International Journal of Sociologies and Anthropologies Science Reviews
Volume 6 Issue 1: January-February 2026: ISSN 2985-2730
Website: https://so07.tci-thaijo.org/index.php/IJSASR/index

Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students

Ma Yunqiang[1] and Thongchat Phucharoen[2]
[1,2] Faculty of Sports Science and Technology, Bangkokthonburi University, Thailand
[1]E-mail: 2569745792@qq.com, ORCID ID: https://orcid.org/0009-0004-4844-1750
[2] E-mail: thongchat.phu@bkkthon.ac.th, ORCID ID: https://orcid.org/0009-0008-2601-7755

Received 08/05/2025 Revised 26/05/2025 Accepted 30/6/2025

Abstract

Background and Aims: The Taekwondo Exercise Program helps pupils develop their discipline, self-confidence, and physical fitness through structured, engaging training. It also fosters general development by combining physical activity, cultural appreciation, and mental focus. This study aims to develop a scientific Taekwondo training plan to improve middle school students' physical fitness based on their developmental needs. It compares the effects of the new plan with traditional methods using experimental and control groups. Pre, mid-, and post-tests assess improvements in fitness, skills, and motivation. The results help refine the plan and guide effective school physical education.

Materials and Methods: This study was experimental research. In the first phase, a literature review of existing studies was conducted to investigate the effects of Taekwondo on the physical fitness of secondary school students, and the factors influencing the development of the training program by five experts. In phase 2, an 8-week training program was developed and evaluated by 3 experts; in phase 3, a focus group was formed by 7 experts to adopt the training program. In this study, 40 students in the experimental group and 40 students in the control group were recruited to test the students' physical fitness indexes after 8 weeks of Taekwondo training. This study aims to explore the effect of Taekwondo on the physical fitness of middle school students. 80 middle school students aged 13-15 years old who had not practiced Taekwondo systematically before were selected as experimental subjects from Haibei Middle School in Nanhai District, Foshan City. All 80 students met the inclusion criteria. The experiment was divided into an experimental group and a control group, and the 80 students were randomly assigned to one of the two groups. There were 40 students in the experimental group (20 boys and 20 girls), and 40 students in the control group (20 boys and 20 girls).

Results: (1) The training program was developed by five experts who gave suggestions, which can show that the training program has a certain degree of scientific validity and effectiveness, as well as through the IOC test (IOC=1.0), and also through the pre-tests of 5 people to further check that the training program can be used in the actual situation. (2) Before the experiment, there was no significant difference between the experimental group and the control group in terms of Lung capacity, 50-meter, standing long jump, sit and reach, Sit-ups, 800-meter run, 1000-meter run, and Pull-ups ($P>0.05$). (3) After the experiment, there was a significant difference ($P<0.05$) between the experimental group and the control group in Lung capacity, 50-meter, standing long jump, Sit and Reach, Sit-ups, 800-meter run, 1000-meter run, and Pull-ups. (4) In the post-experimental period, a comparison of the pre-test and post-test within the experimental group revealed that there was a significant difference in the Lung capacity, 50-meter, standing long jump, sit and reach, Sit-ups, 800-meter run,1000-meter run, and Pull-ups ($P<0.05$).

Conclusion: This study developed and tested an 8-week Taekwondo exercise program to improve physical fitness in secondary school students. Results showed significant improvements in lung capacity, speed, strength, flexibility, and endurance in the experimental group compared to the control group. Regular Taekwondo practice was found to enhance overall physical functions and cardiopulmonary health in adolescents.

Keywords: Taekwondo Exercise Program; Physical Fitness; Secondary School Students

Introduction

The physical well-being of middle school students has increasingly become a major issue in recent years. Students face increasing academic demands because of the swift socio-economic development that limits their opportunities for physical exercise. Research indicates that students in certain regions complete less than an hour of physical activity daily, which does not meet the national guidelines. The extensive use of electronic devices has resulted in sedentary behavior and decreased outdoor physical activity that promotes obesity and myopia alongside declining cardiopulmonary function. The current health trends

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

create dangerous risks for both physical and mental health among teenagers. Traditional PE classes demonstrate major shortcomings that affect student engagement and learning outcomes. Their approach uses old content, which primarily deals with track and field events or ball games, and demonstrates minimal innovative features or student interest. Numerous physical education programs neglect to consider student development stages, which leads to poor student engagement and minimal program effectiveness. These courses focus primarily on skill development while neglecting to instill permanent exercise routines and lifelong fitness knowledge, which reduces their long-term benefits for students' physical health improvement. Middle school PE programs fail to leverage Taekwondo despite its extensive physical and educational advantages. Taekwondo helps students develop physical fitness through strength building and improved speed while enhancing flexibility and agility alongside mental discipline, as well as teaching etiquette and teamwork principles. The development of Taekwondo programs within school curricula faces obstacles because there are not enough qualified instructors available, and resources are lacking, along with an underdeveloped curriculum framework. Obstacles have stopped Taekwondo from achieving its maximum effectiveness in youth development initiatives.

The present difficulties make it essential to design a Taekwondo program specifically for middle school students during this critical period. Taekwondo functions as an effective method to advance both physical and mental well-being among students during an essential growth phase. The program can establish positive fitness routines and enhance overall health through personalized and interesting exercise choices.

