

The Effect of Learning Management Using the Dewey's Five Step Model on Aerobics Classroom in Zhengzhou Primary School

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Abstract

This article aimed to 1) evaluate the influence of Dewey's five-step teaching model on the teaching of aerobics in primary schools in Zhengzhou, 2) compare whether students' cognitive ability of aerobics is improved, 3) compare the psychological and emotional performance, and 4) compare the impact on students' learning skills and physical fitness. The sample was two classes in Grade 6 selected by cluster random sampling. One class served as the control group, and the other was designated as the experimental group. They were selected by the methods of literature review, questionnaire survey, and experiment, which were used in this study. The instrument for collecting data was SPSS software. Statistical techniques such as descriptive analysis, independent sample t-test, one-way ANOVA, and chi-square test were applied to evaluate the influence of the Dewey teaching model on the aerobics curriculum. Analyze data by using descriptive statistics and content analysis. The research results were found as follows:

1. Dewey's five-step teaching model and traditional teaching methods had significantly improved students' cognitive ability, including learning attitude, interest, and cooperative learning. However, Dewey's teaching model had a more significant impact on students' cognitive development.

2. Dewey's teaching model was very popular among students. It created a positive and enjoyable classroom atmosphere, improved students' mental states, and made them more enthusiastic about attending classes and participating.

3. The model also improved the students' aerobics technical ability, and an improvement in their aerobics skills was observed during the study period.

4. In addition, the application of the Dewey teaching model had significantly promoted the physical fitness of students, demonstrating its potential to improve the overall physical health of primary school students.

Keywords: Dewey's Five-Step Model; Primary School Students; Aerobics Education; Cognitive Development; Zhengzhou Primary School

Introduction

The state general administration of sport issued the 14th five-year plan for sports development, emphasizing that young people should master sports skills and strengthen physical education teaching. In 2024, the "Physical Education and Health Classroom Standards [Revised 2022]" will be introduced, focusing on "health first", practicality, fitness and comprehensiveness. As a kind of fitness exercise, aerobics is suitable for different people and requires students to master basic skills. The aerobics course in primary school is facing new requirements, so it is necessary to innovate the teaching mode. As a fitness exercise suitable for different groups of people, the aerobics curriculum in primary schools is facing the challenge of innovating the teaching model to meet the new requirements. (Ministry of Education of the People's Republic of China, 2022)

Primary and secondary school "Physical education and health" teachers began to arrange aerobics course content at level 3. However, the calisthenics curriculum model of primary and secondary schools has not been innovated for many years. In order to improve the traditional curriculum model, students fall in love with calisthenics and feel fun; Make teachers willing to teach and enjoy the lessons; Improve students' physical quality and realize efficient and happy aerobics course model. (People's Education Press, Xinhua News Agency, & Central People's Government of the People's Republic of China, 2019).

The research field of this study is the application and influence of Dewey five-step teaching model in primary school aerobics class. The research question is whether "traditional teaching method" and "Dewey five-step teaching method" can improve students' cognitive

ability, emotional attitude, learning skills and physical quality? The research needs are to understand the characteristics and advantages of Dewey's five-step teaching model, explore the feasibility and effectiveness of its implementation in primary school aerobics classes.

However, the current aerobics curriculum model of primary and secondary schools has not changed for many years, and it is difficult to stimulate students' interest and improve the teaching effect. In order to improve this situation, this study focuses on the application of Dewey five-step teaching method in primary school aerobics class. The purpose is to explore whether it can effectively improve students' cognitive ability of aerobics, improve their psychological emotions, improve their learning skills and physical quality, and then provide a strong reference for the reform of primary school aerobics teaching, helping to achieve efficient and happy aerobics curriculum teaching goals.

Research Objectives

1. To compare cognitive ability of aerobics between the control group "traditional teaching method" and the experimental group "Dewey five-step teaching method"
2. Comparison cognitive ability was compared between the control group's traditional teaching method and the experimental group's
3. Comparison the emotional changes of students were observed by comparing the experimental group and the control group.
4. Comparison the impact of physical fitness. between the experimental group and the control group before and after the experiment.

Literature Review

Dewey's five-step method

Dewey five-step teaching method is a teaching method proposed by John Dewey, a famous American educator, philosopher and psychologist. It was detailed in the book *How We Think*, published in 1910. The method emphasizes the application of scientific thinking processes in teaching to help students acquire knowledge and solve problems (John, 2024).

