changes of the experimental sample and the control sample in the end of the school year

3.2.1 Boys groups

Table 3. Comparison of boys quality index in the end of school year

Teaching classes	Quality Index ($\bar{x} \pm S$)			
	50m (S)	1000m (S)	Standing Long Jump (M)	Bent arm hang (S)
Orienteering	6.91±0.37	215.50±4.95★	2.46±0.08	83.4±6.88
Football	6.90±0.23	223.20±7.73	2.48±0.07	81.2±9.47
Orienteering	6.91±0.37	215.50±4.95★★	2.45±0.08	83.4±6.88
Basketball	7.09±0.32	228.00±9.56	2.45±0.08	78.3±9.66
Orienteering	6.91±0.37	215.50±4.95★★	2.45±0.08★★	83.4±6.88★
Volleyball	7.23±0.35	232.30±8.51	2.33±0.07	75.3±6.72
Orienteering	6.91±0.37★	215.50±4.95★★	2.45±0.08★	83.4±6.88
Fighting skill	7.27±0.39	236.80±9.82	2.38±0.07	75.8±11.93

★ : Significant differences, $P < 0.05$.

★★: Very significant differences, $P < 0.01$.

Through a comparative analysis of the physical indicators of the lateral end of the sample boys orienteering classes and other classes in the school year (Table 3), we can conclude that:

In the development speed quality (50-meter run), the orienteering courses and martial arts classes comparison results showed significant differences ($P < 0.05$), the average difference value (MD) for 0.36s, compared with other projects are no significant differences [7]. This indicates that the speed of orienteering courses for improving the quality of the boys is better than martial arts class, but there is no significant advantage when compared with other projects.

In the development of endurance quality (1000 m run), the results of the orienteering course was a significant difference when compared football lesson ($P < 0.05$), volleyball, martial arts classes compared with basketball results showed a very significant change ($P < 0.01$), the average value of their difference (MD) were 12.5s, 16.8s, 21.3s. It shows that the development of orienteering teaching boys endurance qualities superior to other traditional items.

In the development of the explosive qualities (standing long jump), the orienteering lesson presents a very significant change ($P < 0.01$) compared with volleyball class quality index, MD=0.129m, compared with the martial arts class performance for significant change ($P < 0.05$), MD=0.082m, compared with football, basketball no significant differences [8]. This suggests that boys explosive orienteering course improving the quality was better than teaching volleyball and martial arts classes, but with football, basketball compared to no significant advantage.

3.2.2 Girl groups

Table 4. Comparison of girls quality index in the end of school year

Teaching classes	Quality Index ($\bar{x} \pm S$)			
	50m (S)	800m (S)	Standing Long Jump (M)	Crunches (time)
Orienteering	8.77±0.34	224.30±13.69★	1.79±0.09★	35.1±2.85★
Basketball	9.06±0.40	236.90±9.29	1.71±0.07	31.7±3.16
Orienteering	8.77±0.34★	224.30±13.69★★	1.79±0.09	35.1±2.85★★
Volleyball	9.12±0.35	240.80±11.59	1.72±0.08	29.4±2.95
Orienteering	8.77±0.34★	224.30±13.69★★	1.79±0.09★	35.1±2.85★★
Fighting skill	9.16±0.40	242.00±9.56	1.70±0.08	29.0±3.65
Orienteering	8.77±0.34	224.30±13.69★	1.79±0.09	35.1±2.85
Aerobics	9.11±0.43	237.40±8.71	1.75±0.08	32.2±3.97

★ : Significant differences, $P < 0.05$.

★★: Very significant differences, $P < 0.01$.

Through a comparative analysis of the physical indicators of the end of the sample girls orienteering classes and other classes in the school year (Table 4), we can conclude that:

In the development speed quality (50-meter run), the results of orienteering course showed significant differences compared to the volleyball and martial arts ($P < 0.05$), but it showed no significant differences compared with basketball, aerobics classes [9]. It shows that there are certain advantages on improving quality effect of girls of orienteering course speed compared with other traditional aspects of the project.

In the development of endurance quality (800 m run), the results of orienteering courses showed a significant

difference ($P<0.05$) compared with the basketball, aerobics classes, and the results showed a very significant change ($P<0.01$) compared with volleyball and martial arts compare lesson.

