THE IMPACT OF THE TEAM-TEACHING APPROACH ON MIDDLE SCHOOL PHYSICAL EDUCATION LEARNERS' ACADEMIC ACHIEVEMENT IN HU BEI PROVINCE, CHINA

XUN WANG

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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INSTITUTE OF SCIENCE INNOVATION AND CULTURE
RAJAMANGALA UNIVERSITY OF TECHNOLOGY KRUNGTHEP
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ABSTRACT

Team teaching facilitates the joint participation of schools, families, and society. By enhancing students' sense of participation and interest, enabling multi-party collaboration, addressing individual differences, and fostering teamwork spirit, team teaching provides a comprehensive, scientific, and sustainable solution for the healthy development of adolescents. Therefore, promoting and implementing the team-teaching model significantly improves the academic achievement of both physical and health students. The purpose of this study is 1) to investigate the effect of the team-teaching approach and traditional teaching approach in enhancing the academic achievement of middle school physical education learners; 2) to examine students' attitudes towards team-teaching as an approach for improving the academic achievement of middle school physical education learners. This study adopted the quantitative research method. Sixty-one questionnaires were issued, and 61 were valid, with a validity of 100%. The test consists of pre-test and post-test items. The experimental group comprises 31 students from Class 1, while the control group includes 30 students from Class 2. This study finds that 1) the mean score of the experimental group was 19.97, significantly higher than the mean score of the control group, which was 17.30; 2) the t-test results ($t = 4.059$, $Sig. = 0.000$) further demonstrated that there was a significant difference in the mean scores between the two groups; 3) students' attitudes towards group-based teaching indicate that the mean values of all items range from 3.23 to 3.74. Based on the analysis results, the following suggestions have been put forward. Different teachers can design and guide various curriculum components based on their expertise. Team teaching can take the form of group exercises, allowing students to consolidate their learning through practical participation and improve each other's learning outcomes through teamwork. Applying team-teaching to physical education curricula can significantly improve students' academic performance and cultivate collaboration skills and team spirit.

Keywords: Team Teaching, Physical Education Learner, Academic Achievement, Middle School

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CHAPTER I

INTRODUCTION

1.1 Background and Rationale

With the continuous growth of socially productive forces and the ongoing development of science and technology, people's expectations for a higher quality of life are increasing. The rapid development of the national economy has significantly improved people's living standards. People have more and more channels to access information, and their quality is continually improving. At the same time, national health awareness has increased significantly. According to the results of the 8th National Report on Students' Physical Health Survey by the Ministry of Education of China, although the rate of excellent and good physical health among Chinese students is constantly rising (Wang et al., 2020), it has not yet reached the expected goal. The prevalence of myopia remains high, and the rate of overweight and obesity is on the rise, showing a trend of younger age. Due to the relatively superior material conditions, students are suffering from overnutrition (Ge et al., 2019), leading to a gradual increase in the rate of overweight and obesity among them. Due to a lack of physical exercise, students' grip strength has declined. These problems are crucial to students' development, and they must be addressed urgently. Improving adolescents' physical health is of great importance and a pressing problem that must be addressed urgently (Chen et al., 2020).

China attaches great importance to adolescents' physical health. The Chinese government has taken measures on multiple occasions to improve adolescents' physical fitness and health. The Chinese government has designated "Sunshine Sports," "Fitness for All," and "Healthy China" as national strategies, with adolescents identified as a key population to promote their healthy development (Laar et al., 2021). Similarly, in 2022, the Ministry of Education, in conjunction with the General

Administration of Sport, issued the "Opinions on Deepening the Integration of Sports and Education to Promote the Healthy Development of Adolescents" This document incorporated adolescent physical health issues into national strategies, emphasizing that schools, families, and society should jointly participate and implement measures to promote the healthy development of adolescents effectively. Although national policy documents have achieved some short-term results, their long-term implementation has yielded minimal effects, as adolescents' physical indicators continue to decline or even deteriorate (Laar et al., 2021).

Chen et al. (2020) and Zhang et al. (2019) point to the decline of physical and health students' Academic achievement due to the increasing physical and health curriculum content, as teachers are struggling to understand and master some content considered to be outside their specialization (Chen et al., 2020; Liang & Li, 2018). Hence, to address these issues, many physical and health departments and classrooms have adopted team-teaching approaches to improve students' Academic achievement.

The team-teaching approach is said to be highly relevant and important for enhancing students' Academic achievement and addressing adolescent physical health issues (Liang & Li, 2018). In this context, the team-teaching model demonstrates unique advantages and potential (Zhang et al., 2019). Team teaching emphasizes cooperation and interaction, stimulating students' interest and sense of participation through group activities and collective projects. This approach not only enhances students' physical fitness but also improves their physical education and Academic achievement, as students encourage and support each other in mastering sports skills and knowledge within a team setting. Team teaching facilitates the joint participation of schools, families, and society (Zhang et al., 2019). By enhancing students' sense of participation and interest, enabling multi-party collaboration, addressing individual differences, and fostering teamwork spirit, team teaching provides a comprehensive, scientific, and sustainable solution for the healthy development of adolescents. Therefore, promoting and implementing the team-teaching model is of great

significance for improving students' physical and mental health, academic achievement, and achieving national strategic goals for the healthy development of adolescents.

1.2 Research Questions

This study poses the following research questions:

1. How does the team-teaching approach compare to the traditional teaching approach in improving the academic achievement of middle school physical education learners?

2. What are students' attitudes toward team-teaching as an approach to improving the Academic achievement of middle school physical education learners?

1.3 Research Hypotheses

Hypothesis 1: The academic achievement of the team-teaching approach is better than the traditional teaching approach in improving middle school physical education learners.

Hypothesis 2: Students who learn with a team-teaching approach to improve the academic achievement of middle school physical education learners have a high level of satisfaction.

1.4 Research Objectives

1. To investigate the effect of the team-teaching approach and traditional teaching approach in enhancing the academic achievement of middle school physical education learners.

2. To examine students’ attitudes towards team-teaching as an approach for improving the academic achievement of middle school physical education learners.

1.5 Scope and Limitations of the Research Study

1.5.1 Scope of the Research Study

This study aims to explore the impact of team-teaching on the Academic achievement of middle school students in physical education, using China's A Middle School as a case study, with particular focus on the physical education curriculum at the middle school level within this institution. The research evaluated students across three dimensions: knowledge mastery, skill application, and attitudes and behaviors. Additionally, the study's scope encompasses the specific implementation of team teaching, including how teachers collaborate within this framework, the teaching methodologies employed, and the evaluation and feedback mechanisms used in teaching. Through this research, we aim to analyze the effectiveness of team-teaching in practical application and assess its specific influence on students' Academic achievement in physical education. By conducting a detailed investigation and analysis of the current state of physical education teaching in a Middle School, we can uncover the advantages and challenges of team-teaching in this context, thereby providing valuable insights and references for educational practices in similar contexts.

1.5.2 Limitations of the Research Study

The sample size in this study limits the representativeness of the research results. The relatively short study period is insufficient to observe the long-term effects of team-teaching on students' Academic achievement, attitudes, and behaviors. The effects of team-teaching often take a longer time to manifest; thus, a short-term study may fail to reveal its comprehensive long-term impacts. In terms of controlling independent variables, numerous variables within the educational environment may potentially influence students' Academic achievement, attitudes, and behaviors, such as family environment and individual differences. If these variables are not adequately controlled, they may compromise the accuracy and reliability of the research results.

Teachers' individual differences and teaching styles can also impact the effectiveness of team teaching. Variations in teachers' collaboration methods,

instructional approaches, and feedback mechanisms may lead to inconsistent outcomes in team-teaching, thereby undermining the credibility of the research conclusions. The quality and consistency of team-teaching implementation pose an additional challenge. Suppose the actual implementation fails to meet the expected standards, for instance. In that case, if collaboration among teachers is not sufficiently close, the execution of teaching methods is inconsistent, or the feedback mechanisms are inadequate, these issues may compromise the research findings, making it difficult to assess the effects of team teaching.

1.5.3 Future Research

Future research will prioritize personalized and differentiated instruction. Researchers will explore how to better address students' diverse learning needs and individual characteristics within the framework of team-teaching, aiming to enhance each student's Academic achievement and improve their learning experience. Moreover, long-term effects and continuous tracking will emerge as pivotal directions. Researchers will conduct more extensive, long-term follow-up studies to assess the enduring impact of team-teaching on students' academic achievement, attitudes, and behaviors, thereby uncovering its long-term benefits and potential challenges. As technology advances, the application of modern technologies and digital tools will also become a focal point of research. Studies will explore integrating online collaboration platforms, virtual reality, data analytics, and other technologies into team-teaching to enhance teaching effectiveness and student engagement. Additionally, teacher training and professional development will garner increasing attention, with an emphasis on studying teacher collaboration models and their influence on teachers' professional growth. These trends will significantly propel the application and evolution of team-teaching in educational practice.