This program expands middle school PE curriculum options through content diversity and new teaching methods. Implementing a systematic Taekwondo plan can broaden educational resources and sustain physical education reform in schools. Incorporating Taekwondo cultural values like respect, perseverance, and discipline into educational programs helps develop students' morals and sense of national pride while spreading Taekwondo culture throughout society. This research fills an existing gap by delivering a targeted Taekwondo program verified through empirical testing for use in middle school settings. The research generates practical and theoretical knowledge by matching students' developmental requirements with rigorous effectiveness assessments. This research advances educational practice and sports science by providing practical guidance for PE instruction while contributing to academic knowledge.

Creating a Taekwondo sports program for middle school students in Foshan City, Guangdong Province, represents a crucial initiative. A specially designed Taekwondo program for middle school students presents important advantages for Foshan City. The program offers direct support to healthy adolescent development. The rapid economic expansion in Foshan has led to students experiencing high academic demands alongside inactive routines, which requires immediate attention to their physical health needs. This research introduces a scientifically structured Taekwondo regimen that enhances students' physical capabilities, such as strength and speed, while preventing obesity and myopia through its comprehensive physical and mental health benefits. The investigation provides valuable enhancements to the physical education programs implemented in Foshan schools. Local schools can enhance their physical education programs through the holistic development approach by incorporating Taekwondo training. The combination of discipline-based training and cultural background found in Taekwondo enhances student engagement in physical education while improving its overall quality and attractiveness. The program effectively complements Foshan’s esteemed martial arts tradition. School programs that include Taekwondo boost the city's sports culture with new components and help maintain traditional principles like respect, perseverance, and discipline. Students develop stronger moral values and gain greater respect for Foshan’s martial arts heritage through this cultural synergy. The initiative serves as a critical tool in developing sports talent. The program recognizes potential Taekwondo students who will grow into future athletes while supporting local talent development and strengthening Foshan's competitive sports identity. The program supports the city's objectives for sports development and athletic excellence. The long-term health benefits for society come from enhancing middle school students' physical fitness levels. When

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

students learn healthy habits early, they keep active throughout adulthood, which builds stronger and healthier communities. The program delivers advantages to students while simultaneously advancing the city's goal of establishing a thriving and healthy Foshan.

Objectives

The objectives of this study were 1) to develop a Taekwondo exercise program to improve the physical fitness of secondary school students. 2) To compare the effectiveness of the training program between the experimental and control groups. 3) To compare an effective training program with an experimental, pretest, and posttest.

Research Questions

1. What is the current situation and problems of the Taekwondo exercise program to improve the physical fitness in secondary school students?
2. What are the components of a Taekwondo exercise program to improve the physical fitness of secondary school students?
3. Is the Taekwondo exercise program effective?

Research Hypothesis

1. The 8-week implementation of the Taekwondo exercise program, the Experimental group was better than the control group.
2. The 8-week implementation of the Taekwondo program, experimental after week 8, was better than the pretest.

Scope of research

Scope of population: The subjects of the study were 100 students from the first to second year of two classes participating in the Taekwondo club of a secondary school, aged 13-15 years. This study used purposive simple random sampling to identify 80 students who met the criteria of being physically active but without any prior experience in Taekwondo.

Scope of content: This paper primarily examines the Taekwondo exercise training program, aiming to improve physical fitness, including endurance, muscular strength, flexibility, and cardiovascular endurance, over an 8-week experiment.

Scope of time: This study was conducted between December 2024 and March 2025.

Limitations of research

In this paper, only 100 secondary school students from Haibei Middle School were selected as experimental subjects, and the experimental design of this study and the informativeness of the study only came from one secondary school, Nanhai District, Foshan City, which may have some limitations and should involve students at different schools and age groups in the future.

Definition of Terms

Taekwondo exercise program means Taekwondo exercise program was an integral part of the Taekwondo exercise process, which involves a variety of aspects such as techniques to improve physical fitness such as flexibility, strength endurance muscle and cardiovascular, it is designed to a systematic training method for junior high school students for 8 week, 3 days per week (M W F), and 1.30 hour per session.

Physical fitness in this context refers to the specific fitness required for effective Taekwondo training, impacting an individual's overall physiological performance. Taekwondo demands that practitioners practice flexibility, strength, and endurance. Strength includes lower limb strength for kicking, upper limb

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

strength for punching and defense, and core strength for stability. Endurance covers both aerobic and anaerobic aspects. Flexibility in the legs, waist, and upper limbs is crucial for complex movements.

Secondary school students mean Secondary school students, or secondary school pupils, usually refer to young people studying at the secondary level of education, generally between the ages of 11 and 18. This stage encompasses both middle and high school education and is a critical period in the transition from basic education to higher education. Secondary school students experience rapid cognitive, physical, and socio-emotional development and change. Therefore, the age range of adolescents in this study is 13-15 years, 2024 academic year.

Research Contribution

1.7.1 Methodology contribution

An experimental method was used to verify the effect of 8 weeks of Taekwondo training on the physical fitness of middle school students and to provide a feasible training program to improve the physical fitness of Secondary school students.