Dewey's five-step approach emphasizes: In several books, such as *How We Think* and *Democracy and Education*, Dewey elaborates on the value of his approach. 1) Stimulate interest in learning: Creating situations can stimulate students' curiosity and thirst for knowledge and promote active participation. 2) Develop thinking skills: Students exercise logical, innovative and critical

thinking through the process of identifying problems, proposing hypotheses, reasoning judgments and verification. 3) Improve problem solving ability: Students learn to apply knowledge and methods in practical problem solving to improve their problem-solving ability. 4) Promote knowledge understanding and mastery: Group cooperation and individual exploration practice enable students to have a deeper memory and comprehensive understanding of knowledge, and better internalize knowledge. 5) Enhance cooperation and communication skills: Cooperation and discussion in teaching are helpful to develop students' team spirit and communication skills.

Aerobics

Combining gymnastics, music and dance, calisthenics is an aerobic exercise that features fitness, strength and beauty. Through the fusion of body movement and musical rhythm, it shows vitality and movement, while having the value of fitness and artistic appreciation. (Liu, 2020)

The influence of Dewey's five-step teaching model on calisthenics learning

1) Context creation: Stimulate learning interest and create a pleasant learning atmosphere through story-based context; 2) Problem guidance: encourage students to find the difficulty of action independently, cultivate problem awareness and exploration spirit; 3) Hypothesis inquiry: apply existing knowledge to propose solutions, and expand thinking through innovative practice and teamwork; 4) Reasoning analysis: carry out logical demonstration and group discussion to verify the scientific city and physical adaptability of action design; 5) Practice verification: By showing mutual evaluation and teacher feedback to test learning results, gain a sense of practical achievement and improve learning motivation. Through progressive teaching, this model can effectively improve students' motor skills, thinking ability and learning interest.

Study on Dewey's five-step teaching method

1) Research and development of Dewey's educational thought

Dewey's educational theory was formed at the beginning of the 20th century, and his philosophy and educational thoughts have deeply influenced the global educational system. American thinker Kuebiko ranks him with Plato and Aristotle and appraised him as one of the greatest figures in the history of education. The authoritative research document, The Collected Works of (John, 1882–1953) (27 volumes edited by Boylston), systematically collects his works and provides basic support for academic research.

2) Research on the content of “five-step teaching method” in China

When analyzing the five steps of thinking, the scholar (Marin, 2014) believes that Dewey's “five-step teaching method” is highly related to the five-step method of thinking. The core

features include: first, actively pursue the opposite sex, question the old knowledge and authority, and promote knowledge renewal; the second is creative imagination: put forward hypotheses through association to realize the leap from perceptual to rational thinking; Third, unique knowledge structure: based on solid knowledge reserves, effective hypotheses are formed.

Conceptual Framework

This research is a research study the influence of Dewey's five-step teaching model on aerobics teaching. The researcher defines the research conceptual framework based on the theory of comparing the Dewey five-step teaching method with the traditional teaching method in teaching practice. Together with explore the influence of different teaching methods on students' learning results. The details are as follows:

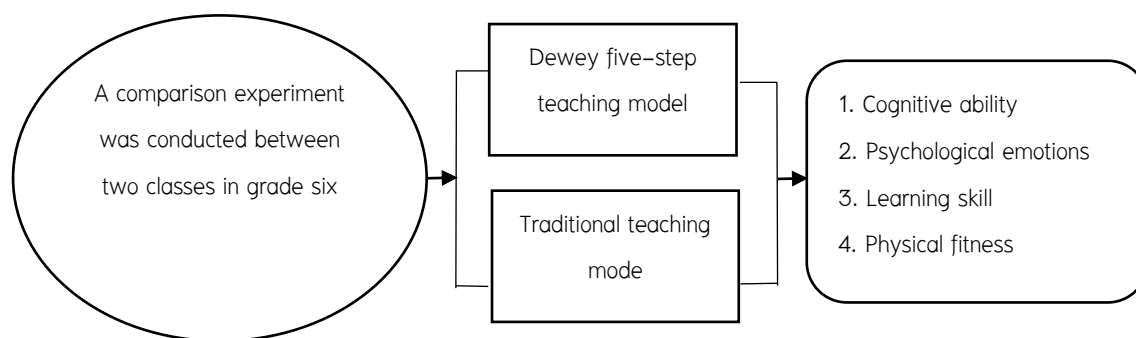


Figure 1 Conceptual Framework

Research Methodology

Population and Sample

1. Population: The object of this study is the sixth grade students of Qiaohanglu primary school in Zhengzhou aviation port district.