1.6 Research Framework

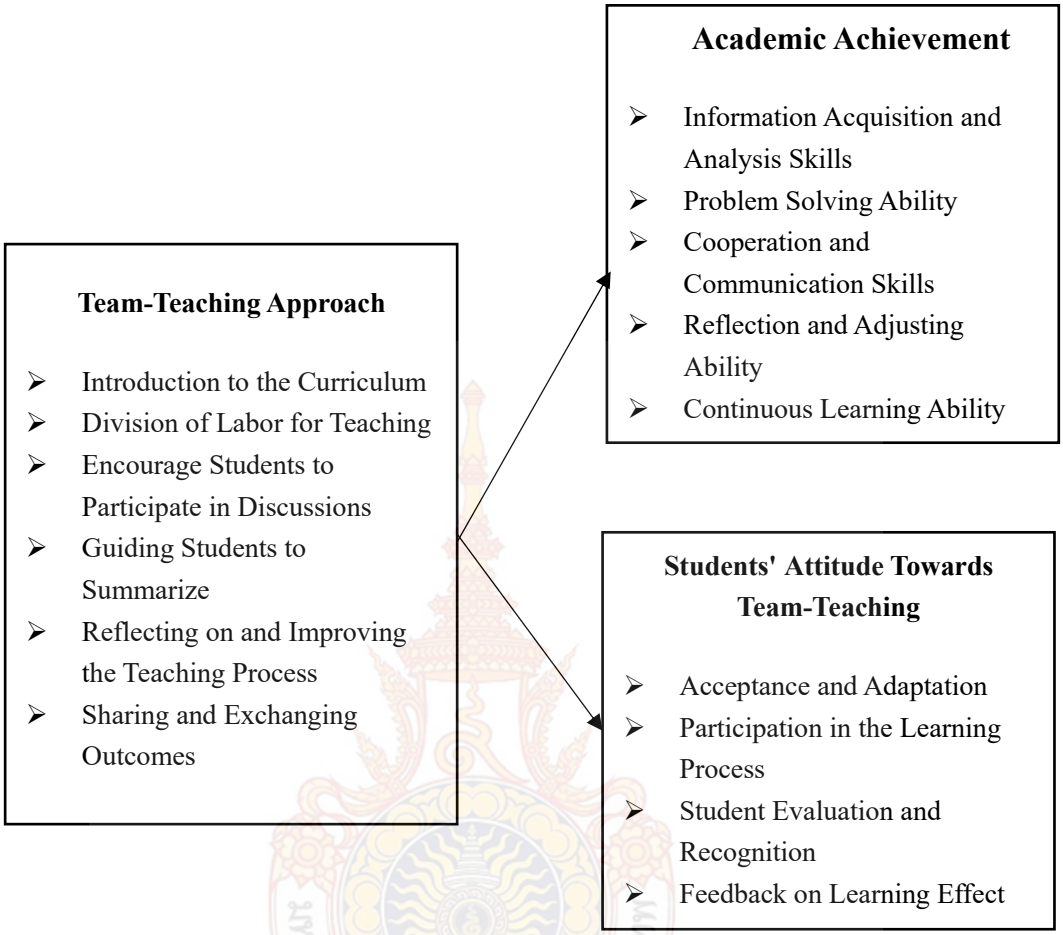

Figure 1.1 Research Framework

1.7 Definition of Key Terms

1.7.1 Team-Teaching

The team-teaching approach in middle school physical education courses involves two or more teachers working together. This teaching approach encompasses cooperation and division of labor among teachers, joint planning of teaching programs, sharing of teaching resources, and collective implementation of teaching objectives in the classroom. The team-teaching approach consists of

Step 1: Introduction to the Curriculum

Step 2: Division of Labor for Teaching

Step 3: Encourage Students to Participate in Discussions

Step 4: Guiding Students to Summarize

Step 5: Reflecting on and Improving the Teaching Process

Step 6: Sharing and Exchanging Outcomes

1.7.2 Academic Achievement

Academic achievement refers to a combination of knowledge, competence development, and personal progress demonstrated by students through various forms of assessment within a given learning period. It encompasses student performance in the areas of information acquisition and analysis, problem solving, cooperation and communication, reflection and adjustment, and the ability to continue learning. Academic achievement reflects the competence that students attain during their education. Academic achievement covers aspects:

1) Information Acquisition and Analysis Skills

2) Problem-Solving Ability

3) Cooperation and Communication Skills

4) Reflection and Adjusting Ability

5) Continuous Learning Ability

1.7.3 Students' Attitude Towards Team-Teaching

Student attitudes toward team teaching refer to the emotions, reactions, and cognitive understandings that students exhibit when confronted with a teaching approach that involves multiple faculty members collaborating to teach a course. The attitude reflects students' acceptance of the mode and the engagement, evaluation, and feedback on the teaching process. Students' attitude towards team-teaching covers the following aspects:

1) Acceptance and Adaptation

2) Participation in the Learning Process

3) Student Evaluation and Recognition

4) Feedback on Learning Effect

CHAPTER II

LITERATURE REVIEW

2.1 Related Theories

2.1.1 Constructive Learning Theory

2.1.1.1 Construct Learning Theory Concept

The core of constructive learning theory centers on student-centeredness, emphasizing students' active exploration, discovery, and construction of meaning from the knowledge they acquire. It prioritizes "learning" over "teaching" in the traditional sense. Individuals, based on their unique prior experiences, may interpret the same phenomenon differently. According to Constructivism, knowledge is acquired by learners through the construction of meaning, facilitated by others (including teachers and peers) within a specific context (Brown et al., 2005). This theory identifies "context," "collaboration," "conversation," and "meaning construction" as the four essential elements of a learning environment (Piaget, 2010).

Jean Piaget, a renowned Swiss psychologist, is widely recognized as a pioneer of Constructivism, whose theory is grounded in his perspectives on children's psychological development and the evolution of cognitive development theory. Piaget's Constructivism posits that students gradually construct their knowledge of the external world through interactions with their surroundings, thereby advancing their cognitive structures (Schafer, 2015). Central to this process is the active role learners must play in constructing their knowledge systems. Teaching, therefore, ought to foster students' initiative and enthusiasm.

The constructive learning theory advocates guiding students to construct new experiences from their existing ones. It upholds a student-centered and humanistic educational philosophy, transcending the traditional behaviorist learning theory that emphasizes knowledge "instillation." (Sangsawang, 2017) This theory values students'

comprehensive abilities, and in the context of physical education, it manifests as increased student participation, where they actively and voluntarily explore issues, thereby achieving fundamental goals in skills and knowledge acquisition. Students also proactively seek solutions, leveraging their initiative to make learning more enjoyable and effortless (Liang & Li, 2018).

The constructive learning theory emphasizes that learners actively construct knowledge through interactions with their environment and others. The three dimensions of team-teaching—teacher collaboration, teaching methods, and assessment and feedback—are rational in enhancing learners' Academic achievement (Schafer, 2015). Within the Constructivist framework, these dimensions operate synergistically to provide students with abundant learning resources and interactive opportunities, fostering their active engagement and deep understanding in knowledge construction, ultimately leading to improved academic achievement. (Sangsawang, 2017; Schafer, 2015)

2.1.1.2 Teaching Method

Diversified teaching methodologies align with the student-centered philosophy espoused by Constructivism, which views learners as the primary agents in knowledge construction. This approach emphasizes that teaching should revolve around students' interests and needs (Pande & Bharathi, 2020). Constructivism advocates methods such as activities, problem-solving, and inquiry-based learning, enabling students to apply and transfer knowledge in authentic contexts. This teaching style emphasizes active student participation and hands-on experiences, aiming to facilitate knowledge construction through personal experiences and practices, rather than relying on passive information reception (Al-Rahmi et al., 2018).

Extensive literature supports the effectiveness of diversified teaching methods. At the heart of Constructivist teaching lies guiding students through authentic problems and tasks, fostering exploration and discovery. Confronted with complex issues in real-life scenarios, students apply their skills and knowledge to solve them,

enhancing the practical application of learning while nurturing critical thinking and problem-solving abilities (Yilmaz, 2011). Diversified approaches offer varied learning paths and experiences, igniting students' curiosity and motivation. Students' learning motivation is intricately linked to their autonomy, sense of competence, and relational feelings in the learning process. By offering a range of activities and choices, teachers empower students to select learning paths tailored to their interests and needs, fostering autonomy and enthusiasm. Students can delve into topics that pique their curiosity, bolstering motivation and facilitating knowledge construction through practical engagement (Abd-El-Khalick & Lederman, 2000).