1.7.2 Academic contribution

Taekwondo can cultivate etiquette, honing will, and practicing Taekwondo can not only recognize the self and improve the comprehensive quality of the individual, but also can develop the body's speed, strength, sensitivity, and other physical fitness.

Literature review

Taekwondo Exercise: A Comprehensive Approach to Physical and Mental Development

Taekwondo originated in Korea as a martial art but now stands as a global form of fitness activity that combines self-defense approaches with physical conditioning and philosophical teachings. Taekwondo serves as a structured activity that offers practitioners a complete physical workout targeting strength development as well as flexibility enhancement, alongside balance maintenance and cardiovascular improvement. According to Bridge et al., A study from 2014 found that regular Taekwondo practice improves muscle strength and aerobic capacity, which makes this activity beneficial for enhancing total physical fitness levels. Taekwondo utilizes repetitive movements and technical drills to build motor coordination and agility, which proves especially advantageous for children and adolescents during their growth years.

Taekwondo practice leads to significant psychological and emotional benefits apart from its physical advantages. Martial arts training programs demonstrate abilities to lower anxiety levels and build self-esteem while promoting better emotional control, according to research findings (Lakes & Hoyt, 2004). Taekwondo builds discipline and self-control by teaching respect alongside perseverance and proper etiquette. The practice and instruction of Taekwondo integrates core values to establish a structured learning environment where students develop goal-setting abilities alongside stress management and resilience skills. Children who attend school benefit from these characteristics because they help them handle both academic demands and social challenges.

School physical education programs increasingly incorporate Taekwondo because of its educational benefits. Through its inclusive structure that engages students, this activity both drives their participation and fosters long-term physical activity routines. Research by Kim et al. According to Kim et al. (2015), Taekwondo's structured curriculum, which features belt ranking systems and defined progress milestones, helps maintain motivation and personal development. The interactive nature of this sport develops social abilities and teamwork skills, which make it an essential resource for educational programs and extracurricular activities.

Through Taekwondo, students get the chance to participate in worldwide traditions and values. Taekwondo represents a martial art that originates from Korean traditions and thus cultivates both cultural appreciation and awareness. The inclusion of Taekwondo within physical education programs broadens academic offerings while fostering international cultural respect (Choi, 2006). Modern education systems

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

that focus on cultural literacy, together with academic success and physical health, share common goals with this worldwide viewpoint.

Taekwondo exercise serves as a comprehensive practice that enhances physical fitness while promoting mental health and education through cultural appreciation. Taekwondo exercise programs for youth students help achieve complete development while supporting public health and educational objectives. Long-term benefits of the practice and the best ways to implement it require further investigation across different educational settings.

Improving Physical Fitness in Schools: A Strategic Educational Priority

Promoting lifelong health and well-being depends on the development of students' physical fitness. The school setting becomes a vital space for developing physical activity routines because students spend much of their daily time there. Youth who participate in regular physical activity show lower chances of developing obesity, cardiovascular disease, and mental health problems (Janssen & LeBlanc, 2010). Structured fitness programs that engage students must be implemented in schools to support their complete developmental needs.

Complete fitness programs implemented in schools must combine multiple physical exercises that work on endurance alongside strength training while enhancing flexibility and coordination abilities. Students can access structured physical activities through their PE classes, alongside active recess periods, extracurricular sports, and movement breaks within classroom settings. The World Health Organization (2020) states that students' physical and cognitive health improves significantly when school programs incorporate at least 60 minutes of moderate to vigorous physical activity daily. Engaging students through a variety of fun activities helps sustain their interest in exercise and promotes favorable perceptions toward physical activity.

It is essential to integrate physical fitness programs with students' developmental requirements. Physical education programs need to accommodate students' various developmental stages while ensuring that activities are accessible for all abilities and student preferences. Martial arts programs, along with dance and fitness circuits, can be tailored to offer adjustable levels of challenge while building participants' self-esteem. Trudeau and Shephard's study from 2008 demonstrated improvements in students' motor skills and academic performance alongside increased activity levels when they took daily fitness-based physical education classes.

Schools need to establish settings that promote physical movement during the entire school day beyond structured activities. Schools must provide secure exercise locations while training staff to promote fitness and embed physical activities in academic lessons. Students receive a stable support system when their parents and community partners help maintain healthy behaviors outside of school.

Developing physical fitness programs in schools remains essential to nurturing lifelong healthy habits in children from an early age. Schools can prepare students to maintain lifelong health through effective PE programs combined with supportive learning environments and active community partnerships. School fitness initiatives receive benefits from sustained investment because they help students personally while improving public health standards and educational achievements.

