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Evaluation of the efficiency of motion games on the physical development of first-grade primary school students in Thai Nguyen province, Vietnam: A follow-up study

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Abstract
Motion games play an important role in the mental and physical development of primary school students. By application of routine study methods in sport, the article identifies 20 motion games aimed at physical development for first-grade primary school students and experiments are organized in reality. Experimental results prove that: The physical capacity of the experimental group positively develops at much higher level than that of the control group, at the probability threshold P <0.05, especially, the students of the experimental group who are very interested in motion games were selected.

Keywords: Physical education, motion games, primary school students, physical capacity, physical and sports

1. Introduction
The motion game is an activity that attract children by its attractiveness. The children are active, playful and interested in new and attractive things, therefore, when organizing activities for children, the organizer should choose activities in line with their psychological characteristics, regional culture and gender so that all of them can participate in the game in a more confident and brave manner. It is important to reasonably arrange time for game organization in consistence with the capacity and level and know how to stop the game at the right time, change the form of the game in a flexible and creative way so that the children do not feel bored. In addition, the organizer should not attach great important to much emphasis on the determination of winner and loser, or evaluate the participation of teams in order to avoid competition and disunity, especially, the organizer should ensure absolute safety in games organization [14, 15].
The motion games contribute to making the collective atmosphere more vivid and happier, quickly helping everyone there to escape from closed passivity, remove any shyness and distance, relieve psychological stress and physical inertia. In primary school, physical exercises are combined with collective song and dance and turned into motion games in which health, quick reflexes and resourceful movements are required. In fact, the motion games does not allow participants to be passive. The children are attracted and participate happily. After a game has really ended, each individual, depending on his/her response level, will discover his own change, especially, he/she become more agile, more alert, smarter or more resourceful. As such, after a period of participation in activities, many games of different forms, the whole group and each individual have automatically improved their physical strength, mind and well practised many skills, which contributes to a friendly and motive atmosphere for further knowledge acquisition [9, 11, 16, 17].
Thanks to a good awareness of importance and meaning of motion games in general, traditional games in particular, primary schools in Thai Nguyen province plan to direct the Youth Union to organize specific, moderate and suitable games for each student. However, according to the results of preliminary survey, extracurricular activities in which the motion games are organized for students are not paid due attention by primary schools, even they are still underdeveloped.

The organization form and method of the movement for practicing extracurricular sports in primary schools are still limited, therefore, the academic results of physical education as well as physical strength of primary school students in Thai Nguyen province, especially the first-grade students are still poor. The organization of motion games in the extracurricular program still reveals many limitations; The reason may be that the facilities, the contingent of teachers in charge of physical education are insufficient and weak; the students have not been given comfortable conditions to play with the games loved by them [1].

2. Study Method

In the study process, we use the following study methods: Methods of analysis and document synthesis; Method of interview, seminar; Pedagogical observation method; Pedagogical test method; Pedagogical experimental method and Mathematical method of statistics.

3. Findings and Discussion

3.1 Selecting sports games to develop physical strength for 1rd grade students in Thai Nguyen Province, Viet Nam

To ensure the scientific basis for the selection of physical games, we interviewed 125 people including: 32 experts and 93 good teachers with long-term and teaching. In order to focus on choosing physical games, the researchers have suggested appropriate and realistic one, in accordance with physiological characteristics, the actual conditions of elementary schools in the Northeastern region, and appropriate with the competence of teachers, students, and existing teaching conditions. The suggested games ensure the harmonious development of typical physical characteristics of students such as health, strength, endurance and ability to coordinate movement, especially guiding students to play games which they can organize play by their own at home [6, 7, 10, 12].

The results are shown in Table 1.