Diversified teaching methods facilitate knowledge construction through concrete operations and practices. In practical instruction, teachers employ methods such as experiments, simulations, and role-playing, immersing students in authentic or simulated contexts to provide hands-on experience and deepen comprehension (Pande & Bharathi, 2020). In physical education, group collaboration and role-playing allow students to experience the practical value and inherent logic of sports skills and knowledge through movement and interaction (Al-Rahmi et al., 2018). These methods enable students not only to grasp knowledge but also to understand its underlying logic and applications. The literature underscores that Deep Learning emphasizes a profound understanding and application of knowledge, transcending superficial memorization and recitation. Techniques like Inquiry-Based Learning and Situated Learning, within diversified teaching, guide students to comprehend the intricate relationships and contextual applications of knowledge through exploration and practice (Pande & Bharathi, 2020).

2.1.1.3 Team-Teaching Approach

Team-teaching, a teaching method involving collaboration among two or more teachers, has garnered considerable attention in education in recent years (Sozer et al., 2019). By fostering cooperation and division of labor among multiple teachers, this approach aims to enhance classroom instruction and promote students' all-around

development. This methodology encompasses joint planning of teaching programs, sharing of instructional resources, and collaborative implementation of teaching objectives in the classroom. In the mid-20th century, Teaching was first adopted in the American education system (van der Lans et al., 2015). With the escalating demand for educational diversification, this method has been gradually extended to various subject areas. It is grounded in the constructivist theoretical foundation, which underscores the significance of learners' active knowledge construction. By facilitating collaboration among teachers, teaching presents students with a broader range of perspectives and knowledge backgrounds, fostering a more comprehensive and profound understanding (Pande & Bharathi, 2020).

In teaching, constructivism provides a practical framework that guides teachers in designing activities to stimulate students' deep learning. Teachers in a team collaborate based on their expertise and teaching styles, offering students diversified perspectives and support (Pande & Bharathi, 2020). This collaboration embodies the constructivist principle of social interaction, as teachers jointly address teaching challenges and facilitate students' construction of knowledge. Team teaching enables the design and implementation of contextualized learning activities, such as Project-Based Learning (PBL) or case studies. By embedding learning content within authentic problems or situations, students can apply their knowledge in practical contexts, thereby enhancing the relevance and depth of their learning (Sindhu et al., 2019).

Furthermore, in Teaching, teachers foster cooperation and interaction among students through group projects or collaborative learning activities. Constructivism posits that through peer interaction, students gain access to diverse viewpoints and feedback, thereby deepening their understanding and improving learning outcomes (Sindhu et al., 2019). This theory underpins Teaching, emphasizing active participation, social interaction, and situated learning to facilitate knowledge construction. In this teaching model, practices such as teacher collaboration and role-sharing, the creation of contextualized learning environments, active student

engagement, social interaction, and reflection and self-regulation (El-Sayed et al., 2018) exemplify the core principles of constructivism. This teaching paradigm not only enriches students' learning experiences but also enhances the effectiveness of the teaching process.

2.1.1.4 Step of the Team-Teaching Approach

(1) Introduction to the Curriculum

This phase involves introducing the course's primary content and objectives to students and ensuring that all participants share a clear understanding of the instructional materials. The teaching team collaborates to design and introduce the curriculum, clarifying course goals and themes. The introductory stage emphasizes captivating students' interest and guiding them into a learning mindset (Schafer, 2015).

(2) Division of Labor for Teaching

Teachers allocate teaching tasks and responsibilities based on their respective expertise and interests. This division enhances teaching efficiency and quality. The teaching team assigns teaching roles based on individual professional backgrounds and teaching styles. Some teachers focus on theoretical lectures, while others specialize in practical guidance or facilitating group activities. The rationality of this division directly affects teaching effectiveness (Liang & Li, 2018).

(3) Encouraging Student Participation in Discussions

By organizing classroom discussions and interactive activities, students are encouraged to deepen their comprehension and mastery of knowledge. Teachers employ questioning, case analysis, and group discussions to stimulate student participation. Research indicates that multi-teacher interaction in team teaching contributes to an open classroom atmosphere and increased student engagement (Sangsawang, 2017; Schafer, 2015).

(4) Guiding Students to Summarize

Teachers assist students in summarizing and organizing classroom content, ensuring students can effectively review and consolidate what they have learned. At the

end of each teaching segment, teachers jointly guide students through the summarization process. This helps students reinforce their understanding, reflect on their learning journey, and consolidate knowledge (Al-Rahmi et al., 2018).

(5) Reflecting on and Improving the Teaching Process

The teaching team regularly reflects on the effectiveness of the teaching process, identifies issues and challenges, and discusses strategies to improve teaching quality. After each teaching session, teachers engage in reflection, sharing classroom performance and student feedback to pinpoint areas for improvement. The literature highlights that a significant advantage of team teaching is the ability to refine teaching strategies through teacher feedback and discussion (Pande & Bharathi, 2020).

(6) Sharing and Exchanging Outcomes

Teachers share their teaching experiences and students' learning outcomes, fostering knowledge exchange and best practices, thereby optimizing teaching strategies. Both teachers and students share learning achievements, while teachers also exchange successful experiences and lessons learned. This not only contributes to teachers' professional growth but also further enhances the effectiveness of teaching (Yilmaz, 2011).

2.1.2 Educational Goal Classification Theory

Academic achievement encompasses knowledge mastery, skill application, and attitude and behavior, which can be grounded in Bloom's theory of educational goal classification (Gomes & Jelihovschi, 2019). Bloom's Taxonomy of Educational Objectives, proposed in 1956, categorizes educational objectives into three domains: cognitive, affective, and psychomotor, which correspond to the three components of academic achievement: knowledge acquisition, skill application, attitude, and behavior (Sozer et al., 2019). The three components of academic achievement (knowledge mastery, skill application, and attitude and behavior) correspond, respectively, to the cognitive, motor skill, and emotional domains in the theory of educational goal classification (Meyer & Rowan, 1977). Bloom's taxonomy provides a systematic

framework to help educators comprehensively assess and develop students' knowledge, skills, and attitudes, thereby achieving comprehensive educational goals (Sozer et al., 2019). Through this theoretical framework, educators can design and implement a variety of teaching methods and evaluation methods to comprehensively improve students' Academic achievement (DiMaggio & Powell, 1983). For example, cognitive goals can be achieved through classroom teaching and testing; goals in the emotional realm can be achieved through motivation and emotional education; and goals in the field of motor skills can be developed through practical and experimental courses (Scott, 1987). The integration of goals in these three areas can help students develop comprehensively in knowledge acquisition, skill application, attitude, and behavior, and ultimately improve their overall Academic achievement (Gomes & Jelihovschi, 2019).

2.1.2.1 Academic Achievement

Academic achievement, as a comprehensive reflection of students' accomplishments during a specific learning phase, encompasses various aspects, including information acquisition and analysis, problem-solving, collaboration and communication, reflection and adjustment, and continuous learning abilities (Nordin et al., 2013). These abilities are interconnected and mutually reinforcing, collectively constituting the cornerstone of students' Academic achievement. Cultivating these abilities not only enhances their Academic achievement but also lays a solid foundation for their future development (Abdurrahman et al., 2019). Academic achievement refers to the comprehensive manifestation of students' knowledge, ability development, and personal progress through various forms of assessment within a specific learning period. Its evaluation necessitates consideration not only of students' knowledge and skills but also of their emotional attitudes and capacity for continuous learning (Fung et al., 2018). By integrating theories of educational objective classification, research can provide a more comprehensive understanding and assessment of students' Academic achievement, thereby guiding educational practices more effectively.

(1) Information Acquisition and Analysis Ability

In the era of information explosion, the ability to acquire and analyze information has become an indispensable part of students' Academic achievement. Research indicates that good reading habits and effective utilization of internet resources are crucial for enhancing this ability (Péladeau et al., 2003). By reading classic literature, popular science books, newspapers, and magazines, students can accumulate knowledge, stimulate reading interest, and cultivate the skills of information screening and evaluation. Additionally, teaching students to employ effective search techniques and assess the authenticity of information is an effective way to enhance their information acquisition and analysis abilities (Fung et al., 2018). This ability not only contributes to Academic achievement but also fosters independent thinking and critical thinking (Sangsawang, 2017; Schafer, 2015).

(2) Problem-Solving Ability

Students' problem-solving ability refers to their capacity to flexibly identify and adopt effective methods to address various problems. This ability is closely related to improving academic achievement. Research suggests that cultivating students' thinking and creativity, as well as providing challenging problems and cooperative learning opportunities, can effectively enhance their problem-solving abilities (Kaiser et al., 2009). Strong problem-solving abilities not only improve students' learning efficiency but also stimulate their interest and motivation, thereby promoting Academic achievement.