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

International Journal of Sociologies and Anthropologies Science Reviews
Volume 6 Issue 1: January-February 2026: ISSN 2985-2730
Website: https://so07.tci-thaijo.org/index.php/IJSASR/index

Conceptual Framework

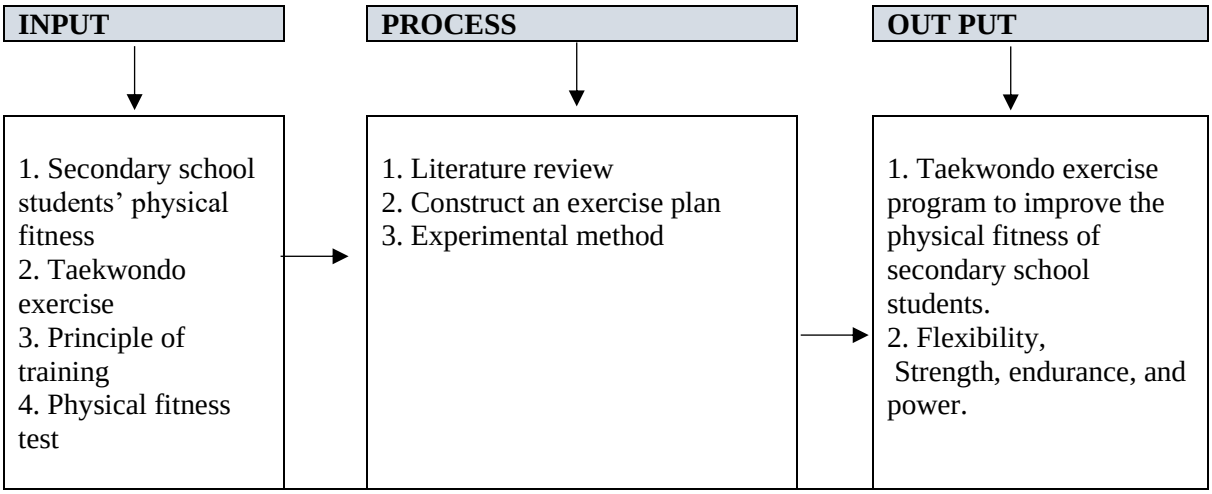

Figure 1 Conceptual Framework

Methodology

1. Population and Sample

Population Specification and Size

The subjects of this study were middle school students of Haibei Middle School in Foshan, China. The purpose of this study was to investigate the effects of Taekwondo on improving the physical fitness of middle school students. There were 80 middle school students (aged 13-15 years) in Nanhai District, Foshan. Two classes of about 50 students were recruited for this study, and the highest and lowest subjects were removed based on their athletic ability scores to scientifically extract the sample. The total population size consisted of 80 students who met the criteria of being physically active but did not have any Taekwondo experience.

Sample

The sample was selected using simple random sampling and consisted of 40 students. This study used systematic sampling to divide the participants into two groups based on endurance. The experimental group consisted of 40 students, including 20 boys and 20 girls, with an equal gender ratio. The control group also consisted of 40 students, including 20 boys and 20 girls, with the same gender ratio as the experimental group.

2. Research instrument

1. Taekwondo exercise program: Taekwondo exercise program was an integral part of the Taekwondo exercise process, which involves a variety of aspects such as techniques to improve physical fitness such as flexibility, strength endurance muscle and cardiovascular, it is designed to a systematic training method for junior high school students for 8 week, 3 days per week (M W F), and 1.30 hour per session.

Validity test

Then, this study adopted purposive sampling and invited 3 experts by face-to-face interview to evaluate content validity. The IOC assessment scores were 1.00, expressing good construct validity.

Tryout

This study conducted a try-out phase with pretests on sample populations of 3, 5, and 9 participants to assess the feasibility and effectiveness of the Taekwondo exercise training program. Pretesting helped refine the research design by verifying its impact on endurance, strength, flexibility, and cardiovascular fitness. Data analysis from the pretests allowed for necessary adjustments to optimize the program and enhance its applicability. The try-out also identified potential risks and challenges, ensuring

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

preventive measures were in place. Ultimately, this phase provided a strong foundation for the full-scale experiment, ensuring scientific rigor and practical application.

2. Physical Fitness test:

3. Standing long jump (cm)

Measurement: The subject stands with feet naturally apart behind the take-off line, without touching the line. Both feet jump simultaneously without any run-up or consecutive jumps. The distance is measured from the back edge of the take-off line to the nearest landing point. Each subject jumps three times, and the best result is recorded.

What it measures: It assesses lower limb explosive power and body coordination.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

4. Sit and Reach (cm)

Measurement: The subject sits on the testing device with legs extended and together, heels touching, and feet pressed against the device's footplate. The subject slowly pushes the slider forward with both hands until the maximum extension is reached. The value indicated by the slider is the test result.

What it measures: It assesses body flexibility, especially in the waist and lower limbs.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

5. Test - Sit-ups (times)

Measurement: The subject lies supine on a mat with legs slightly apart and knees bent at about 90 degrees. The hands are crossed behind the head or lightly touching the ears. Another person stabilizes the ankles. The subject uses abdominal muscle contractions to sit up quickly, keeping the upper body vertical, and then returns to the starting position. The number of sit-ups completed in 60 seconds is recorded.

What it measures: It assesses abdominal muscle endurance.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

6. Test - 800 m (min)

Measurement: Subjects are tested in groups of at least two, starting in a standing position. Upon hearing the "go" command, they start running. The timer starts when the flag is raised and stops when the subject's torso reaches the vertical plane of the finish line.

What it measures: It assesses cardiopulmonary endurance and aerobic capacity.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

7. Test - Pull-ups (times)

Measurement: The subject jumps up and grasps the bar with both hands in a pronated grip, arms shoulder-width apart and hanging straight. After a brief pause, the subject pulls up with both arms (without additional movements) until the chin is above the bar. Lowering the arms straight completes one repetition. The number of pull-ups is recorded.