Table 1: Results of selecting sports games for 1rd grade students (n = 125)

Sports games	Groups	The first time		The second time	
		n	%	n	%
Hide and seek	1	101	80,80	110	88,00
Tâng cầu	1	99	79,20	102	81,60
Following orders	1	62	49,60	58	46,40
Who is better	1	97	77,60	100	80,00
Cock fighting	1	12	9,60	14	11,20
Hula hoop	1	104	83,20	119	95,20
Morning and evening	1	75	60,00	71	56,80
Relay	2	28	22,40	32	25,60
Ready for order	2	99	79,20	101	80,80
Win the victory flag	2	34	27,20	30	24,00
Running with pinwheel	2	98	78,40	101	80,80
Thả đỉa ba ba	2	99	79,20	114	91,20
Dragon and snake	2	88	70,40	90	72,00
Handing towels	2	36	28,80	38	30,40
Chicken chasing toad	3	96	76,80	99	79,20
Leapfrog	3	103	82,40	101	80,80
Hopping relay	3	35	28,00	31	24,80
Rope skipping	3	0	0,00	0	0,00
Avoid the ball	3	121	96,80	119	95,20
Hopscotch	3	111	88,80	109	87,20
Jumping sheep	3	0	0,00	0	0,00
Horse riding	4	35	28,00	31	24,80
Throwing	4	52	41,60	50	40,00
Who pulls well	4	97	77,60	100	80,00
Throw the target	4	102	81,60	108	86,40
Toss the ball to each other	4	101	80,80	106	84,80
Chanting while sawing wood	4	107	85,60	111	88,80
Armwrestling	4	62	49,60	60	48,00
Transferring objects	5	94	75,20	98	78,40
Who is faster and more skillful	5	15	12,00	19	15,20
Hurdle relay	5	0	0,00	0	0,00
Pass fast, jump quickly	5	12	9,60	10	8,00
Chồng đống chồng đe	5	96	76,80	100	80,00
Planting flower buds	5	91	72,80	97	77,60
Jumping down from above	5	96	76,80	101	80,80

Based on theoretical and practical basis in primary schools in Thai Nguyen province, especially in the conditions of teachers, time-fund for organization of semi-boarding programs (two sessions per day), yard conditions and by pedagogical observation, exchanges and interviews with experts and teachers, we would like to propose to organize the application of motion games for primary school students of Thai Nguyen province with 70% or more of approval [3, 4, 5].

Based on the findings aimed at determining the degree of consistency and confidence between the results of the two interviews, the article determines Wilcoson standards through the motion games selected for primary school students from grade 1. The obtained results show that at the value $\alpha = 0.05$, the value T is $392.50 > W\alpha = 317.48$, which proves that the results between the two interviews are homogeneous. In other words, the results of two interviews with experts and teachers shows consistence in opinions of selection of motion games in line with age, object characteristics and practical conditions

for application during extracurricular hours for first-grade primary school students in Thai Nguyen province as proposed by the research process of the article [8].

Based on the above findings, the article identifies 20 motion games to be applied in extracurricular hours for the first-grade primary school students in Thai Nguyen province. Specifically:

Group 1: Including games training the ingenuity, balance and orientation in space: Hide and seek; "Tâng cầu"; Who is better; Hula hoop.

Group 2: Including games that train the ability of walking, running and agility: Running with pinwheel; Ready for order; "Thả đỉa baba"; Dragon and snake.

Group 3: Including games to practice jumping skills and develop leg strength: Chicken chasing toad; Leapfrog; Avoid the ball; Hopscotch.

Group 4: Including games to practice throwing, carrying, pulling skills and develop chest strength: Who pulls well; Throw the target; Toss the ball to each other; Chanting while sawing wood.

Group 5: Including games to train coordination skills and develop endurance: Transferring objects; "Chồng đống chồng đe"; Planting flower buds; Jumping down from above.