(3) Collaboration and Communication Ability

Collaboration and communication abilities are integral to students' academic achievement. Cooperative learning among students, through shared task completion, mutual exchange, and negotiation, significantly enhances learning outcomes and academic achievement (Lorenzo et al., 2016). During the collaboration, students not only complement each other's knowledge and skills but also broaden their horizons, stimulating their curiosity and motivation to learn. Furthermore, cooperative

learning fosters students' collaboration, communication, and social skills, which are crucial for both academic pursuits and future careers. However, cooperative learning requires attention to avoid individualism and dependency, and practical teacher guidance is essential.

(4) Reflection and Adjustment Ability

The ability to reflect and adjust refers to students' capacity to modify their learning strategies and methods in response to feedback from the learning process, thereby improving learning outcomes. This ability is significant for enhancing academic achievement. Students should regularly reflect on their learning attitudes, methods, and outcomes, identify existing problems and deficiencies, and promptly make adjustments and improvements (Liang & Li, 2018). For instance, students can enhance their mastery and understanding of learning content by engaging in peer-assisted learning, seeking teacher guidance, actively participating in class discussions, and correcting errors. Reflection and adjustment abilities not only help students address current learning issues but also cultivate their self-management and autonomous learning skills.

(5) Continuous Learning Ability

Continuous learning ability refers to a student's capacity to maintain enthusiasm and motivation in a constantly evolving learning environment, continually acquiring new knowledge and skills. This ability is vital for students' lifelong development and academic achievement. Research indicates that effective learning habits, suitable learning environments, and scientific learning methods are crucial factors in developing continuous learning abilities (Pande & Bharathi, 2020). Maintaining a positive learning attitude and motivation is also a crucial manifestation of this ability.

2.1.2.2 Students' Attitude Towards Team-Teaching

The affective field concerns students' attitudes, values, and emotional responses, and Attitude and Behavior is the core content of this field. Attitude and

behavior refer to students' interest, motivation, values, and behavior patterns in the learning process (Kehoe & Wright, 2013). The educational objective in this field is to develop positive learning attitudes and values in students that influence their learning behavior and long-term development. Attitudes and behaviors play a crucial role in the affective domain, as they directly impact students' motivation and engagement. Bloom's theory of educational objective classification categorizes the emotional field into five levels: receiving, responding, valuing, organizing, and characterizing (Fischer et al., 2017). These levels, from low to high, respectively, reflect students' progression from passive acceptance to active participation, and then to the formation of stable values and behavior patterns. The cultivation of attitudes and behaviors is of great significance to students' long-term development (Carolan, 2015). A positive learning attitude and sound values not only affect students' current academic achievement but also have a profound impact on their future careers and social lives. Educators should focus on the teaching process by creating active learning.

2.2 Related Studies

Academic achievement reflects students' learning outcomes and mastery of knowledge, serving as an evaluation of their learning results (Zeilhofer, 2020). It is a relative concept, referring to the knowledge and skills acquired through continuous education, which represent a relatively straightforward, well-defined range of learning outcomes. Research on academic achievement mostly takes the standard scores of mid-term or final exams in Chinese, mathematics, and English, the three core subjects, as reference standards (Carolan, 2015; Zeilhofer, 2020).

The study of team teaching and academic achievement has a long history. There is abundant research on the impact of team teaching on academic achievement (Frenk et al., 2020). Team teaching enhances academic achievement by improving student engagement, knowledge richness, and cognitive and psychological levels.

Scholars conducted a group-experimental study involving 214 sixth-grade students to analyze academic achievement in the experimental and control classes. The results demonstrated a significant impact of team teaching on students' academic achievement (Paauwe, 2022). Studies in Texas, USA, have shown that team teaching has a positive impact on primary school students' math and reading scores. Surveys of American high school students, conducted via questionnaires, revealed that academic achievement enhancement is related to team teaching, with various programs, environments, and intensities of team teaching influencing students' academic performance (Teece, 2019). Experimental research indicates that team teaching promotes students' executive and judgment abilities, thereby improving academic achievement. While team teaching can elevate students' academic achievement, indirect factors, such as students' health status, self-confidence, and attitudes, vary across age groups and also influence this relationship (Zeilhofer, 2020).

The comprehensive review of previous research reveals a consistent correlation between team teaching and academic achievement. Scholars have elucidated the influence of team teaching on students' academic achievement from diverse perspectives, providing theoretical support for the present study.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

This study employed a quantitative research design to investigate the impact of team-teaching on the academic achievement of middle school physical education students (Liang & Li, 2018). Quantitative research focuses on collecting numerical data and using statistical methods to test hypotheses and analyze relationships between variables (Ortiz, 2007). In this case, the research measured students' academic achievement using standardized tests, enabling objective comparisons across different teaching methods.

Specifically, this study employed an experimental research design, a form of quantitative research that aims to determine cause-and-effect relationships by manipulating one variable and observing its impact on another (Pattison et al., 2019). In this design, participants were randomly assigned to either the experimental or the control group. The experimental group was taught using team-teaching methods, while the control group received traditional teaching. This structure allowed for a direct comparison of the effects of these two instructional methods on academic achievement, making it ideal for assessing the impact of teaching strategies.

The experimental research design is particularly well-suited for this study (Sindhu et al., 2019) because it allows for the controlled manipulation of teaching methods while minimizing external factors that could influence student outcomes (Pande & Bharathi, 2020). By randomly assigning classes to groups, the study can minimize bias and ensure that any differences in academic achievement are attributed to the teaching methods used rather than to other variables such as prior knowledge or student characteristics. This design provides a robust framework for evaluating whether team-teaching enhances students' academic achievement relative to traditional

instruction.

The independent variable in this study is team-teaching, while the dependent variable is academic achievement. Based on these variables, survey questionnaires, learning plans, and mathematical thinking tests were designed. The questionnaire is divided into two parts. The first part collected basic demographic information from the sample, including gender, age, and other demographic characteristics. The second part consisted of measurement items based on students' attitudes towards team-teaching, including their acceptance and adaptation levels, participation in the learning process, evaluations and recognition, and feedback on learning outcomes. It measured students' attitudes towards team-teaching, with four items designed for each process, totaling 20 questions. The questionnaire used a five-point Likert scale for responses.

3.2 Samples and Sample Size

3.2.1 Population

The research participants are second-year physical education learners from A Middle School, comprising five classes totaling 155 students. However, the specific focus of this study is on physical education learners in Classes 1 and 2, both in the second grade at A Middle School. The second-year students in this school have been divided into an experimental group and a control group. The experimental group consisted of 31 students from Class 1, while the control group consisted of 30 students from Class 2. By conducting a thorough investigation of this group, the research aims to gain a deeper understanding and broader insights into the subject.

3.2.2 Samples

This study selected Classes 1 and 2 of the second grade as research subjects due to their comparability in terms of student numbers and teaching conditions, making them representative for implementing specific teaching methodologies. By dividing

students into an experimental and a control group, the research aims to investigate the effectiveness of team teaching on students' academic achievement in physical education. The experimental group received team-teaching, while the control group continued with traditional teaching methods, ensuring an accurate assessment of the intervention's effects. The study collected data through various methods, including questionnaires and academic achievement evaluations, to obtain comprehensive information about students. The data analysis was used to verify differences between the experimental and control groups, thereby supporting the research's validity.

3.2.3 Sampling Methods

In this study, the target population comprised second-year middle school students from A Middle School, including five classes totaling 155 students. The research focused on learners in physical education from second-grade Classes 1 and 2. To ensure our sample is truly representative and to minimize potential bias, the study employed a purposive sampling method (Kehoe & Wright, 2013). This method was chosen to ensure that we capture the most accurate and insightful data possible. When selecting students for the experimental and control groups, it was ensured that the chosen classes had similar baseline conditions, thereby enhancing representativeness. The sample size was determined based on the research objectives, resource constraints, and data analysis requirements. The sample sizes of the experimental and control groups were kept relatively close to ensure the validity and reliability of statistical analysis.

3.3 Data Collection

Step 1: Research on Theories Related to Team Teaching

This study reviewed relevant research on team teaching. It identified the implementation steps for team teaching, designed a teaching plan, and applied the team-teaching method to the experimental group. Based on related research, the components

of academic achievement are determined. This study designed academic achievement tests to obtain students' academic achievement before and after receiving team teaching.

Step 2: Develop a Questionnaire on Students' Attitudes Towards Team Teaching. Students' participation in teaching, learning outcomes, and learning evaluations reflects their attitudes toward team teaching. Therefore, the study developed a questionnaire to collect students' attitudes and evaluations towards team teaching.