What it measures: It assesses upper limb muscle strength and endurance.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

8. Test - 1000 m (min)

Measurement: Subjects are tested in groups of at least two, starting in a standing position. Upon hearing the "go" command, they start running. The timer starts when the flag is raised and stops when the subject's torso reaches the vertical plane of the finish line.

What it measures: It assesses cardiopulmonary endurance and aerobic capacity.

Scoring criteria: According to the National Student Physical Fitness and Health Standard.

3. Data collection

1. This study constructs a Taekwondo exercise program; IOC questionnaires from 3 experts were scored, distributed by mail, and returned. Three experts, including two Taekwondo coaches and one Taekwondo teacher.

2. Experimental implementation, including pre-test and post-tests, measuring the physical fitness of secondary school students.

4. Data Analysis

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

1. Descriptive statistics were performed by the software package, including mean, standard deviation, and percentage.

2. Mean comparison between the experimental and control groups was compared, including an independent sample t-test, and within-group with an independent t-test.

3. The significance level is set at $p<0.5$.

Results

Result found that:

1. The training program was developed by five experts who gave suggestions, which can show that the training program has a certain degree of scientific validity and effectiveness, as well as through the IOC test (IOC=1.0), and also through the pre-tests of 5 people to further check that the training program can be used in the actual situation.

Table 1 Validation and Feasibility of the Taekwondo Training Program

Validation Method	Description	Result	Conclusion
Expert Review (5 Experts)	The training program was reviewed and refined based on suggestions from 5 experts in Taekwondo and physical education.	Expert feedback integrated	Demonstrates scientific validity and expert-based design.
IOC (Item-Objective Congruence) Test	Three selected experts evaluated the content relevance and clarity using the IOC method.	IOC Score = 1.00	Indicates excellent content validity.
Pre-Test with Small Groups	Try-outs were conducted with 3, 5, and 9 participants to assess feasibility, safety, and program effectiveness.	Adjustments made based on outcomes	Confirms applicability in real training environments.

2. After the experiment, there was a significant difference ($P<0.05$) between the experimental group and the control group in standing long jump, sit and reach, sit-ups, 800-meter run, 1000-meter run, and pull-ups.

Table 2 Post-Test Comparison of Physical Fitness Indicators Between Experimental and Control Groups

Physical Fitness Test	Measured Ability	Result	Significance Level (p)	Conclusion
Standing Long Jump (cm)	Lower limb explosive strength	Experimental group > Control	$p < 0.05$	Significant improvement in the experimental group
Sit and Reach (cm)	Flexibility (waist and lower limbs)	Experimental group > Control	$p < 0.05$	Significant improvement in the experimental group
Sit-Ups (times in 60 sec)	Abdominal muscle endurance	Experimental group > Control	$p < 0.05$	Significant improvement in the experimental group
800 m Run (min)	Cardiopulmonary endurance (females)	Experimental group < Control	$p < 0.05$	Significant improvement in the experimental group

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

Physical Fitness Test	Measured Ability	Result	Significance Level (p)	Conclusion
1000 m Run (min)	Cardiopulmonary endurance (males)	Experimental group < Control	$p < 0.05$	Significant improvement in the experimental group
Pull-Ups (times)	Upper limb strength and endurance	Experimental group > Control	$p < 0.05$	Significant improvement in the experimental group

3. In the post-experimental period, a comparison of the pre-test and post-test within the experimental group revealed that there was a significant difference in the standing long jump, sit and reach, sit-ups, 800-meter run,1000-meter run, and Pull-ups (P<0.05).

Table 3 Pre-Test and Post-Test Comparison Within the Experimental Group

Physical Fitness Test	Measured Ability	Pre-Test Mean ± SD	Post-Test Mean ± SD	p-value	Conclusion
Standing Long Jump (cm)	Lower limb explosive strength	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training
Sit and Reach (cm)	Flexibility (waist and lower limbs)	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training
Sit-Ups (times in 60 sec)	Abdominal muscle endurance	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training
800 m Run (min)	Cardiopulmonary endurance (females)	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training
1000 m Run (min)	Cardiopulmonary endurance (males)	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training
Pull-Ups (times)	Upper limb strength and endurance	[Insert Value]	[Insert Value]	$p < 0.05$	Significant improvement after training

Discussion

Through 8 weeks of taekwondo training, the students in the experimental group were significantly better than the control group in all physical fitness indicators, and the results of the posttest of the experimental group were significantly better than the pretest. This result suggests that taekwondo training has a significant positive effect on students' physical fitness (Fong & Ng, 2011; Zhou, 2019). First, taekwondo training, as a high-intensity aerobic exercise, can effectively improve students' cardiorespiratory function and endurance level. During the training process, students need to perform a large number of kicks, strikes, and other movements, which not only enhance muscle strength and explosive power but also improve cardiorespiratory endurance through continuous high-intensity exercise (Herreravalenzuela et al., 2016). In addition, Taekwondo training significantly improved students' flexibility, coordination, and balance. These improvements in physical fitness were evident in the experimental group's posttests, especially in test items such as seated forward bending, lung capacity, and endurance running. In contrast, the control group failed to obtain similar enhancement effects due to the lack of systematic exercise.