4. Evaluation of the efficiency of motion games selected during extracurricular hours for the first-grade primary school students in Thai Nguyen province, Vietnam

4.1 Experimental organization

Experimental method: Using an experimental method of parallel comparison

- Experimental period: The pedagogical experiment process was conducted in 9 months (corresponding to 1 academic year).
- Experimental location: The experiment was conducted at 03 primary schools in Thai Nguyen province (Quang Vinh Primary School - Thai Nguyen City, Chien Thang Primary School - Dong Hy District, Ba Hang Primary School - Pho Yen Town).
- Experimental objects: Including 182 first-grade primary school students in Thai Nguyen province. Experimental objects were divided into 2 groups. Students in these 2 groups had the same conditions of: level of cognitive knowledge, physical competency; quantity; Material facilities and means of organizing activities, sources of documents; teachers are people who have experience in organizing educational activities, having knowledge and understanding about physical activities in education for students

To be specific:

- Experimental group: Including 98 elementary school students (52 boys and 46 girls) at grade 1 of the 3 above primary schools. These subjects participated in the Physical education program under the regulation of the Ministry of Education and Training and were allowed to use games included in the research in their after-school and extra-curricular activities.
- The control group: Including 84 elementary school students (48 boys and 36 girls) at grade 1 of the 3 above primary schools. These subjects participated in regular Physical Education program under the regulation of the Ministry of Education and Training.
- Experimental period: The games were conducted in extracurricular hours. Specifically in after-school activities (2 periods per week as prescribed by the Ministry of Education and Training) and in extracurricular activities (2 periods conducted every Friday afternoons) [5].
- Testing and evaluation: Testing was conducted before and after the experiment. The content of testing and evaluating the use of 12 indicators listed in the people's physical investigation program in 2001 of the Institute of Physical Education and Sports to check the research subjects in both experimental and control groups; thereby, calculating the growth in achievement of those indicators before the experiment [13].

4.2 Assessment of experimental results

Before the experiment, we conducted a test to assess the physical capacity of the students in the experimental group by 12 tests according to the results of the 2001 Vietnam National Health Survey of the Vietnam Sport Science Institute.

The pre-experimental test results showed that the physical capacity of two groups is similar, expressed by $t_{calculated} < t_{tablet}$ at the threshold $P > 0.05$, which proves that the grouping is completely objective. We use such results as the basis for conducting experiment for the selected motion games [8].

After one-year experiment, we conducted to test and evaluate the results. The test purpose is to compare the physical capacity of control group and experimental group, as a basis for evaluation of the efficiency of selected motion games application in reality. The results are presented in Table 2.

Table 2: Comparing the physical strength of 1rd students of control group and experimental group (After the experiment)

Indicators	Male students						Female students					
	Control group (n=48)		Experimental group (n=52)		Statistical differences		Control group (n=36)		Experimental group (n=46)		Statistical differences	
	$\bar{X}$	± δ	$\bar{X}$	± δ	t	P	$\bar{X}$	± δ	$\bar{X}$	± δ	t	P
Standing height (cm)	124.69	4.84	126.81	4.88	2.1797	<0.05	121.44	4.87	123.78	5.05	2.1245	<0.05
Weight (kg)	25.24	3.54	27.42	4.92	2.5575	<0.05	23.01	3.77	24.91	4.16	2.1638	<0.05
Cardiac function	13.25	1.03	12.43	2.07	2.5366	<0.05	13.69	1.57	12.72	1.88	2.5447	<0.05
Quetelet index	204.36	35.92	220.15	36.85	2.1690	<0.05	189.5	31.89	194.88	25.80	0.8231	>0.05
BMI index	16.24	2.89	17.71	2.98	2.5035	<0.05	15.60	2.86	15.82	2.07	0.3887	>0.05
Run 30m XPC (s)	7.21	0.47	6.63	0.58	5.5122	<0.05	7.51	0.54	7.23	0.60	2.2187	<0.05
Long jump stand (cm)	127.35	13.49	140.25	12.95	4.8701	<0.05	125.67	11.73	133.54	10.01	3.2128	<0.05
Flexibility (cm)	5.89	1.98	7.22	2.36	3.0611	<0.05	5.61	2.03	7.30	2.58	3.3196	<0.05
Lie on your back with belly bend (time/30s)	11.94	2.56	13.88	2.47	3.8504	<0.05	11.64	1.95	13.02	1.94	3.1875	<0.05
Force squeeze of preferred hand (kg)	12.15	2.19	14.86	2.27	6.0748	<0.05	10.99	1.73	13.12	1.64	5.6603	<0.05
Shuttle run 4x10m (s)	13.02	1.44	12.17	0.91	3.4957	<0.05	14.62	0.94	13.79	1.03	3.8040	<0.05
Free running for 5 mins (m)	721.45	65.72	775.38	74.45	3.8465	<0.05	668.94	67.07	706.20	67.68	2.4866	<0.05

