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APPLICATION OF PHYSICAL EXERCISES WITH MUSIC TO DEVELOP THE GENERAL PHYSICAL FITNESS OF FOUR-GRADED STUDENTS IN HO CHI MINH CITY, VIETNAM

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Abstract:
The purpose of this study is to select and apply physical exercises with music to enhance the general physical health of grade 4 students at a public Primary school in District 8, Ho Chi Minh City. To conduct the study, 79 fourth-grade pupils were randomly chosen and divided into two groups, namely experimental and control. While the control group consisting of 17 males and 22 females was instructed using the present Physical Education curriculum, the experimental group including 17 males and 22 females was given physical exercises with music. The experiment lasted for eight weeks. Applying the conventional approaches to studying sports, the study selected five exercise groups (15 exercises with music) for chest/shoulders/arms, abdomen/torso, legs, and two compounds. The results indicated that the music-based exercises could promote the general physical fitness of four-grade pupils at a public Primary school in District 8, Ho Chi Minh City.

Keywords: 15 exercises with music, 4th-grade students, general physical fitness, Physical Education program

1. Introduction

Primary school age lasts 5 years (from 6 to 11). Compared to kindergarten, this is also a time of significant mental and physical transformation. Since they are capable of functioning independently, teaching kids life skills and sports seems more important than teaching them how to properly eat and drink (Vuong Nghe Lam, 2013). However, the ways children are taught are completely different from adults. To successfully stimulate children's enthusiasm and potential talents, coaches have to be informed of

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children's psychophysiology. Notably, consistent practice and appropriate training are also recognized as two essential elements in the physical growth and muscle maintenance of young athletes (Sawczyn et al., 2016) - this is also one of the prerequisites for high performances in competition. Intriguingly, it has been discovered that music-infused exercises can foster children's passion, creativity, and involvement, notably in regular physical education (PE) classes and extracurricular sports activities (Nguyen Trung Kien, 2009). Today, aerobics and other forms of fitness with music are becoming incredibly popular across society and serve as a helpful method for everyone to maintain a healthy lifestyle.

The primary school where the study was conducted is a public school with singled-session classes, so the children spend most of their time in school for academic subjects, and they rarely have enough time to engage in extracurricular activities or practice their favorite sports. It results in a situation where young children lack the self and are not particularly proactive in physical education classes. Besides, it has been reported that the physical conditions have not fully met the quality standards. Therefore, designing PE exercises with music in the limited condition of facilities becomes an urgent solution for the limited conditions of the school. Despite numerous earlier research having proposed certain musical exercises, those exercises have never been conducted in any other schools in the area due to the different characteristics of students and schools. Thus, exclusive research is required in each specific unit to make the assessment more accurate and appropriate.

2. Methodology

The interviewees were 20 people, including experts, teachers, and coaches for many years teaching PE at primary schools. The research subject includes 79 students in grade 4, currently studying at a public primary school.

Document synthesis: to synthesize previous studies related to the application of music in physical exercises and sports in general.

Expert interview: to consult the selection of experts (senior PE teachers and lecturers with experience in applying music in practical sports teaching) about physical exercises with music for the four graders, at a public Primary School, District 8, Ho Chi Minh City.

Pedagogical testing method: to assess the general fitness level of the research group with 06 tests according to Circular 53/2008 of the Ministry of Education and Training to assess, including handgrip force of the dominant hand (kg), crunches in the 30s (times), long jump (cm), 30-meter sprint (s), 4x10m run (s), and 5-minute run (m).

Pedagogical experimental method: to evaluate the differences in the general fitness of 4th-grade students at a public primary school with and without applying exercises with music. The study subjects were allocated into 2 groups, in which 39 students in the experimental group (17 boys and 22 girls) and 40 students in the control one (17 boys and 23 girls). Both groups practiced from the eighth to sixteenth week of the

first semester (2 classes/week, 35 minutes/class) according to the regulation of the Ministry of Education and Training. None of the participants had physical problems, illnesses, or drug use during the research. Both groups were given physical fitness tests before and after the experiment and were assured to practice in the same conditions throughout the study. Songs were used in the research including *Em yêu trường em* (I love my school), *Mái trường mến yêu* (My beloved school), *Bài ca đi học* (Going to school), *Lớp chúng ta đoàn kết* (Our class bond), *Bốn phương trời* (Four directions). Notably, only the melody was used for the experiment.