2. Sample: The sample of this study is the sixth grade students of Qiaohanglu Primary School in Zhengzhou aviation port area. Cluster random sampling method was used, Research design.

This study is an experimental study, using a group of pre-test-post-test design. A quantitative study method (Campbell & Stanley, 1963). The participants provided informed consent.

Table 1 The explanations of the words T1, T2 and X are shown below:

T1	means	Pretest
T2	means	Posttest
X	means	Five-step teaching method of primary school aerobics teaching model innovation

Research Instruments

In this study, the investigators identified the study tools and study procedures as follows.

1. Research tools: For this study, we used five research tools.

1.1 Dewey five-step teaching model of primary school aerobics classroom scheme

The class plan consists of 16 class hours, each class hour (16 week). 16 classroom lesson plans, each consisting of five teaching steps of Dewey's five-step teaching model.

1.2 Cognitive ability test of aerobics learning

According to Likert (1967) rating scale, a cognitive questionnaire for aerobics learning was developed to assess learning cognitive ability. The questionnaire consists of ten questions designed to test students' interest in learning, attitude and ability to cooperate.

1.3 Aerobics course learning students' emotional change psychological test

Renowned British psychologist Pippa Wilson designed the test as part of the famous Blob Tree test series to help identify students' true inner and ideal emotional states and detect changes in emotions before and after learning.

1.4 Aerobics learning skills test

This test is based on the national aerobics movement evaluation form with a total of 10 points, including: performance and team spirit 4 points, movement completion 6 points. This test is used to test the movement skills before and after learning aerobics in both control class and experimental class.

1.5 Physical fitness test for aerobics learning

This study refers to the test content and scoring standards of the National Physical Health Standards for Primary and Secondary Schools, this test is used to test the physical fitness before and after learning aerobics in the control class and the experimental class.

Research Results

Table 2 Comparative analysis of students' learning interest, attitude and cooperation ability within control group and experimental group before and after the experiment

	Group	Experiment	Number of cases	Mean value	Standard deviation	t	P
Interest	Experimental group	Pretest	45	5.5556	2.11655	4.906	<0.001
		posttest	45	8.1778	2.89426		*
	Control group	Pretest	45	3.3778	1.59956	5.644	<0.001
		posttest	45	6.0667	2.76668		*
Attitude	Experimental group	Pretest	45	5.3778	2.31879	-8.324	<0.001
		posttest	45	8.3778	0.68387		*
	Control group	Pretest	45	7.2	1.89017	-2.075	0.041*
		posttest	45	7.8667	1.03573		
Cooperation ability	Experimental group	Pretest	45	5.4222	3.04628	3.172	0.002*
		Posttest	45	9.1778	3.29799		
	Control group	Pretest	45	6.7556	2.12132	1.697	0.093
		Posttest	45	8.1333	2.48267		

*P<0.05

In table 2, compared with before the experiment, the scores of learning interest of the two groups of students increased significantly after the experiment. There was a significant difference in the learning attitude of the control group before and after the experiment ($p=0.041$ ($p<0.05$)). In the experimental group before and after the experiment, there was also a significant difference in the intra-group comparison $p=0.00$ ($p<0.05$), the control group: intra-group comparison of students' cooperation ability before and after the experiment showed no significant difference $p=0.093$ ($p>0.05$). Experimental group: before and after the experiment, there was a significant difference within the group $p=0.002$ ($p<0.05$).

Table 3 Comparative analysis of students' learning interest, attitude and cooperation ability between the experimental group and the control group before and after the experiment

		Group	Number of cases	Mean value	Standard deviation	t	P
Interest	Pretest	Experimental group	45	5.5556	2.11655	-3.537	0.734
		Control group	45	3.3778	1.59956		
	Posttest	Experimental group	45	8.1778	2.89426	-5.507	<0.001*
		Control group	45	6.0667	2.76668		
Attitude	pretest	Experimental group	45	5.3778	2.31879	-4.086	0.115
		Control group	45	7.2	1.89017		
	Posttest	Experimental group	45	8.3778	0.68387	2.763	0.07
		Control group	45	7.8667	1.03573		
Cooperation ability	Pretest	Experimental group	45	5.4222	3.04628	-3.619	0.129
		Control group	45	6.7556	2.12132		
	Posttest	Experimental group	45	9.1778	3.29799	-5.097	0.004*
		Control group	45	8.1333	2.48267		

*P<0.05

In table 3 it can be seen that after the experiment, the study interest score of the subjects showed significant difference between the groups.