The results of Table 2 shows that: The physical capacity of experimental group is much better than that of the control group at all indicators and the difference is expressed by $t_{calculated} = t_{tablet} = 1,960$, at the probability threshold $P < 0.05$. As such, it can be seen that the application of motion games selected during extracurricular hours in this research topic has a positive impact on the physical development of students.

In addition, the findings showed that, after one year of experimental study, the physical capacity of control group and the experimental group had growth. However, the experimental group had a significant growth in most of the test indicators and this growth was much higher than that of the control group, which proves that the motion game selected and applied were highly effective in developing the physical strength for students of experimental group. Specific results are presented in tables 3, 4 and charts 1, 2.

Table 3: Physical growth of male students in 1rd grade after the experiment

Indicators	Control group (n=48)			Experimental group (n=52)		
	$\bar{X}_1$	$\bar{X}_2$	W	$\bar{X}_1$	$\bar{X}_2$	W
Standing height (cm)	120.00	124.69	3.83	119.04	126.81	6.32
Weight (kg)	22.10	25.24	13.3	22.03	27.42	21.80
Cardiac function	13.23	13.25	0.15	13.29	12.43	6.69
Quetelet index	184.78	204.36	10.10	184.66	220.15	17.53
BMI index	15.45	16.24	4.99	15.52	17.71	13.18
Run 30m XPC (s)	7.34	7.21	1.80	7.33	6.63	10.00
Long jump stand (cm)	116.88	127.35	8.57	116.04	140.25	18.89
Flexibility (cm)	5.28	5.88	10.80	5.13	7.22	33.85
Lie on your back with belly bend (time/30s)	10.08	11.94	16.90	10.3	13.88	29.61
Force squeeze of preferred hand (kg)	10.91	12.15	10.8	10.58	14.86	33.65
Shuttle run 4x10m (s)	13.9	13.02	6.50	13.93	12.17	13.50
Free running for 5 mins (m)	701.35	721.45	2.83	696.15	775.38	10.77

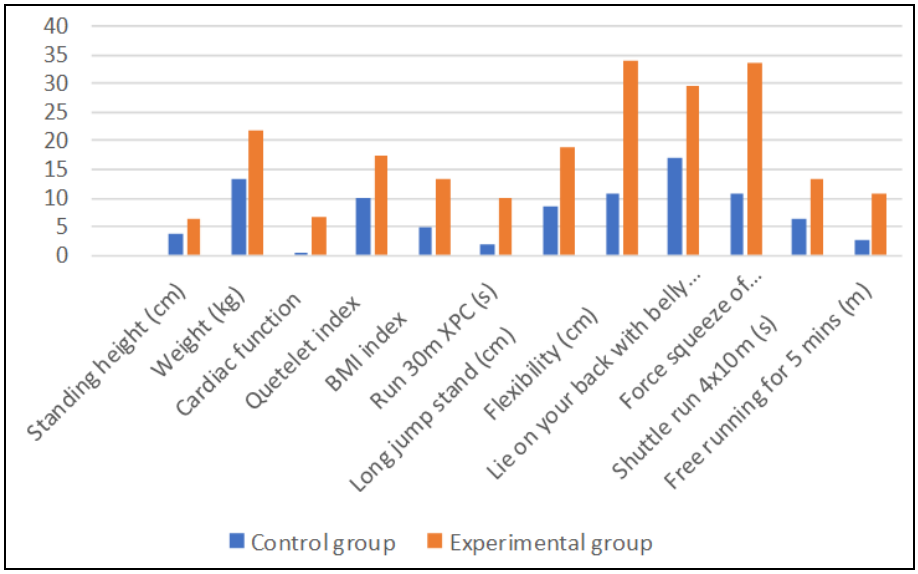

Chart 1: Comparison of physical growth of male students in 1rd grade after the experiment