Mathematical statistics method: Descriptive Analysis was used to analyze the results of expert interviews to evaluate the homogeneity of the study samples by calculating the coefficient of variation (Cv%). Afterwards, the Pair Sample T-test algorithm was applied to evaluate the difference between before and after the experiment in each group, while the Independent T-test algorithm was used to assess the difference between the control and experimental groups. The growth in each indicator was assessed for each group using the growth rate formula (W%). The tools utilized to run the above-mentioned algorithms were the Microsoft Excel program version 2019 and the program SPSS (Statistical Package for the Social Science) version 20 for Windows. Data was presented as the mean scores ± standard deviation ($\bar{x}$ ±SD), rounded to 2 decimal places. There was a statistically significant difference in the evaluated statistics at the threshold $p < 0.05$.

3. Results and Discuss

3.1. General physical fitness of 4th graded students at Luu Huu Phuoc primary school, District 8, Ho Chi Minh City before the experiment

Statistics of the general physical fitness of the participants before the experiment are shown in Table 1.

Table 1: General physical fitness of participants before the experiment

Gender	Test	Experimental group (n=39)	Control group (n=40)	t	p
Male (n=34)	1	142.35±19.63	140.47±7.91	0.37	>0.05
	2	11.53±2.45	11.76±2.41	-0.28	>0.05
	3	13.39±0.98	13.32±1.12	0.21	>0.05
	4	11.97±0.77	11.73±1.09	0.76	>0.05
	5	6.53±0.49	6.69±0.55	-0.90	>0.05
	6	747.82±33.68	744.12±18.51	0.40	>0.05
Female (n=45)	1	130±13.59	128.70±8.8	0.38	>0.05
	2	10.5±1.87	10.13±1.46	0.74	>0.05
	3	12.77±1.15	12.61±0.74	0.56	>0.05
	4	13.05±0.77	13.11±0.8	-0.26	>0.05
	5	6.93±0.55	7.03±0.61	-0.58	>0.05
	6	728.36±29.66	725.09±19.77	0.44	>0.05

Note: 1: Handgrip force of the dominant hand (kg), 2: Crunches in 30s (times), 3: Long jump (cm), 4: 30-meter sprint (s), 5: 4x10m run (s), 6: 5-minute run (m).

Table 1 indicates that the general fitness between the control and experimental groups has no statistically significant difference at the probability threshold $p>0.05$. In other words, the homogeneity of both groups is ensured before the experiment. Hence, the participants are deemed qualified for the study.

3.2. Selection of exercises with music for 4th-graded students at a public primary school, District 8, Ho Chi Minh City

Referencing from a number of previous research such as Bui Quang Hai (2008), Huynh Trong Khai et al (2010), Lai Phung Thu (2015), Nguyen Trung Kien (2017), Le Van Lam (2008), Nguyen Kim Lan (2005), Phan Thanh Chien (2015), Hare (1996), Davydov & Karasnov (2000), Sleeper et al (2012), Artemyeva & Moshenska (2017), etc., and based on the characteristics of physical and mental development of the primary age, the writers synthesized and selected 27 exercises with music to improve the general fitness for 4th graders. The exercises were categorized into five groups, involving: Exercises for chest, shoulders and arms (4 exercises): warrior breath 1, warrior breath 2, arm movement 1, arm movement 2; Exercises for abdomen and torso (8 exercises): lats 1, lats 2, abdomen 1, abdomen 2, torso twist 1, torso twist 2, body workout 1, body workout 2; Exercises for legs (6 exercises): jump, leg movements, triangle step, knee-to-chest stretch, workout of legs, arms and shoulders, run and jump; Compound exercises 1 (5 exercises): foot-stomping, toned arms walking, coordination movements in horizontal, body conditioning, balance; Compound exercises 2 (4 movements): foot stomping with hand swing, hip thrust, tiptoe, run on the spot.

Expert interview: Interviewing 37 PE teachers and coaches with long-term teaching experience in primary schools to obtain 37 valid interview questionnaires with three responses “Agree”, “Uncertain” and “Disagree”. Those responses were converted into points where "Agree" was 3 points, "Uncertain" 1 point, and "Disagree" 0 points. The data collected from the questionnaires are shown in Table 2.