In the development of the explosive qualities (standing long jump), the results showed significant differences ($P<0.05$) of orienteering courses compared with the basketball and martial arts classes, and its quality index showed no significant change compared with volleyball lessons and aerobics classes [10].

In the development of strength quality (crunches), the orienteering courses compared with the basketball program were significantly different ($P<0.05$), compared with volleyball, martial arts project which is manifested in the quality index change is very significant difference ($P<0.01$) compared with no significant difference in aerobics class.

3.3 Physical indicators changes before and after the experiment

3.3.1 Speed quality

Table 5. Longitudinal comparison on quality index of 50 meters run

Teaching classes	50m (S)			
	Male		Female	
	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)
Orienteering	7.29±0.43	6.91±0.37☆☆	9.22±0.39	8.77±0.34☆☆
Football	7.27±0.30	6.90±0.23☆☆		
Basketball	7.24±0.34	7.09±0.32☆	9.22±0.40	9.06±0.40☆☆
Volleyball	7.26±0.35	7.23±0.35☆	9.19±0.35	9.12±0.35☆☆
Fighting skill	7.30±0.39	7.27±0.39	9.17±0.41	9.16±0.40
Aerobics			9.15±0.42	9.11±0.43☆

☆ : Significant differences, $P<0.05$.

☆☆ Very significant differences, $P<0.01$.

Boys groups in other classes were significantly increased speed quality in addition to fighting skill classes. The results showed a highly significant difference ($P<0.01$) in the before and after the orienteering longitudinal comparison and boys soccer squad ran 50 meters achievement. Basketball and volleyball project was a significant difference ($P<0.05$) [11].

Girls groups in other classes were significantly increased speed quality in addition to fighting skill classes. The results showed a highly significant difference ($P<0.01$) in the before and after the orienteering, basketball and volleyballs squad ran 50 meters achievement. Aerobics class was a significant difference ($P<0.05$).

The results show that the effect is very significant increase of Orienteering Teaching students rate the quality. Its margin of increase that the average difference value (MD) of the boys is 0.38s, girls are 0.45s, were higher than other projects.

Table 6. Quality index longitudinal comparison of 800/1000 meter run

Teaching classes	800/1000m (S)			
	Male		Female	
	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)
Orienteering	236.90±9.34	215.50±4.95☆☆	245.00±12.12	224.30±13.69☆☆
Football	232.60±10.05	223.20±7.73☆☆		
Basketball	235.50±9.97	228.00±9.56☆☆	243.30±11.30	236.90±9.29☆☆
Volleyball	233.40±10.09	232.30±8.51	241.60±12.08	240.80±11.58
Fighting skill	238.00±10.32	236.80±9.82	243.20±10.92	242.00±9.56
Aerobics			243.30±8.91	237.40±8.71☆

☆ : Significant differences, $P<0.05$.

☆☆ Very significant differences, $P<0.01$.

Boys groups, boys' 1000m Dash is obvious of orienteering, football and basketball classes through comparison of before and after longitudinal. The results showed a highly significant difference ($P<0.01$), which averages the difference (MD), respectively 21.4s, 9.4 s, 7.5s. The volleyball classes and martial arts classes to improve performance is not obvious [12].

Girl groups, all classes girls run 800 meters results is evident excerpt volleyball and Aerobics classes through the before and after the improvement outside a longitudinal comparison. Which improvement of Endurance of orienteering classes, basketball class girls was very significant difference ($P < 0.01$), the average difference (MD), respectively 20.7s, 6.4s. Aerobics classes showed significant differences ($P < 0.05$).

The results show orienteering course on improving the quality of students' endurance effect is very significant. The average difference value of its boys is 21.4s, girls' value is 20.7s, which is much higher than other projects and is the most prominent in all projects.

3.3.2 Explosive qualities

Table 7. Comparison of quality index standing long jump

Teaching classes	Standing Long Jump (M)			
	Male		Female	
	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)
Orienteering	2.32±0.10	2.46±0.08☆☆	1.69±0.10	1.79±0.09☆☆
Football	2.36±0.11	2.48±0.07☆☆		
Basketball	2.33±0.13	2.45±0.08☆☆	1.68±0.08	1.71±0.07☆
Volleyball	2.30±0.09	2.33±0.07	1.69±0.11	1.72±0.08☆
Fighting skill	2.38±0.11	2.38±0.07	1.69±0.09	1.70±0.08
Aerobics			1.68±0.09	1.75±0.08☆☆

☆ : Significant differences, $P < 0.05$.