Step 3: Pre-test

Before the study began, a pre-test was administered to assess students' academic achievement. Understanding students' academic achievement before exposure to different teaching methods provided a baseline for subsequent comparative analysis.

Step 4: Post-test

After the teaching experiment, a post-test was conducted to reassess students' academic achievement. The post-test adopted the same or similar assessment methods as the pre-test to determine whether significant changes in academic achievement had occurred. By comparing pre-test and post-test results, this study analyzed the intervention's different impacts.

Step 5: Survey on Students' Attitudes Towards Team Teaching

Following the experiment, a survey was conducted to collect data on students' attitudes toward team teaching. The survey aimed to gather students' subjective opinions on team teaching. The survey results provided more qualitative data to help understand the impact of different teaching methods.

3.4 Research Instrument

Part 1 for Answering Research Question 1

Academic Achievement Test

This test aimed to comprehensively evaluate students' academic achievement in physical education learning, specifically covering five crucial aspects.

The Information Acquisition and Analysis Ability was assessed through reading comprehension and data analysis questions. This part of the test required students to extract information from the provided texts, perform reasonable calculations and interpret data, ensuring their effectiveness in acquiring and applying the necessary knowledge.

Next, Problem-Solving Ability was evaluated through case analysis and strategy formulation questions. These questions challenged students to analyze the root causes of problems in real-life situations and propose practical solutions to address them.

Collaboration and Communication Skills were tested through role-playing and group discussion activities. Students needed to demonstrate how they can effectively collaborate and solve problems within a team during their roles, and describe their contributions and the team's collaborative effectiveness in group discussions, thereby examining their performance in actual teamwork.

Reflection and Adjustment Ability were examined through self-assessment and activity summaries. After completing the sports activities, students self-assessed their performance, proposed improvement plans, and summarized the success factors and issues encountered. This part of the test focused on how students reflect on their performance and develop effective adjustment strategies to optimize future performance.

Continuous Learning Ability was assessed through a learning plan and reflective questions. Students were tasked with developing detailed personal sports training plans and reviewing completed learning plans to identify achievements and challenges they have encountered. These questions assessed students' abilities to formulate, execute, and adjust personal learning plans, as well as their capacity to improve through learning experiences.

The academic achievement test was divided into five categories: information acquisition and analysis, problem-solving, collaboration and communication, reflection and adjustment, and continuous learning. This test consisted of 10 questions covering five abilities, with 2 questions per capability, comprehensively examining students' academic and practical abilities. Through these questions, this test comprehensively assessed students' performance in competencies such as information processing, problem-solving, teamwork, reflection, adjustment, and continuous learning.

Lesson Plan: Team Teaching

Total Course Duration: 3 hours

Course Objectives:

- To facilitate students' academic development through the team-based learning model, enhancing their abilities in information acquisition, problem-solving, and team collaboration.
- To strengthen students' engagement in the classroom, fostering their communication skills, critical thinking, and a collaborative spirit.

Planning and Course Explanation

This course plan consists of six steps, each with defined instructional objectives and corresponding activity arrangements. The total course duration is 3 hours, aiming to achieve optimal teaching effectiveness through transparent task allocation, active student participation, and practical guidance from the teacher.

The first part of the course introduced the course and set goals, helping students understand the course objectives, content, and the fundamental principles of the team-based learning model. The second part clarified task division to ensure each student's roles and responsibilities are clear, reinforcing group cooperation. The third part deepens students' understanding of the course content through group discussions and activities. In contrast, the fourth part required students to summarize the discussion results and present them, facilitating digestion and reflection on the learning material.

Ultimately, the course encouraged students to reflect on and share their accomplishments, thereby further enhancing their learning outcomes. The timing and design of activities enhanced students' engagement, deepened their understanding of the material through various interactive forms, and provided continuous feedback to support their learning. Detailed Step-by-Step Course Design:

Step 1: Introduction to the Curriculum

Duration: 30 minutes

Content:

Introduce course goals, content, and structure.

Explain the fundamental principles and expected outcomes of the team-teaching approach.

Outline the main activities and division of labor for the session.

Activities:

Use slides to present the course syllabus and objectives.

Distribute course introduction materials.

Conduct a brief Q&A session to address student queries.

Teacher's Tasks:

Convey course information clearly to ensure students understand learning goals and expectations.

Students' Tasks:

Listen attentively, ask relevant questions, and comprehend course content and requirements.

Step 2: Division of Labor for Teaching

Duration: 20 minutes

Content:

Divide students into groups, each responsible for specific teaching tasks or activities.

Clarify roles and responsibilities within each group (e.g., material

preparation, discussion facilitation, presentation).

Activities:

Organize group discussions for task allocation.

Ensure each group understands their tasks and role assignments.

Teacher's Tasks:

Guide students in distributing tasks equitably and transparently.

Students' Tasks:

Participate in task allocation and understand individual roles and responsibilities.

Step 3: Encourage Student Participation in Discussions

Duration: 40 minutes

Content:

Facilitate group discussions on designated topics or issues (e.g., enhancing teamwork in sports activities).

Circulate among groups to encourage active participation.

Activities:

Intra-group discussions with viewpoint sharing.

Group representatives present the discussion outcomes to the class.

Teacher's Tasks:

Pose discussion questions, guide discussions, and provide support and feedback.

Students' Tasks:

Actively engage in group discussions, share opinions, and listen to others.

Step 4: Guiding Students to Summarize

Duration: 30 minutes

Content:

Instruct students to summarize the discussion content and key learning points.

Assist in organizing summary reports, including key findings and recommendations.

Activities:

Groups compile discussion outcomes into summaries.

Each group presents its summary, with teacher feedback and commentary.

Teacher's Tasks:

Help students organize their discussion outcomes by providing a summary framework and offering constructive feedback.

Students' Tasks:

Compile and present summaries, highlighting main findings and recommendations.

Step 5: Reflecting on and Improving the Teaching Process

Duration: 30 minutes

Content:

Jointly reflect on the teaching process with students.

Discuss aspects that worked well, areas for improvement, and propose enhancements.

Activities:

Conduct a class-wide discussion and feedback session.

Collect student and teacher feedback, and document improvement suggestions.

Teacher's Tasks:

Facilitate reflection discussions, record feedback, and consider improvement plans.

Students' Tasks:

Participate in reflection discussions, provide honest feedback, and offer suggestions.

Step 6: Sharing and Exchanging Outcomes

Duration: 30 minutes

Content:

Allow groups to share their summaries and discussion results.

Facilitate student-to-student exchange of outcomes, with the teacher summarizing class performance.

Activities:

Groups present their achievements.

Organize student exchanges on experiences and learning outcomes, followed by the teacher's summary and encouragement.

Teacher's Tasks:

Organize outcome presentations, encourage sharing, and conclude the class.

Students' Tasks:

Share group achievements, exchange learning experiences, and receive feedback.

Part 2: Answering Research Question 2

Questionnaire

A questionnaire survey is a research method that utilizes controlled scales to investigate issues and obtain reliable information. The process involves developing the final questionnaire, distributing it via online links, and collecting the responses. The questionnaire comprises four main sections:

Section One: This section collects basic personal information to categorize respondents into different subgroups for stratified sampling and analysis. Questions in this part include gender, age, and grade. Understanding these demographic variables facilitates the analysis of the sample's diversity. Section Two: This section evaluates team teaching in A middle school. The designed questions aim to assess the status of team-teaching. The questions were designed to use a five-point Likert scale to measure knowledge mastery, skill application, attitudes and behaviors.

In Sections Two through Three, respondents were required to use a five-point Likert scale to rate their level of agreement with the statements, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The interpretation of the mean values was elaborated in a separate section. Arithmetic means were utilized to analyze the responses, yielding continuous numbers with decimal points. The interpretation of these mean values is as follows:

The mean value of 1 but less than 1.5 indicates "Strongly Disagree."

The mean value of 1.5 but less than 2.5 falls under the "Disagree" category.

The mean value of 2.5 but less than 3.5 represents a "Neutral" stance.

The mean value of 3.5 but less than 4.5 signifies "Agree."

The mean value of 4.5 and above belongs to the "Strongly Agree" level.

To maximize the response rate, the questionnaire included an explanation of the study's nature and purpose. Respondents were informed that their contributions are important and valuable. It was estimated that completing the questionnaire took approximately 15 to 20 minutes.