Table 2: Results of expert interviews

Exercise group	Exercise	Agree	Uncertain	Disagree	Scores	Percentage %
Chest, shoulders and arms (choose 2)	Warrior breath 1	34	3	0	105	95
	Warrior breath 2	3	34	0	43	39
	Arm movement 1	34	3	0	105	95
	Arm movement 2	3	34	0	43	39
Abdomen and torso (choose 4)	Lats 1	34	3	0	105	95
	Lats 2	3	34	0	43	39
	Abdomen 1	37	0	0	111	100
	Abdomen 2	5	32	0	47	42
	Torso twist 1	34	3	0	105	95
	Torso twist 2	3	34	0	43	39
	Body workout 1	37	0	0	111	100
	Body workout 2	7	30	0	51	46

Legs (choose 4)	Jump	34	3	0	105	95
	Leg movements	37	0	0	111	100
	Triangle step	37	0	0	111	100
	Knee-to-chest stretch	3	34	0	43	39
	Isolation workout of legs, arms and shoulders	6	31	0	49	44
	Run and jump	37	0	0	111	100
Compound 1 (choose 3)	Foot stomping	34	3	0	105	95
	Toned arms walking	3	34	0	43	39
	Coordination movements in horizontal	37	0	0	111	100
	Body conditioning	37	0	0	111	100
	Balance	12	25	0	61	55
Compound 2 (choose 2)	Foot stomping with hand swing	34	3	0	105	95
	Hip thrust	5	32	0	47	42
	Tiptoe	37	0	0	111	100
	Run on the spot	3	34	0	43	39

Based on the results of Table 2, the study could select 15 exercises with music that had "Agree" rates of 80% or higher, or total scores of greater than 100, as follows:

- Exercises for chest, shoulders and arms: warrior breath 1, arm movement 1
- Exercises for abdomen and torso: lats 1, abdomen 1, torso twist 1, body workout 1
- Exercises for legs: jump, leg movements, triangle step, run and jump
- Compound exercises 1: foot-stomping, coordination movements in horizontal, body conditioning
- Compound exercises 2: foot stomping with hand swing, tiptoe, run on the spot.

It can be seen that the exercises based on the PE curriculum of the Ministry of Education and Training mainly focus on bare-handed movements. Consequently, the control group was trained according to the current program with bare-arm exercises, while the experimental group was taught the above-chosen exercises with music. The exercises with music were applied for 8 weeks at the end of the first semester.

3.3. Application of the chosen exercises with music for 4th-graded students at a public primary school, District 8, Ho Chi Minh City

Post-experimental data of the study groups are shown in Table 3.

The outcomes of the general fitness assessment tests reveal significant disparities between the two groups. Results from the experimental group demonstrated a statistically significant difference in both male and female students before and after the experiment, but those from the control group, particularly in the running tests, show a slight difference in female students and no differences in males (30 meters, 4x10m, and 5 minutes).

Table 3: Results of the participants' general fitness assessment before and after the experiment

Group	Test	Male				Female			
		Before the experiment	After the experiment	t	W%	Before the experiment	After the experiment	t	W%
Experimental	1	142.35±19.63	160±19.79	19.45**	11.85	130±13.59	142.09±12.99	23.36***	9.02
	2	11.53±2.45	14.88±2.52	10.87**	26.05	10.5±1.87	13.64±1.65	8.81***	26.60
	3	13.39±0.98	15.37±1.24	12.56**	13.68	12.77±1.15	13.60±1.14	17.41***	6.33
	4	11.97±0.77	10.8±0.78	49.57**	10.36	13.05±0.77	12.45±0.83	16.54***	4.69
	5	6.53±0.49	6.17±0.51	7.06**	5.62	6.93±0.55	6.64±0.55	11.83***	4.35
	6	747.82±33.68	771.18±34.17	31.46*	3.08	728.36±29.66	749±30.42	14.16***	2.79
Control	1	140.47±7.91	147.18±10.75	3.25*	4.57	128.7±8.8	134.17±8.93	8.24***	4.18
	2	11.76±2.41	13±2.55	12.45**	10.00	10.13±1.46	12.26±1.86	10.08***	18.80
	3	13.32±1.12	14.36±1.21	2.93**	7.49	12.61±0.74	13.01±0.73	8.33***	3.13
	4	11.73±1.09	11.53±0.99	1.77ns	1.65	13.11±0.8	12.99±0.8	47.78***	0.89
	5	6.69±0.55	6.58±0.55	0.28ns	1.59	7.03±0.61	7.01±0.61	11.63***	0.37
	6	744.12±18.51	762.76±17.52	1.20ns	2.48	725.09±19.77	733.48±20.19	18.74***	1.15

Note: 1: Handgrip force of the dominant hand (kg), 2: Crunches in 30s (times), 3: Long jump (cm), 4: 30-meter sprint (s), 5: 4x10m run (s), 6: 5-minute run (m). ns: no statically significant difference. *, **, ***: Significant difference at the threshold $p<0.05$, $p<0.01$, $p<0.001$ respectively.