☆☆ Very significant differences, $P < 0.01$.

Boys groups, standing long jump performance of boys increase significantly in orienteering, football, basketball classes. It showed a highly significant difference ($P < 0.01$) through the before and after comparison. While the volleyball classes and Aerobics classes score increase is not obvious ($P > 0.05$). The average difference value (MD) of Boys is 0.14m learns early orientation classes and end of school year that is higher than other projects.

Girl groups, all classes' scores were significantly improved in addition to fighting skill classes through a longitudinal comparison before and after school classes and standing long jump data. Where orienteering classes and aerobics classes the most significant achievement to improve longitudinal comparative results were very significant differences ($P < 0.01$), basketball and volleyball classes longitudinal comparative results for the significant difference ($P < 0.05$). Orienteering class girls in early learning and school at the end of the sample mean of the difference value (MD) of 0.10m, higher than other projects.

The results show the improving effect of the quality of student explosive is very significant in Orienteering Course.

3.3.3 Strength quality

Table 8. Comparison of quality index of bent arm hang and crunches

Teaching classes	Bent arm hang (S)/Crunches (times)			
	Male		Female	
	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)	Begin of school Year ($\bar{x} \pm S$)	End of school Year ($\bar{x} \pm S$)
Orienteering	65.8±8.35	83.4±6.88☆☆	26.2±3.68	35.1±2.85☆☆
Football	65.3±12.28	81.2±9.47☆☆		
Basketball	66.2±8.43	78.3±9.66☆☆	29.2±3.74	31.7±3.16☆☆
Volleyball	64.5±7.22	75.3±6.72☆☆	28.4±3.60	29.4±2.95☆
Fighting skill	70.5±11.84	75.8±11.93	27.0±3.53	29.0±3.65☆☆
Aerobics			29.2±3.55	32.2±3.97☆☆

☆ : Significant differences, $P < 0.05$.

☆☆ Very significant differences, $P < 0.01$.

Boys groups, boys bent drape scores were very significant increase in all courses in addition to martial arts classes. Each class longitudinal comparative results showed a highly significant difference ($P < 0.01$) [13]. The average difference value of orientation class boy is 17.6s which is higher than other projects.

Girl groups, longitudinal comparison crunches data classes before and after school, grades were significantly improved, which in addition to volleyball squad for the significant difference between the outer ($P < 0.05$), other

items classes are very significant differences ($P < 0.01$). Orienteering class girls learn early in the school year the average difference value is 8.9 which are higher than other projects.

The results showed that students Orienteering Course power quality improvement effect is very significant.

CONCLUSION

The Improvement of the physical fitness of students is significant after learning orienteering lesson. In the development of physical fitness, orienteering class has certain advantages compared with traditional items, but do not have the advantage or the advantage is not obvious in the quality of development speed, power, upper body strength aspect.

4.1 Develop speed quality through the campus one hundred meters orientation exercises

One hundred meters orientation should be selected in the terrain is simple, obvious feature, the venue undulating areas, such as school athletic fields, campus squares, gardens, dormitory areas. Make 150-400 meters away from general practice, the route can be crossed, expected completion time for 1-3 minutes. In the way, we can set 5-10 point scale based on between specific topography, surface features, the linear distance between points is shorter according to the situation on the ground is set to a distance ranging from 30-100 meters. Practice organization can divide 2-8 students into 2-4 routes simultaneously starting. Competition in the form of exercise may be one form of confrontation or grouping confrontation.

4.2 Improve jumping ability and weight through the campus Line directional orientation exercise

When we arrange the checkpoint, we can choose to skip the ditches, bunkers, low vegetation, hurdle or rockery, stairs, bleachers and other things, on one side or both sides of the arrangement of one or more consecutive points mark, students must travel the route of these provisions, the checkpoint encountered route marked and painted onto the map, prompting students to run the process in order to reach each target point who must be repeated jumping or climbing exercises to develop their strength and lower limb jumping ability. In order to enhance the effect of exercise, the exercise can be weight-bearing but not too long distance running.

4.3 Develop upper body strength by increasing the quality of practice sports content

Due to the unique characteristics of orienteering, there are fewer opportunities for improving upper body strength during the exercise. Thus, we can plan to develop upper body strength increased mainly in the form of motion exercises at the quality of the content based on the actual situation of each student.

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