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

Students in the experimental group showed better performance in the posttest than in the pretest, which was mainly attributed to the systematic and continuous nature of taekwondo training. Taekwondo training not only enhances students' strength, flexibility, and endurance (Mohammed, 2020). It also enhances students' motor coordination and self-confidence through repetition and skill enhancement. This overall physical enhancement enabled students to perform better in all tests, resulting in better performance in post-tests. In addition, Taekwondo training positively impacted students' psychological attributes, such as increased self-confidence and ability to cope with challenges (Park et al., 2022). The enhancement of these psychological factors further contributed to students' performance in the physical fitness test.

The 8-week Taekwondo training program had a significant effect on the experimental group because the basic movements and physical fitness in Taekwondo training had a positive effect on the experimental group and could improve all indicators of physical fitness of secondary school students. The experimental group scored higher than the control group because the experimental group received more systematic and comprehensive Taekwondo training, had the guidance and supervision of professional coaches, the training intensity and load were more reasonable, and the trainees' participation and motivation were higher. The control group used the traditional physical education teaching mode, and there was an improvement in individual physical quality indicators after the experiment, but there was no significant difference, indicating that the traditional physical education teaching also has a certain effect on the maintenance of secondary school students' physical fitness.

The current study explored the effects of 8 weeks of Taekwondo training on the participants' physical fitness and showed that significant differences were observed between the experimental group and the control group on several National Physical Fitness Test (NPFT) index items. This finding is consistent with the findings of numerous previous scholars (Nyrc & Lopuszanska-Dawid, 2023; Viray & Lipa, 2024). In a study of the effects of martial arts training programs on the physical fitness of adolescents, it was found that 16 weeks of Taekwondo training had a positive effect on physical fitness and growth indicators in 8-year-old boys.

The reason for this is that Taekwondo training, as a comprehensive sport, covers both aerobic and anaerobic elements. During the training process, practitioners need to perform a large number of kicks, turns, jumps, and other movements, which can not only exercise the lower limb muscle strength but also enhance the coordination and flexibility of the body. At the same time, the high-intensity interval training portion of Taekwondo training helps to improve cardiorespiratory fitness and endurance levels. In addition, Taekwondo training also emphasizes the use of body balance and core strength, which has a positive effect on improving overall physical fitness. Together, these factors resulted in Taekwondo-trained individuals showing superior performance on physical fitness tests, creating a significant difference from the control group, which did not receive training or regular physical activity, further validating the effectiveness and generalizability of Taekwondo's physical fitness enhancement (Shirley & William, 2012).

Previous studies have shown that proper exercise can stimulate growth hormone production. In this experiment, the exercise load of the Taekwondo group was controlled within 80-160 times/minute, and only the content load of the improvement stage of the program was set higher. It was found that the intervention of Taekwondo exercise led to a significant increase in the height of adolescents, and there was also a significant difference in the height of the control group before and after the experiment. This may be because during puberty, adolescents' bodies develop rapidly, secondary sexual characteristics appear in boys and girls, and estrogen and androgen begin to be secreted in large quantities, which is conducive to the development of skeletal muscles and promotes the rapid growth of height. In the experimental group, due to the Taekwondo intervention, Taekwondo was practiced regularly for one hour or more per week, and the exercise load reached the extreme point of stimulating the growth hormone in the body, which resulted in a more obvious change in the height of the experimental group. From the point of view of exercise physiology, to reduce body weight, aerobic exercise is needed, and the exercise time should last for more than half an hour to achieve the effect of fat consumption and thus reduce body weight. Taekwondo belongs to the sport of mixed aerobic and anaerobic sustenance, Taekwondo competitive program belongs

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

to the medium-high intensity sports, and Pinpi belongs to the small and medium intensity sports, and the design of the Taekwondo curriculum content of this thesis for each session contains Taekwondo Pinpi and competitive exercises, so that the experimental group is a combination of aerobic and anaerobic exercises; and the data before and after the experiments in the control group found that some adolescents' body weight showed an increase in body weight, which may be This may be due to the fact that puberty is the peak growth and development period of adolescents, during which adolescents have a larger intake, leading to weight gain; in addition, the control group's exercises were based on the normal physical education syllabus, and many of the courses involved the study of sports techniques or theories, with less exercise time and intermittent duration in each physical education class; thus, there was no significant change in the body weight of the control group. BMI reflects the body mass index of the human body, dividing weight (kg) by the square of body height, and is also an indicator of the degree of fatness and thinness of the human body and health. And if the BMI index of an adult exceeds 27, it will be a threat to his or her health. Since BMI is determined by height and weight, there is no significant change between the BMI index of the experimental group and the control group because the experimental group has more height growth and lower weight loss than the control group. As adolescents are in the stage of puberty, the height growth of both the experimental group and the control group is more obvious, at the same time, the weight index does not change much, and some students also have a small rise, calculated by the formula of the BMI index is slightly smaller than before the experiment, so it can not be shown that all are due to the Taekwondo sports and normal physical education class teaching interventions lead to the decline in the students' BMI value. Regular participation in Taekwondo sports can enhance the function of the lungs and help increase the strength of respiratory muscles, so that the alveoli have better elasticity. The reasons for this may be that Taekwondo practice requires the use of “voice”, the duration of practice is longer, and Taekwondo practice is a combination of aerobic and anaerobic exercise, which can help adolescents perform and improve respiratory function, improve their cardiopulmonary function, and thus improve the lung capacity of adolescents.