3.5 Content Validity and Reliability

3.5.1 Validity

Validity refers to the extent to which a measurement tool or method accurately measures its intended content. Factor analysis is commonly used to examine the construct validity of scales. Initially, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity can be employed to determine whether the data are suitable for factor analysis. According to Kaiser, H., a KMO value above 0.90 indicates that the scale is highly suitable for factor analysis; between 0.8 and 0.9, it is suitable; between 0.7 and 0.8, it is marginally suitable; between 0.6 and 0.7, it can still be considered marginally suitable, albeit with caution; between 0.5 and 0.6, factor analysis is not recommended; and below 0.5, factor analysis is deemed

highly unsuitable. Additionally, factor analysis can proceed when Bartlett's test of sphericity is statistically significant at or below the specified level of significance. The questionnaire in this study was designed based on relevant literature, thereby demonstrating high content validity. This study utilized factor analysis to assess structural validity. Specifically, exploratory factor analysis was conducted on the collected data to determine its underlying structure.

This study employed principal component analysis to extract factors with eigenvalues greater than 1. After factor extraction from the items, the final factors explained over 50% of the total variance, indicating substantial variation was accounted for. This further validated the effectiveness of the standard factor analysis in this study. Factor loadings were all above 0.5, with each variable exhibiting a high loading on only one common factor and lower loadings on other common factors. This suggests that each variable has good validity and that the factor consistency is satisfactory. In conclusion, the questionnaire demonstrates good construct validity.

Ratings were as follows:

A rating of +1 indicates that the statement is "consistent with the definition."

A rating of 0 indicates "uncertain whether it aligns with the definition."

A rating of -1 indicates that the item is "not consistent with the definition."

The Index of Objective Consistency (IOC) was calculated. A content consistency index of 0.5 or greater is deemed suitable for research. The IOC analysis result was 1.00.

3.5.2 Reliability

Reliability analysis is a statistical process that estimates the true extent of a measured characteristic based on the consistency or stability of test scale results. The more uniform the test results are, the better the data represents the overall situation, and the higher the reliability. Through reliability analysis, we can assess whether the questionnaire design is reasonable and make revisions to avoid misclassification.

Cronbach's alpha is used to evaluate the internal consistency among test items. A higher Cronbach's alpha indicates greater consistency among items. When a subscale's reliability coefficient is above 0.7, the scale or questionnaire's reliability is considered good. A reliability coefficient between 0.6 and 0.7 is also acceptable. However, for the entire scale, a reliability coefficient of 0.8 or higher indicates good overall reliability. Additionally, the corrected item-total correlation coefficient for all items should be at least 0.4, and deleting any item should result in a decrease in reliability of varying degrees.

3.6 Data Analysis

The data analysis process aims to explore the impact of team teaching on the Academic achievement of physical education learners in A Middle School. A variety of statistical tests and analyses were conducted using statistical software. The following steps outline the data analysis process based on research hypotheses and questionnaire content. Firstly, the collected data were screened to identify and address missing, incomplete, or inconsistent responses. Invalid responses, such as those with significant data missing or displaying a pattern of random answers, were excluded. Next, the questionnaire responses were numerically coded for ease of analysis (e.g., Male = 1, Female = 2; Likert scale responses ranging from 1 to 5).

3.6.1 Descriptive Statistics

Descriptive statistics were used to summarize the data's basic characteristics. Frequency distributions were calculated for categorical variables (such as gender, grade, and significant). For continuous variables (such as age), measures of central tendency (mean, median, mode) and variability (standard deviation, range) were computed.

3.6.2 Inferential Statistics

Inferential statistics were used to analyze the data, testing hypotheses at the

0.05 significance level. This analysis aimed to examine the relationships or interactions between the dependent variable and several independent variables.

In this study, the use of descriptive and inferential statistical methods enabled an in-depth analysis of the impact of team-based instruction on the academic achievement of middle school students in physical education. Descriptive statistics summarized the fundamental characteristics of the data. For categorical variables such as gender, grade, and specialty, frequency distributions were calculated to showcase the number of samples within each category, providing insights into the sample. For continuous variables, such as age, measures of central tendency (e.g., mean, median, and mode) and variability (e.g., standard deviation and range) were computed to reveal the distribution and dispersion of the data. This statistical information offered a comprehensive overview of the data, enabling researchers to identify fundamental trends and characteristics and laying a foundation for further analysis.

Inferential statistics were used to analyze the data and test research hypotheses at the 0.05 significance level. By extrapolating from sample data to infer characteristics, inferential statistics examines the relationships or interactions between dependent variables (e.g., academic achievement) and independent variables (e.g., gender, grade, teaching methodology), assessing the influence and significance of these variables. The t-tests determined whether the independent variables had a statistically significant impact on the dependent variables, shedding light on the roles and interrelationships of the different factors in Academic achievement.

By combining descriptive and inferential statistics, researchers can systematically analyze and interpret the effects of team-based instruction on the academic achievement of physical education learners, thereby validating research hypotheses and drawing scientific conclusions. This process not only unveiled the potential effectiveness of educational strategies but also provided empirical evidence for further educational interventions and policy-making.

CHAPTER IV

ANALYSIS RESULT

This chapter collects data and verifies the hypotheses. The SPSS software validates each hypothesis using descriptive statistics (frequencies, percentages, means, and standard deviations) and independent-samples t-tests. The study focuses on a middle school in China, with the research subjects being second-year junior high school students participating in physical education. The sample consists of physical education learners from Class 1 and Class 2 of the second grade in junior high school. The experimental group consists of 31 students from Class 1, while the control group comprises 30 students from Class 2. The study analyzes the distribution characteristics and demographic variables of the sample. This research employs questionnaires, learning plans, and tests for data collection and analysis. The questionnaire covers basic student information and students' attitudes towards team-teaching, divided into acceptance and adaptation, participation in the learning process, student evaluation and recognition, and feedback on the learning effect. A total of 61 questionnaires were collected.

The test items for assessing whether team-teaching improves academic performance among junior high school physical education learners were administered through pre-tests and post-tests. The test content encompasses information acquisition and analysis, problem-solving, cooperation and communication, reflection and adjustment, and continuous learning. The pre-test measures students' academic performance consistency before they receive team-based and traditional teaching, ensuring there are no significant differences. The post-test items measure the improvement in students' academic performance after receiving team-teaching.

4.1 Sample Characteristics

The physical education learners from Class 1 and Class 2 of the second grade in junior high school at A Middle School demonstrate a relatively balanced distribution in demographic variables, exhibiting some significant differences and characteristics. For gender, the proportion of male students is 55.7%, slightly higher than the 44.3% of female students, indicating a nearly equal gender ratio but with a slight male majority. Regarding age, students are concentrated mainly under 14, accounting for 41.0%, followed by those aged 15 and above, who make up 23.0%. The proportions of students aged 14 and 15 are 21.3% and 14.8%, respectively. This distribution reveals a relatively wide age span among the students, but the majority are under 14 years old. For GPA (Grade Point Average), students' GPAs range from 2.6 to 3.0, accounting for 45.9%. The next-largest group falls within the range of 2.1-2.5, representing 31.1%. The proportions of students with GPAs above 3.5 and below 2 are relatively low, each accounting for 9.8%. A small part of students have GPAs of 3.1-3.5, which is 3.3%. These data reflect the characteristics of the sample students in terms of gender, age, and academic performance, with balanced gender and age distributions and a trend of GPA distribution concentrated in the middle range.

Table 4.1 Descriptive Characteristics

Items	Options	Frequency	Percent%
Gender	Male	34	55.7
	Female	27	44.3
Age	Under 14	25	41.0
	14	13	21.3
	15	9	14.8
	Over 15	14	23.0
GPA	Under 2	6	9.8
	2.1-2.5	19	31.1
	2.6-3.0	28	45.9
	3.1-3.5	2	3.3
	Over3.5	6	9.8
Total		61	100.0

4.2 Findings of Improving the Academic Performance of Junior High School Physical Education Learners through Team-teaching

The subjects of this study are the physical education learners in Class 1 and Class 2 of second grade at A Middle School. The experimental group consists of 31 students from Class 1, while the control group comprises 30 students from Class 2. Two tests were conducted before and after the study, as pre-tests and post-tests, respectively. The pre-tests aim to assess students' academic performance before receiving different teaching methods, while the post-tests evaluate changes in academic performance after instruction. The test content should align with the curriculum outline.

4.2.1 Analysis of Pre-Test Results

Before the implementation of team-teaching, data tests were conducted on physical education learners from Class 1 and Class 2 of the second grade at A Middle School, yielding 61 tests. Independent sample t-tests were performed on the scores of students from the two classes, as shown in Tables 4-2 and 4-3.