Before the experiment, $p>0.05$ in the learning attitude test of the experimental group and the control group. so there was no significant difference between the two groups before the experiment. After the experiment, $p>0.05$, there was no significant difference between the two groups after the experiment. It can be seen that after the experiment, both groups of students have improved in the overall score of learning attitude, and the score of the experimental group has significantly improved, which proves that the effectiveness of relevant factors or measures in improving subjects' learning attitudes.

Before the experiment, there was no significant difference in cooperation ability between the two groups, $p=0.129$ ($P>0.05$); after the experiment, there was a significant difference between the two groups, $p=0.004$ ($p<0.05$).

Table 4 Overall comparative analysis of overall learning and cognitive ability between the experimental group and the control group before and after the experiment

	Group	Number of cases	Mean value	Standard deviation	t	p
Pretest	Experimental group	45	12.233	2.984	-7.481	0.061
	Control group	45	12.603	1.984		
Posttest	Experimental group	45	16.604	3.970	-9.411	<0.001*
	Control group	45	14.604	2.970		

*p<0.05

In table 4 compared with before the experiment, the scores of the subjects' learning and cognitive ability were significantly improved after the experiment. $p < 0.001$

Table 5 Comparison of students' emotions between experimental group and control group before and after experiment

		Experimental group	Control group	χ^2	p
Pretest	Passive layer	16(35.6%)	6(13.3%)	60.28	0.049*
	Neutral state	13(28.9%)	18(40.0%)		
	Active layer	16(35.6%)	21(46.7%)		
Posttest	Passive layer	5(11.1%)	8(17.8%)	1.358	0.507
	Neutral state	14(31.1%)	16(35.6%)		
	Active layer	26(57.8%)	21(46.7%)		

*p<0.05

In table 5 according to the score of the emotional dot plot, the emotions of the subjects were divided into three layers. The negative level refers to the subjects' more negative emotional attitude; the positive level refers to the subjects' positive emotional attitude; Neutral layer refers to the subjects' emotional attitude has no obvious tendency.

Before the experiment, 16 students in the experimental group were in the active level, accounting for 35.6%; there were 13 people in the neutral layer, accounting for 28.9%; 16 people were negative, accounting for 35.6%. In the control group, there were 21 students in the negative layer, accounting for 13.3%, and 18 students in the neutral layer, accounting for 40.0%. 21 people were active, accounting for 46.7%. Chi-square test results show that there is a significant difference between the two, $p = 0.049$ ($p < 0.05$). This showed that students in the experimental group were generally more negative than those in the control group, and the difference was statistically significant.

After the experiment, 26 students in the experimental group were in the active level, accounting for 57.8%; there were 14 people in neutral layer, accounting for 31.1%. Five people were negative, accounting for 11.1%. In the control group, there were 8 students in the negative layer, accounting for 17.8%, and 16 students in the neutral layer, accounting for 35.6%. 21 people were active, accounting for 46.7%. Chi-square test results showed that there was no significant difference between the two, $p=0.507(p>0.05)$. This showed that students in the experimental group were overall higher than those in the control group, and the difference was not statistically significant. Considering that before the experiment, the overall mood of the experimental group was significantly worse than that of the control group. Therefore, it can be believed that the experiment significantly improved the students' mood.

Table 6 Comparative analysis of students' emotions within control group and experimental group before and after the experiment.

	Experimental group		Control group	
	Before the experiment	After-experiment	Before the experiment	After-experiment
Passive layer	16(35.6%)	5(11.1%)	6(13.3%)	8(17.8%)
Neutral state	13(28.9%)	14(31.1%)	18(40.0%)	16(35.6%)
Active layer	16(35.6%)	26(57.8%)	21(46.7%)	21(46.7%)
χ^2		8.180		0.403
p		0.017*		0.817

* $p<0.05$

In table 6 the experimental evaluation showed that the emotional stratification of the experimental group changed significantly before and after the experiment, with the active layer increasing from 35.6% to 57.8%, and the negative emotion decreasing from 35.6% to 11.1%. The Chi-square test $p=0.017$, indicating that the experiment effectively improved the students' emotions.