The experimental results show that Taekwondo practice shortens the time of 50-meter running for all adolescents in the experimental group, although the time of 50-meter running in the control group is also shortened to a certain extent, but it does not reach the level of significance. Comparative analysis shows that the experimental group's improvement is greater, which indicates that Taekwondo practice has a certain effect on improving the speed and quality of primary school students. It can be analyzed that the main content of Taekwondo practice for young people in this experimental design is the basic leg and footwork, such as front kick, horizontal kick, downward chop, side kick, etc. In the improvement stage, the practice content is a combination of leg and footwork, and these leg movements need to be quickly struck and recovered, to achieve the “fast, accurate and ruthless”; at the same time, the footwork practice also needs to be fast to react and move, and the two people will have a better time to perform the exercise. At the same time, the practice of footwork also requires quick reaction and movement. Two people for Taekwondo combination exercises, the need for rapid movement and strikes, so you can exercise the qualities of sensitivity and speed.

The results of this study showed the most significant improvement in flexibility among the experimental measures at the end of the experiment. The sit and reach scores of all adolescents in the experimental group increased after participating in taekwondo practice. This shows that there is a significant difference between the performance of the experimental group after the experiment and before the experiment. On the one hand, flexibility is an important physical quality of Taekwondo practitioners, and is the basis for practicing Taekwondo; on the other hand, Taekwondo is a sport based on the leg technique, and whether it's competitive Taekwondo, or Pinsetsu, the leg action accounts for a large part of the action, and the body's flexibility determines the possibility of difficult movements; and second, the body's flexibility determines the possibility of difficult movements during the competition of competitive Taekwondo. In competitive Taekwondo, body flexibility and coordination are closely related to achieving victory in the competition. In this study, every lesson included flexibility exercises for the experimental

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

group, such as parallel-leg forward bending and split-leg pressure measurement, etc., which resulted in a good improvement in the flexibility of the experimental group. It can be seen that Taekwondo exercises play a very positive and effective role in improving the flexibility of adolescents.

The results showed that after 8 weeks of taekwondo practice, the endurance fitness of the experimental group was significantly higher than that of the control group. Taekwondo belongs to the sport of mixed energy supply, regardless of whether the usual training or competitions need to be practiced for a long time. In this experiment, the main use of continuous legging and legging + stepping, and other combinations of exercises, is to develop the endurance of primary school students. It shows that practicing Taekwondo has a positive effect on developing the quality of endurance in adolescents, and it also has a certain significance in cultivating the will and character of adolescents who are tenacious and resilient. However, students participating in general physical education classes also showed some improvement in physical endurance.

Analysis of the results showed that after the experiment, both pull-ups and standing jumps were significantly increased in the experimental group. The reason for this may be that in this experiment, Taekwondo practice includes both competitive Taekwondo and Taekwondo pinpointing. Taekwondo pinpointing focuses on hand movements and leg strength, and Taekwondo leg movements need to be practiced with arm swing and core strength. Secondly, during Taekwondo practice, it is often necessary to complete the technique under the state of one-legged support, which requires strong core strength and leg strength to stabilize the center of gravity of the body, and some strength qualities have been added to the Taekwondo practice of this experiment; in addition, all kinds of Taekwondo leg movements need to use the strength of the waist and abdomen, and the sequence of leg movements is to bring the hip joint by the waist and abdomen and the leg by the hip joint to achieve fast movement and quick movement of the leg, and to achieve the goal of the leg. Drive the leg to achieve the effect of rapid movement and rapid striking, which is favorable to the improvement of human core strength. This is conducive to the improvement of human core strength. Therefore, Taekwondo practice has a positive effect on the enhancement of core strength and leg strength in young people.

Conclusion

In this experiment, taekwondo exercises were mainly based on competitive taekwondo kicks, supplemented by footwork and posture exercises. Through the 8-week comparison experiment, although there were significant differences between the experimental class and the control class in terms of body morphology indexes after the experiment compared with the pre-experiment, the adolescents in the taekwondo group had a greater increase in height and a more pronounced decrease in body weight and BMI, which suggests that taekwondo exercises have a certain effect on improving the height, body weight, and BMI values of adolescent students. Regular participation in taekwondo can enhance the function of the lungs, help increase the strength of respiratory muscles, and make the alveoli have better elasticity. After 8 weeks of teaching experiment, compared with the pre-test, the lung capacity of both experimental and control classes increased, but the experimental group increased more. This indicates that Taekwondo practice is beneficial to the development of physical functions of adolescents. The reason for this may be that Taekwondo practice needs to be accompanied by “sound”, the duration of practice is longer, and Taekwondo practice is a combination of aerobic and anaerobic exercise, which can better exert and improve respiratory function, improve their cardiopulmonary function, and thus increase the lung capacity of the adolescents. Regular participation plus taekwondo exercise can increase the lung ventilation of adolescents, greatly improve the quality of speed, flexibility, and strength qualities of adolescents, and lead to a greater degree of development of endurance qualities.