The research findings reflect the performance characteristics of the two classes in the pre-tests by describing the sample sizes, means, standard deviations, and standard errors of the mean for both classes. From the data, Class 1 has 31 students and Class 2 has 30, resulting in a very close sample size that ensures the rationality of the comparison. In terms of the mean, Class 1 has an average score of 10.61, while Class 2 has an average score of 10.90. Although Class 2 scores slightly higher, the difference is only 0.29, indicating that the baseline levels of the two classes in the pre-test stage are quite close. For standard deviation (Standard Deviation), Class 1 has a value of 1.202, and Class 2 has a value of 1.213, indicating that the score distributions within the two classes are relatively concentrated. The standard errors of the means (Standard Error of the Mean) are also 0.216 and 0.222, respectively, further indicating the high stability of the means for the two classes. The research results indicate that the baseline levels of Class 1 and Class 2 are identical, with no statistically significant differences between

them. Such results provide a good prerequisite for subsequent research to explore the impact of team-teaching, making two classes more fair and scientific.

The independent-samples t-test was conducted on the scores of physical education learners from Class 1 and Class 2 in second grade at A Middle School. This analysis showed that the pre-test differences between the two classes are significant. The results of Levene's test for equality of variances show an F-value of 0.024 with a corresponding significance level (Sig.) of 0.877. This indicates that the variances of the scores between the two classes are equal, as the significance level exceeds 0.05, and the subsequent t-test is conducted under the assumption of equal variances. According to the t-test results, the t-value is -0.928, with a degree of freedom (df) of 59, and the corresponding two-tailed significance level (Sig. (2-tailed)) is 0.357. Since the significance level exceeds 0.05, it can be concluded that the mean differences in pre-test scores between Class 1 and Class 2 are not statistically significant. This conclusion is further supported by the 95% confidence interval for the mean difference, which is [-0.906, 0.332]. This interval includes zero, indicating that the difference is statistically insignificant. The results of the independent-samples t-test indicate that there are no significant differences in baseline scores between the physical education learners in Class 1 and Class 2 before the implementation of team-teaching. This provides a fair basis for comparison in subsequent teaching interventions, ensuring reliability and consistency.

Table 4.2 Pre-Test Group Statistics

Class	N	Mean	Std. Deviation	Std. Error Mean
1	31	10.61	1.202	0.216
2	30	10.90	1.213	0.222

Table 4.3 Pre-Test Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
						95% Confidence Interval of the Difference	
	F	Sig.	T	df	Sig. (2-tailed)	Lower	Upper
Equal variances assumed	0.024	0.877	-0.928	59	0.357	-0.906	0.332
Equal variances not assumed.			-0.928	58.893	0.357	-0.906	0. 332

4.2.2 Analysis of Post-Test Results

After team-teaching, data tests were administered to physical education learners in Class 1 and Class 2 of second grade at A Middle School. The experimental group consisted of 31 students from Class 1, while the control group included 30 students from Class 2. A total of 61 valid test papers were collected, and independent-samples t-tests were performed on the students' scores from the two classes. See Tables 4-4 and 4-5 for details.

The research data present statistical information on the post-tests administered to physical education learners in Class 1 and Class 2 of second grade at A Middle School, following the team-teaching approach. There were significant differences in performance between the experimental group (Class 1) and the control group (Class 2) in the post-tests, providing data to support the exploration of team-teaching effectiveness. The experimental group (Class 1), consisting of 31 students, had a posttest mean of 19.97, a standard deviation of 0.875, and a standard error of the mean of 0.157. The standard deviation and standard error indicate that the distribution of students' scores in this class is relatively concentrated. The control group (Class 2), consisting of 30 students, had a posttest mean of 17.30, a standard deviation of 1.495,

and a standard error of the mean of 0.638. Compared to the experimental group, the mean of the control group was significantly lower, and the standard deviation was higher, indicating that the score distribution of students in this class was more dispersed, with higher individual differences.

From the comparison of means, the experimental group's mean was significantly higher than the control group's, with a difference of 2.67. This difference initially suggests that team-teaching significantly improved students' scores in the experimental group. In contrast, the control group, which did not adopt team teaching, showed a relatively minor improvement in scores. The research results indicate a positive impact of team-teaching on students in the experimental group, characterized by a concentrated score distribution and stable performance. This result provides basic data for subsequent statistical analysis (e.g., t-tests) to assess whether the actual effect of team-teaching is significant.

The research results present the findings of the independent-samples t-test on post-test scores for the experimental group (Class 1) and the control group (Class 2) following team-teaching. This test aims to determine whether the difference in the post-test means between the two classes is statistically significant. The results of Levene's test for equality of variances showed an F-value of 15.792 and a significance level (Sig.) of 0.000, both of which are less than 0.05. This indicates that the data variances are unequal, and subsequent analysis should use the t-test results under the assumption of "Equal variances not assumed." According to the t-test results under the assumption of "Equal variances not assumed," the t-value is 4.059, the degree of freedom (df) is 32.508, and the corresponding two-tailed significance level (Sig. (2-tailed)) is 0.000, which is much less than 0.05. This indicates that the difference in post-test scores between the experimental and control groups is statistically significant. The 95% confidence interval for the mean difference is [1.330, 4.006], with both the upper and lower limits positive, indicating that the mean score of the experimental group is significantly higher than that of the control group. Comparing the means (19.97 for the

experimental group and 17.30 for the control group), it can be concluded that team-teaching has significantly promoted the scores of physical education learners in the experimental group. This result is consistent with the independent-samples t-test's significance level, further validating the effectiveness of team-teaching.

Table 4.4 Post-Test Group Statistics

Class	N	Mean	Std. Deviation	Std. Error Mean
1	31	19.97	0.875	0.157
2	30	17.30	1.495	0.638

Table 4.5 Post-Test Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Lower	Upper
Equal variances assumed	15.792	0.000	4.119	59	0.000	1.372	3.964
Equal variances not assumed.			4.059	32.508	0.000	1.330	4.006

4.3 Students' Attitudes Towards Team-Teaching Findings

Cronbach's alpha is utilized to assess the internal consistency of test items. A higher Cronbach's alpha indicates greater consistency among items. When a subscale's reliability coefficient is above 0.7, the scale or questionnaire is considered to have good reliability. Coefficients between 0.6 and 0.7 are also acceptable. On the overall scale, a reliability coefficient of 0.8 or higher indicates excellent reliability.

The research results presented reliability statistics for the questionnaire

assessing team-teaching effectiveness. Cronbach's alpha coefficients were used to assess the consistency and reliability of the questionnaire items within each dimension. The Cronbach's alpha coefficients for all dimensions ranged from 0.842 to 0.896. Among them, the "acceptance and adaptation" dimension had the highest reliability, with a coefficient of 0.896, indicating the internal consistency among its items; the "participation in the learning process" dimension followed closely with a reliability of 0.892; the "students' evaluation and recognition" dimension had a reliability of 0.866; while the "feedback on learning outcomes" dimension had the lowest reliability, but it still reached 0.842. All dimensions had Cronbach's alpha coefficients significantly above 0.8, suggesting high internal consistency across various questionnaires. Higher Cronbach's alpha coefficients indicate strong item-to-item correlation within each dimension, suggesting that the items are practical and focused on specific topics, without apparent redundancy or deviation. The questionnaire demonstrates high reliability, making it a powerful tool for studying team-teaching effectiveness. As shown in Table 4.6.

Table 4.6 Reliability Statistics

Dimension	Cronbach's Alpha	N of Items
Acceptance and Adaptation	0.896	5
Participation in The Learning Process	0.892	5
Student Evaluation and Recognition	0.866	5
Feedback on Learning Effect	0.842	5

The questionnaire's validity is indicated by the Kaiser-Meyer-Olkin (KMO) value. A KMO value greater than 0.7 suggests that the survey data are suitable for factor analysis. The KMO and Bartlett's Test of Sphericity for team teaching were effective in assessing the survey questionnaires. These results indicate that the data are highly suitable for factor analysis. The KMO test result (0.855) indicates a high level of sample adequacy and strong inter-variable correlations. Generally, a KMO value between 0.8 and 0.9 is considered an excellent fit, indicating that the questionnaire design is

reasonable and that the item correlations support the extraction of underlying factors. The chi-square value for Bartlett's Test of Sphericity is 765.167, with 190 degrees of freedom and a significance of 0.000. The significance level is well below 0.05, indicating that the correlation matrix is not an identity matrix and that there are significant correlations. This result further confirms that the data are suitable for factor analysis.

According to the factor analysis results of each variable, the cumulative explanatory rates for acceptance and adaptation, participation in the learning process, student evaluation and recognition, and feedback on the learning effect are 69.203%, exceeding 0.5, indicating four valid factors.