There was no significant change in the emotion stratification of the control group before and after the experiment, the negative layer increased from 13.3% to 17.8%, and the positive emotion remained at 46.7%. $p=0.817$ by Chi-square test indicated that the emotion of the control group was not affected by the experiment.

Table 7 Comparison of aerobics technical ability between the experimental group and the control group before the experiment

	Group	Number of cases	Mean value	Standard deviation	t	p
Pretest	Experimental group	45	0.0156	0.05623	0.736	0.848
	Control group	45	0.0178	0.05347		

In table 7 independent sample T test was used to obtain Table11. It can be seen that the students' aerobics foundation was tested before the experiment, and no significant difference was found between the two groups $p=0.848$ ($p>0.05$).

Table 8 Group comparison of (performance and teamwork) and (movement completion) between experimental and control groups after the experiment

	Group	Number of cases	Mean value	Standard deviation	t	p
Performance and teamwork	Experimental group	45	3.604	0.367	-2.077	0.041*
	Control group	45	3.413	0.497		
Movement completion	Experimental group	45	5.464	0.607	-3.373	<0.001*
	Control group	45	5.031	0.612		

* $p<0.05$

In table 8 further significance analysis showed that $t=-2.077$, $p=0.041$ ($P<0.05$). This indicates that at the 95% statistical confidence level, the scores of the experimental and control groups can be considered statistically significant. Specifically, the experimental group scored higher for acting and teamwork.

Further significance analysis showed that $t=-3.373$, $p=0.001$ ($P<0.05$) This indicates that at the 95% statistical confidence level, the scores of the experimental and control groups can be considered statistically significant. Specifically, the experimental group scored slightly higher on completion.

Table 9 Comparison of total score of aerobics technique test between experimental group and control group after experiment

	Group	Number of cases	Mean value	Standard deviation	t	p
Posttest	Experimental group	45	9.069	0.863	-3.469	0.001*
	Control group	45	8.444	0.845		

* $p<0.05$

In table 9 further significance analysis showed that $t=-3.469$, $p=0.001$ ($P<0.05$). This indicates that at the 95% statistical confidence level, the scores of the experimental and control groups can be considered statistically significant. Specifically, the experimental group scored higher on aerobics technical ability. It can be concluded that the experiment can significantly improve students' aerobics skills.

Table 10 Comparison of physical fitness within the experimental group before and after the experiment

	Experimental group (n=45) pretest		Experimental group (n=45) posttest		Difference comparison	
	Mean value	Standard deviation	Mean value	Standard deviation	T-value	p-value
Vital capacity (ml)	1800.32	180.67	1897.87	448.09	-0.375	<0.001*
50M Race (s)	10.29	0.94	10.09	0.63	-0.099	0.234
Sit and Reach(cm)	5.20	7.35	9.38	5.46	0.509	<0.001*
Sit-ups (min/session)	29.70	6.44	32.58	11.95	-1.395	<0.001*
1 minute jump rope (each)	94.98	30.78	95.34	19.89	-0.087	0.493
50 x 8 round trip (seconds)	56.44	11.69	56.87	15.56	0.365	0.180

* $p<0.05$

In table 10 through the experimental group of 45 students, the statistical analysis before and after the experiment, according to the primary school physical education and health standard test items. It includes six items, namely, the test results are shown as follows:

50 meters running, $p=0.234$, $P>0.05$; 1 minute skip rope, $p=0.493$, $p>0.05$; 50×8 round trip, $p=0.180$, $p>0.05$, indicating no significant difference between the three tests before and after the experiment. There was no significant difference between 50-meter running, 1-minute jump rope running and 50×8 round trip running.

Table 11 Comparison of physical fitness within the control group before and after the experiment

	Control group (n=45) pretest		Control group (n=45) posttest		Difference comparison	
	Mean value	Standard deviation	Mean value	Standard deviation	T-value	p-value
Vital capacity (ml)	1650.38	205.33	1860.73	483.75	3.678	<0.001*
50M Race (s)	10.31	0.99	10.30	0.85	-1.331	<0.001*
Sit and Reach(cm)	4.89	4.92	6.81	4.79	2.374	<0.001*
Sit-ups (min/session)	29.10	9.96	34.58	8.87	0.270	0.259
1 minute jump rope (each)	96.82	29.51	96.97	25.76	0.489	0.294
50 x 8 round trip (seconds)	59.62	9.60	58.90	18.30	-0.567	0.798

* $p<0.05$

In table 11 there were still 45 students in the control group, and the results of comparative analysis before and after the experiment were as follows: Vital capacity: $t=3.678$, $p<0.001$, $P<0.05$, indicating a significant difference before and after the experiment, and significant improvement in vital capacity. 50m running: $t=-1.331$, $p<0.001$, $P<0.05$, indicating a significant difference before and after the experiment, but the range of change is small. Sitting forward flexion: $t=2.374$, $p<0.001$, $P<0.05$, indicating significant difference before and after the experiment, flexibility improved. The other three items, sit-up $p=0.259$, one-minute jump rope $p=0.294$, 50x8 round trip running $p=0.798$, $P>0.05$, indicating no significant difference before and after the experiment.