It is evident that the existing PE program's exercises have less of an impact than those that incorporate music, especially in the group of male pupils. A more thorough comparison between the two groups was made in order to more accurately evaluate the differences between the experimental and control groups, as shown in Table 4.

Table 4: Results of the general fitness of the two groups after the experiment

Gender	Test	Experimental group (n=39)	Control group (n=40)	t
Male (n=34)	1	160±19.79	147.18±10.75	2.35*
	2	14.88±2.52	13±2.55	2.16*
	3	15.37±1.24	14.36±1.21	2.41*
	4	10.8±0.78	11.53±0.99	-2.39*
	5	6.17±0.51	6.58±0.55	-2.24*
	6	771.18±34.17	762.76±17.52	0.90*
Female (n=45)	1	142.09±12.99	134.17±8.93	2.39*
	2	13.64±1.65	12.26±1.86	2.62*
	3	13.6±1.14	13.01±0.73	2.07*
	4	12.45±0.83	12.99±0.8	-2.02*
	5	6.64±0.55	7.01±0.61	-2.13*
	6	749±30.42	733.48±20.19	2.03*

Note: 1: Handgrip force of the dominant hand (kg), 2: Crunches in 30s (times), 3: Long jump (cm), 4: 30-meter sprint (s), 5: 4x10m run (s), 6: 5-minute run (m). *: Significant difference at the threshold $p<0.05$.

Table 4 indicates that all fitness tests of the experimental group have a statistically significant difference at the probability threshold $p < 0.05$ compared with that of the control group. This implies that music-based workouts have a positive impact on the physical growth of Luu Huu Phuoc Primary School's fourth-grade male and female students. Hence, it can be concluded that integrating music into physical training is beneficial in boosting young learners' general fitness levels in elementary schools. It is

also in line with the findings of Karageorghis & Terry (2009), who showed that using music in sports training can have certain advantages. One of the proven benefits of listening to music while exercising is that it can lift athletes' spirits, boost enthusiasm while practices, and reduce anxiety before competitions. Similar results in healthy adults are also found in the study of Rasteiro et al. (2020). According to the research, women who ran on conveyor machines while listening to music had higher heart rates and longer running time.

Therefore, the benefits of using music during exercise are undeniable. Even among university students who were not athletes, the results showed that those who exercised to music performed noticeably better than those who did not (Meeks & Herdegen, 2002; Birnbaum et al., 2009; Barwood et al., 2009; Clark et al., 2016). Additionally, Simpson & Karageorghis (2005) suggested the criteria for choosing music is that it should best suit the nature of sessions and exercises as well as the preferences of athletes. Rendi et al. (2008) also recommended that music used during sport trainings concentrate on a certain kind of movements in a specific sport. In summary, many researchers in the sports field have acknowledged the merits of incorporating music into sports activities, as it can motivate athletes during practice, allowing them to complete large volumes of exercise more excitingly, thereby enhancing their physical endurance as well as satisfying their needs of general fitness development (Stork et al., 2019).

This paper has also proven that physical exercises with music have a good effect on improving the general fitness of fourth-graders at a public Primary school, District 8, Ho Chi Minh City. The obtained results are meant to serve as a reliable reference for further studies. Moreover, the writers highly suggest more research be made to evaluate the effectiveness of different music listening techniques while exercising such as headphones and speakers with various sound intensities, or to find solutions to reverberation issues when music is played in a closed environment such as stadiums, practice rooms, etc.

4. Conclusion

The research team has selected five exercise groups with 15 different exercises with music, that are found highly appropriate for fourth-graded students at a public Primary School, District 8, Ho Chi Minh City. Using music for physical activities is proven to offer more benefits than not using it in the current PE programs.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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