Table 4: Physical growth of female students in 1rd grade after the experiment

Indicators	Control group (n=36)			Experimental group (n=46)		
	$\bar{X}_1$	$\bar{X}_2$	W	$\bar{X}_1$	$\bar{X}_2$	W
Standing height (cm)	118.30	121.44	2.62	118.56	123.78	4.31
Weight (kg)	21.42	23.01	7.16	21.17	24.91	16.23
Cardiac function	13.78	13.69	0.70	13.71	12.72	7.49
Quetelet index	181.52	189.50	4.30	176.00	194.88	10.18
BMI index	15.41	15.60	1.23	14.92	15.82	5.86
Run 30m XPC (s)	7.78	7.51	3.50	7.83	7.23	7.97
Long jump stand (cm)	110.56	125.67	12.8	108.46	133.54	20.73
Flexibility (cm)	5.36	5.61	4.56	5.30	7.30	31.75
Lie on your back with belly bend (time/30s)	10.06	11.64	14.60	9.75	13.02	28.72
Force squeeze of preferred hand (kg)	9.19	10.99	17.80	9.15	13.12	35.65
Shuttle run 4x10m (s)	14.99	14.62	2.50	15.04	13.79	8.67
Free running for 5 mins (m)	646.53	668.94	3.41	642.83	706.2	9.40

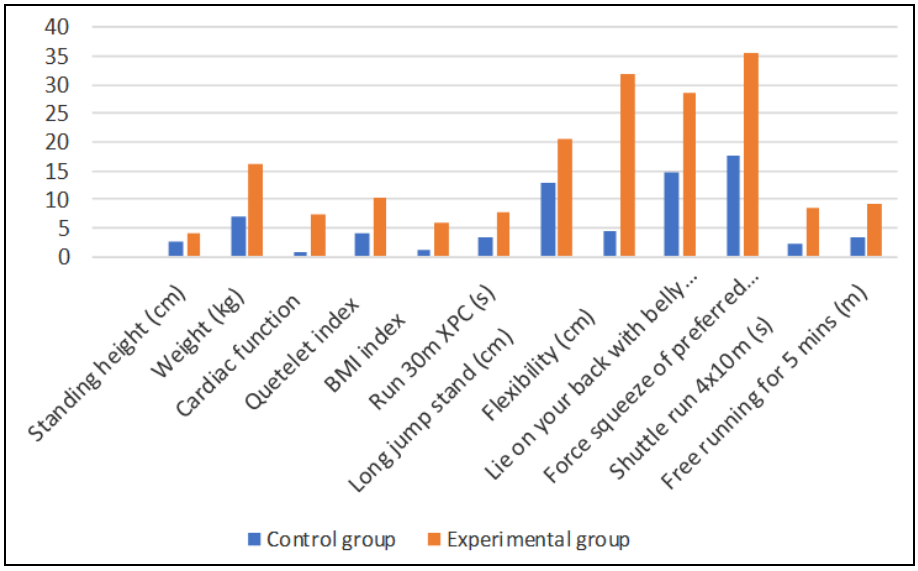

Chart 2: Comparison of physical growth of female students in 1rd grade after the experiment

5. Conclusion

Through the findings in the article, some conclusions are given as follows:

1. In the study process, 20 motion games belonging to 5 skill training groups were selected for developing the physical strength of first-grade primary school students in Thai Nguyen province. Such motion games are organized in line with age, object's characteristics as well as actual conditions and obtained high consensus for selection by experts.
2. In the experimental process, 20 motion games were selected to be applied into reality for ensuring all the requirements and necessary elements. The experimental results affirm the efficiency of the selected motion games. After one year of experimental study, the indicators of evaluation of physical capacity of students had a statistically significant difference, which is expressed by $t_{calculated} > t_{tablet}$ at the threshold $P < 0.05$ in all test indicators for male and female students. This proves that the motion games selected and applied in reality promotes its high efficiency in development and improvement of physical capacity of the students in experimental group.

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