Table 12 Between groups comparison of physical fitness between groups before the experiment

	Experimental group (n=45)		Control group (n=45)		Difference comparison	
	Mean value	Standard deviation	Mean value	Standard deviation	T-value	p-value
Vital capacity (ml)	1800.32	180.67	1650.38	205.33	-0.375	0.709
50M Race (s)	10.29	0.94	10.31	0.99	-0.099	0.922
Sit and Reach(cm)	5.20	7.35	4.89	4.92	0.509	0.635
Sit-ups (min/session)	32.58	6.44	34.58	9.96	-1.395	0.087
1 minute jump rope (each)	94.98	30.78	96.82	29.51	-0.087	0.901
50 x 8 round trip (seconds)	56.44	11.69	59.62	9.60	0.365	0.716

* $p<0.05$

In table 12 according to the pre-test, there was no significant difference in physical fitness between the two groups

Table 13 Between groups comparison of physical fitness after the experiment

	Experimental group (n=45)		Control group (n=45)		Difference comparison	
	Mean value	Standard deviation	Mean value	Standard deviation	T-value	p-value
Vital capacity (ml)	1897.87	448.09	1860.73	483.75	3.678	$<0.001^*$
50M Race (s)	10.09	0.63	10.30	0.85	-1.331	0.188
Sit and Reach(cm)	9.38	5.46	6.81	4.79	2.374	0.019^*
Sit-ups (min/session)	29.70	11.95	29.10	8.87	0.270	0.787
1 minute jump rope (each)	95.34	19.89	96.97	25.76	0.489	0.627
50x8 round trip (seconds)	56.87	15.56	58.90	18.30	-0.567	0.573

* $p<0.05$

In table 13 the results showed that There was no significant difference between the experimental group and the control group in the test of 50 meters, sit-ups (min/time), one-minute jump rope (PCS), and 50×8 round trip running (SEC) ($p>0.05$), that is, there was no significant difference between the experimental group and the control group in the average value of these tests. There were significant differences in 2 of the 6 tests: one was vital capacity. In the experimental group, the mean of vital capacity (ml) was 1897.32, and the standard deviation was 448.09; In the control group, the mean and standard deviation of vital capacity (ml) were 1860.38 and 483.75. According to the analysis results, at 95% confidence level, $t=3.68$, $p=0$ ($p<0.05$), so it is considered that there is a significant difference in ml lung capacity between the two groups, and the experimental group is significantly higher. The first one was seated forward bend (cm), the mean of the experimental group was 9.38, the standard deviation was 5.46; The mean and standard deviation of the control group were 6.81 and 4.79. According to the analysis results, at 95% confidence level, $t=2.37$, $p=0.02$ ($p<0.05$), it is considered that the two groups have significant differences in seated forward flexion (cm), and the experimental group is significantly higher.

Discussions

Based on the influence of Dewey's five-step teaching model on primary school aerobics class in Zhengzhou, this paper reveals the remarkable results of this teaching model in many aspects, and also provides a valuable reference for the reform of primary school physical education.

1. Dewey's five-step teaching model has unique advantages in improving students' aerobics cognition.

The results showed that both the experimental group using Dewey five-step teaching mode and the control group using traditional teaching mode had a significant improvement in the cognitive ability of aerobics. This finding fits well with constructivist learning theory, which emphasizes the process by which learners actively construct knowledge. For example: domestic researcher Hu and Wu, she also believes that the "five-step teaching method" first focuses on cultivating students' complete thinking ability, so that students can learn to seriously and repeatedly think about problems. Also pay attention to exercise students' practical ability, and finally stimulate students' rational interest attitude (Hu & Wu, 2015). Gao Tian Ming also believes that "five-step teaching method" has a tendency to shift learning from the learning of a few

people to the cooperative learning of the majority, which can help inferior students learn and cultivate students' teamwork ability (Gao, 2001). In addition, the influence of aerobics on cognitive ability is consistent with the research conclusions of some scholars on the positive impact of physical education teaching on students' physical education cognition. Therefore, it proves that physical education plays an indispensable role in cultivating students' physical literacy and Dewey's five-step teaching model has unique advantages in improving students' aerobics cognition.