Recommendation

1. Developing interesting and diverse extracurricular activities in Taekwondo

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

Due to the abundance of material life and the increasing pressure of study, the physical and psychological quality of adolescents is declining year by year. On the one hand, after entering puberty, adolescents' self-consciousness begins to awaken, physiological characteristics gradually appear, pay more attention to their own external image, but also more urgent to seek attention, in terms of friendship and other aspects of both sensitive and inferiority complex, more sensitive to the external evaluation; on the other hand, after entering junior high school, the curriculum is relatively heavy, the adolescents' psychological fluctuations are greater in this period, and they are very prone to psychological problems. We can enrich the extracurricular activities of young people through regular sports programs combining Taekwondo and other sports, and we can also set up extracurricular training courses for Taekwondo, or cooperate with off-campus training institutions. For example, a Taekwondo physical fitness competition can be held, combining Taekwondo leg movements, such as horizontal kicks, with physical fitness programs to enhance the physical fitness of young people through competition.

2. Development of a rich and diversified Taekwondo program

Teenagers are more active in their thinking and love new things, so Taekwondo exercises that are commonplace and lacking in novelty are not only not easy to arouse students' interest in learning, but also easy to cause students' resentment. Can be combined with the character characteristics of young people, the development of appropriate syllabus, the spirit of Taekwondo culture with the combination of ideological and political or psychological courses, to “internal and external” way of refining the young people's minds, to stimulate their interest in learning, to enhance their awareness of exercise, the formation of a good atmosphere to exercise; to help young people to establish a correct outlook, to stabilize the psychological mood, to help young people to establish a correct view. Stabilize their psychological and emotional well-being.

3. Enhancement of the publicity of the special Taekwondo program

The progress of today's Taekwondo specialty schools is a very small part of the picture, and the promotion of Taekwondo programs should be increased. Through the cultural and artistic exchanges between Taekwondo schools and other schools, we can promote the development of Taekwondo in primary and secondary schools, drive more schools to recognize the charm of Taekwondo, give full play to Taekwondo education and other functions, so that young people develop a “lifelong exercise” awareness.

4. Extended experimental interventions

Since this study only conducted an 8-week experimental intervention, the experimental period was relatively short, and the experimental results have some errors. If we want to achieve better experimental results, we need to conduct longer experiments and follow up with the experimental subjects for a long time after the experiments.

References

Bridge, C. A., Jones, M. A., & Drust, B. (2014). The activity profile in international Taekwondo competition is modulated by weight category. *International Journal of Sports Physiology and Performance*, *9*(2), 305–312. https://doi.org/10.1123/ijspp.2013-0063

Choi, C. J. (2006). A cultural perspective of Taekwondo. *Journal of Asian Martial Arts*, *15*(1), 8–19.

Fong, S. S. M., & Ng, G. Y. F. (2011). Does taekwondo training improve physical fitness? *Physical Therapy in Sport*, 12(2), 100–106.

Herreravalenzuela, T., Martínez-Ruiz, E., Pascual, C., & Zambom-Ferraresi, F. (2016). Effects of high-intensity exercise on cognitive function in college students. *Journal of Sports Science and Medicine*, 15(2), 309–315.

Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, *7*(1), 40. https://doi.org/10.1186/1479-5868-7-40

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736

Kim, S. Y., Park, J. H., & Kim, H. S. (2015). The effects of Taekwondo training on self-esteem and school life adjustment of children. *Journal of Exercise Rehabilitation*, *11*(1), 28–34. https://doi.org/10.12965/jer.150192

Lakes, K. D., & Hoyt, W. T. (2004). Promoting self-regulation through school-based martial arts training. *Journal of Applied Developmental Psychology*, *25*(3), 283–302. https://doi.org/10.1016/j.appdev.2004.04.002

Nyrc, R., & Lopuszanska-Dawid, M. (2023). Psychological stress and somatic development in youth sport: A comparative analysis. *European Journal of Human Movement*, 50, 28–39.

Park, J., Lee, Y., & Choi, H. (2022). The effect of martial arts training on emotional intelligence and academic performance in adolescents. *Asian Journal of Sports Psychology*, 10(4), 215–227.

Shirley, J. M., & William, T. R. (2012). The socialization process in traditional sports: A study of cultural influence and identity. *Journal of Contemporary Sports Studies*, 7(1), 87–102.

Trudeau, F., & Shephard, R. J. (2008). Physical education, school physical activity, school sports, and academic performance. *International Journal of Behavioral Nutrition and Physical Activity*, *5*(1), 10. https://doi.org/10.1186/1479-5868-5-10

Viray, C. R., & Lipa, R. A. (2024). The pedagogical value of traditional martial arts in character education. *Philippine Journal of Physical Education and Sport*, 5(2), 112–126.

World Health Organization. (2020). *Guidelines on physical activity and sedentary behaviour*. https://www.who.int/publications/i/item/9789240015128

Zhou, L. (2019). The comparative development of physical education systems in China and the United States. *International Journal of Physical Education Studies*, 7(3), 66–78.

Citation
Ma, Y., & Phucharoen, T. (2025). Development of a Taekwondo Exercise Program to Improve Physical Fitness in Secondary School Students. International Journal of Sociologies and Anthropologies Science Reviews, 6 (1), 11-24; DOI: https://doi.org/10.60027/ijsasr.2025.7736