2. It has a positive impact on students' mental health

The research shows that the aerobics teaching under Dewey's five-step teaching model has obvious effect on improving students' psychological mood and mental health. The results echo theories in sports psychology about the role of exercise in promoting mental health. The book "Sports and Mental Health" published by Yang Ying in 2017 fully explains the relationship between sports and mental health to readers, and at the same time, better improve the level of individual mental health. (Yang, 2017) Chen Caihong published Dewey's introspective Thinking and the Enlightenment of the "Five-Step Method" on Teaching. Although the paper did not directly mention the positive impact on students' psychology, from the side, paying attention to and cultivating students' interest can make students maintain a positive attitude towards learning and reduce their fear of difficulties. Paying attention to guiding students to think independently can make students gain a sense of achievement in learning and enhance self-confidence, which have a positive effect on students' psychology. (Chen, 2019) Before this experiment, about 22% of students had negative psychological and emotional states. Under Dewey's five-step teaching model, aerobics promoted the secretion of dopamine in students' bodies, which enabled students to enjoy learning and effectively adjusted their psychological states.

1. The internal mechanism for the improvement of students' aerobics technical ability

Dewey's five-step teaching mode can obviously improve students' aerobics technical ability, which is consistent with the research conclusion of many experts and scholars that different teaching methods or learning methods can improve the aerobics technical ability. For example, Xiao Yan's Study on the Application Effect of Contract Learning Method in Public Physical Aerobics Courses in Colleges and Universities in 2023 shows that: The application of contract learning is conducive to the development of aerobics athletic ability. The role transformation of teachers and students and the diversification of evaluation in contract learning are conducive to the students' active processing, understanding and thinking of aerobics knowledge and skills, and the

improvement of students' class participation and extracurricular exercise degree, so as to improve their athletic ability. (Xiao, 2023)

4. Contributions and reflections on the improvement of students' physical fitness

From the physical health test results, in general, before and after the experiment, intra-group comparison: the experimental group has a significant improvement effect on lung capacity, seated forward bending and sit-ups, but the improvement effect on 50 meters running, 1 minute skipping and 50×8 round trip running is not obvious. In the control group, the vital capacity and the forward bending of the sitting body were significantly improved, but the improvement of 50m running was not obvious. Sit-ups, 1 minute jump rope and 50×8 round trip did not improve significantly. Future experiments could consider adjusting training methods and intensity to improve performance in these events.

5. Far-reaching significance for cultivating students' lifelong sports consciousness

Dewey five-step teaching method shows good teaching effect in primary school aerobics class. By reflecting students' classroom subjectivity, it promotes students' active participation, increases students' interest in learning movement combinations, and then cultivates students' physical exercise consciousness, which helps students develop lifelong physical education consciousness. This is highly consistent with the concept of cultivating students' lifelong learning and healthy lifestyle advocated by modern education. For example: In Han Yuehua's "How to Cultivate Students' Lifelong Sports Consciousness in Aerobics Class Teaching", aerobics teaching is to make full use of modern educational thoughts and comprehensive teaching methods and learning methods, so that students can experience the challenges of exercise learning, communication and innovation, fully mobilize the main role of students, and realize the development of education and teaching toward "happiness, life and life". It is an effective way to highlight health education, quality education, entertainment education and lifelong sports. (Han, 2005) In 2008, Zhang (2008) wrote in aerobics on the Cultivation of Lifelong Sports Consciousness of College Students that aerobics can not only comprehensively exercise all parts of the body, but also cultivate people's conscious exercise habits, so that students can voluntarily and consciously participate in sports, which plays an extremely important role in promoting people's healthy development and the formation of lifelong sports consciousness. It plays a strong role in promoting the implementation of the national fitness program.

Knowledge from Research

This study confirmed the applicability of Dewey's five-step teaching model in primary school aerobics education in Zhengzhou and illustrated its practical implementation through specific case analysis. The model significantly enhanced students' cognitive understanding of aerobics, improved their psychological and emotional engagement, and contributed to the development of their learning ability and physical fitness. These findings demonstrate that Dewey's model not only enriches the learning process but also supports the holistic development of students, offering a new perspective for cultivating core competencies within the context of aerobics education.

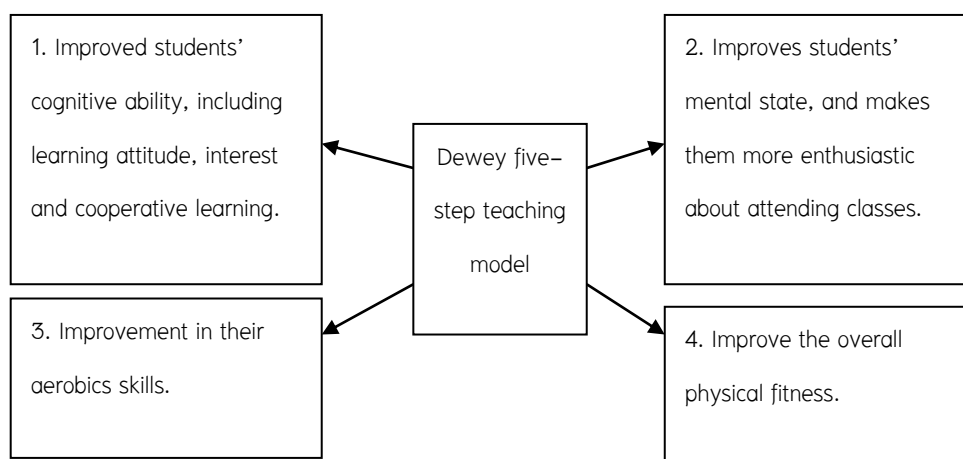


Figure 2 Knowledge from Research

Conclusion

This study focuses on the application of Dewey's five-step teaching model in the aerobics class of Zhengzhou Primary School, and explores its influence on students' cognition, psychology, skills and physical quality through comparative experiments, and draws the following conclusions:

1. Applicability of teaching mode and practice path: Through case study, Dewey's five-step teaching mode is applicable to the aerobics class of primary schools in Zhengzhou, and the practical mode in class is clearly defined, providing new ideas for cultivating the core quality of aerobics class.

2. Significant improvement in various abilities

Cognitive ability: Both Dewey's five-step teaching mode and traditional teaching method can improve students' cognition of aerobics, but the five-step teaching method has a more significant effect, which is in line with the constructivism learning theory, and helps to cultivate students' thinking and improve their practical and cooperative learning ability.

Psychological emotion: Aerobics teaching under Dewey's five-step teaching mode has obvious effects on improving students' psychological emotion and promoting mental health. It conforms to the theory of sports psychology, can adjust students' psychological state and increase the proportion of positive emotion.

Technical ability: Dewey five-step teaching mode significantly improves students' technical ability in aerobics, which is consistent with the conclusion of different teaching methods in related studies, and helps students to master knowledge and skills and improve participation.

Physical fitness: Comparing before and after the experiment, it was found that the experimental group significantly improved in terms of vital capacity, seated forward bend and sit-up, while the control group only improved in terms of vital capacity and seated forward bend, but the two groups did not improve significantly in 50m running, 1-minute skipping and 50×8 round trip running. Follow-up experiments can optimize training methods and intensity.

3. Cultivating lifelong exercise consciousness: Dewey's five-step teaching method has achieved good results in primary school aerobics classes, which can highlight students' dominant position, stimulate their interest in learning, and cultivate students' exercise and lifelong sports consciousness, which is in line with modern education concepts.

Suggestions

1. Teachers have heavy lesson preparation tasks and need to deeply understand “Penguin Journey” and integrate it into the curriculum to create interesting story scenes and enhance class interest.

2. The change of students' status: the student-led classroom may affect the teaching progress and grasp of key points. Teachers need to prepare in advance, understand the characteristics of students, conduct targeted teaching and prevent problems.

3. Dewey's five-step teaching method emphasizes group cooperation. Teachers should make reasonable groups, encourage shy students to express themselves, and promote students' active participation.

4. It is difficult for students to create calisthenics combinations, so they need to watch the competition video to broaden their horizons and set reasonable teaching goals. Teachers should adjust the groups timely, guide students with learning difficulties, reduce the difficulty, and let students experience the joy of learning and success.

5. The teaching method should be integrated, combined with multimedia teaching, so that students can intuitively feel the rhythm and movement details of aerobics.

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