Table 4.7 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.855
Bartlett's Test of Sphericity	Approx. Chi-Square	765.167
	df	190
	Sig.	0.000

Table 4.8 Total Variance Explained

	Initial Eigenvalues			**Extraction Sums of Squared Loadings**		**Rotation Sums of Squared Loadings**	
Component	**Total**	**% of Variance**	**Cumulative %**	**% of Variance**	**Cumulative %**	**% of Variance**	**Cumulative %**
1	9.129	5.643	5.643	5.643	5.643	9.852	9.852
2	11.912	9.558	55.201	9.558	55.201	17.381	37.234
3	11.572	7.859	63.060	7.859	63.060	16.309	53.543
4	11.229	6.143	69.203	6.143	69.203	15.660	69.203
5	0.787	3.933	73.136				
6	0.726	3.632	76.768				
7	0.638	3.188	79.956				
8	0.596	2.979	82.935				
9	0.516	2.578	85.513				
10	0.480	2.402	87.915				
11	0.415	2.077	89.992				
12	0.388	1.939	91.931				
13	0.331	1.656	93.586				

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	% of Variance	Cumulative %	% of Variance	Cumulative %
14	0.274	1.371	94.958				
15	0.224	1.121	96.078				
16	0.199	0.994	97.073				
17	0.176	0.878	97.951				
18	0.168	0.842	98.792				
19	0.155	0.776	99.568				
20	0.086	0.432	100.000				

Through factor analysis, all items were divided into four dimensions. Based on the dependent variable factor analysis, four factors with eigenvalues greater than 1 were extracted, which are consistent with the original item categorization. Additionally, the questionnaire items' factor loadings were all above 0.5, indicating good discriminant validity among the dimensions and suggesting that each dimension is independent. This demonstrates that the questionnaire's overall validity is good, as shown in Table 4.9.

Table 4.9 Rotated Component Matrixa

	Component			
	1	2	3	4
Q1		0.806		
Q2		0.645		
Q3		0.740		
Q4		0.814		
Q5		0.725		
Q6	0.808			
Q7	0.732			
Q8	0.726			
Q9	0.760			
Q10	0.744			
Q11			0.726	
Q12			0.621	
Q13			0.584	
Q14			0.678	
Q15			0.828	

	Component			
	1	2	3	4
Q16				0.722
Q17				0.607
Q18				0.748
Q19				0.740
Q20				0.799

The research data presents descriptive statistics on students' attitudes towards group teaching, specifically categorized into acceptance and adaptation, participation in the learning process, student evaluation and recognition, and feedback on the learning effect. Each dimension comprises multiple items, and Table 4.10 displays the mean and standard deviation (Std. Deviation) for each item. The mean values of all items range from 3.23 to 3.74, indicating high overall ratings by the participants and reflecting relatively positive evaluations of the relevant dimensions. The standard deviations, ranging from 1.006 to 1.410, indicate some variability in scores among different participants; however, the overall distribution is relatively stable.

In the "Acceptance and Adaptation" dimension, the mean values of the five items range from 3.30 to 3.44, indicating a generally moderate level of agreement among participants, with standard deviations indicating slight variation in individual evaluations. The mean values for the "Participation in the Learning Process" dimension are slightly higher, ranging from 3.46 to 3.62, suggesting a more active engagement by students in the learning process, with a higher degree of variability in individual scores, particularly for Q9, where the standard deviation reaches 1.410, reflecting a more dispersed distribution of opinions on this item.

In the "Student Evaluation and Recognition" dimension, the mean values range from 3.23 to 3.59, reflecting a relatively positive perception of evaluation and recognition among students, although not to a significantly high degree. Conversely, the mean values for the "Feedback on Learning Effect" dimension are generally higher, with Q18 and Q20 achieving 3.74 and 3.72, respectively, indicating a more positive

perception of the effectiveness of learning feedback, which is the highest-rated dimension. Additionally, the relatively low standard deviation in this dimension suggests a more consistent perception of feedback on the learning effect among participants.

The table shows that the mean values of each dimension are at the upper-middle level, reflecting students' relatively positive attitudes towards acceptance and adaptation, learning engagement, evaluation and recognition, and feedback on learning effect. Meanwhile, the differences in standard deviations indicate significant individual variability for some items, warranting further analysis.

Table 4.10 Descriptive Statistics

Dimension	Item	N	Min	Max	Mean	Std. Deviation
Acceptance and Adaptation	Q1	61	1	5	3.44	1.259
	Q2	61	1	5	3.33	1.221
	Q3	61	1	5	3.43	1.147
	Q4	61	1	5	3.33	1.091
	Q5	61	1	5	3.30	1.116
Participation in The Learning Process	Q6	61	1	5	3.56	1.232
	Q7	61	1	5	3.59	1.006
	Q8	61	1	5	3.62	1.171
	Q9	61	1	5	3.52	1.410
	Q10	61	1	5	3.46	1.259
Student Evaluation and Recognition	Q11	61	1	5	3.49	1.273
	Q12	61	1	5	3.44	1.259
	Q13	61	1	5	3.23	1.216
	Q14	61	1	5	3.59	1.101
	Q15	61	1	5	3.51	1.312
Feedback on Learning Effect	Q16	61	1	5	3.62	1.098
	Q17	61	1	5	3.66	1.078
	Q18	61	1	5	3.74	1.353
	Q19	61	1	5	3.41	1.202
	Q20	61	1	5	3.72	1.082

CHAPTER V

CONCLUSION AND DISCUSSION

5.1 Conclusion

Part 1 for Answering Research Question 1

This study conducted a comparative analysis of differences in physical education performance between an experimental group (Class 1) and a control group (Class 2) of second-grade students at Junior High School A, before and after the implementation of team-teaching, using an independent-samples t-test. The statistical results indicate that team-teaching improves the academic performance of junior high school students in physical education.

Before implementing team-teaching, a comparative analysis of Class 1 and Class 2 scores was conducted. The t-test results showed a t-value of -0.928, with 59 degrees of freedom and a significance level (Sig) of 0.357, which is greater than 0.05. This suggests that there is no significant difference in the mean scores between the two classes, indicating that their baseline levels of physical education performance are consistent. The t-test enables us to control for the influence of baseline performance differences on subsequent experimental results. Following the team-teaching, an independent-sample t-test was used to compare the post-test scores of the experimental group (Class 1) with those of the control group (Class 2). The results showed that the experimental group had a mean score of 19.97, significantly higher than the control group's 17.30. The standard deviation of the experimental group (0.875) was smaller than that of the control group (1.495), indicating that the scores within the experimental group were more concentrated and stable. The t-test results ($t = 4.059$, $p = 0.000$) further demonstrated a significant difference in the mean scores between the two groups, with a significance level far below 0.05. The t-test results support the notion that the experimental group's performance was significantly better than that of the control group.

Through team teaching, the physical education performance of the experimental group (Class 1) was significantly improved, surpassing that of the control group (Class 2) by a considerable margin. This suggests that team-teaching, as a teaching method, has a significant promotional effect on improving students' physical education performance. Although the control group did not show significant improvement, its performance served as a comparison group, providing a reference for verifying the effectiveness of team-teaching. Therefore, this study proves the effectiveness of team-teaching in improving physical education performance. Analysis indicates that Hypothesis 1 is supported. Team-teaching is more effective than traditional teaching methods in improving the academic performance of junior high school students in physical education.

Part 2 for Answering Research Question 2

The descriptive statistics regarding students' attitudes toward group-based teaching indicate that the mean scores across all items range from 3.23 to 3.74 on a 5-point Likert scale (1 = "completely disagree," 5 = "completely agree"). This suggests that participants' overall ratings are relatively high, reflecting a generally positive attitude towards group-based teaching. In terms of the standard deviation range, the standard deviations of each item range from 1.006 to 1.410, indicating that although there is some variability in students' ratings of attitudes towards group-based teaching, the overall distribution remains relatively concentrated. The distribution of mean values indicates slight differences in students' recognition of specific dimensions; however, the magnitude of these differences is not significant. Students generally hold relatively positive views on multiple aspects of group-based teaching. For instance, some items have mean values close to 3.7, suggesting that students experience more positive effects in specific teaching sessions.

In contrast, items with lower mean values (such as 3.23) involve aspects that students believe could be improved. The results demonstrate that, as a teaching model, group-based teaching is recognized by students, with its effects showing

consistency and a certain degree of stability across multiple dimensions. However, there are still some differences in individual items that deserve further exploration and improvement. This provides strong support for group-based teaching and suggests that educators should tailor their strategies to meet the specific needs of individual students, thereby better addressing their diverse learning needs.

5.2 Discussion

Part 1: To Answer Research Question No. 1

1. How does the team-teaching approach compare to the traditional teaching approach in improving the academic achievement of middle school physical education learners?

The study compared the effectiveness of team-teaching and traditional teaching in improving the physical education performance of middle school students, revealing significant differences between the two teaching methods. Before the experiment, an independent samples t-test was conducted on the physical education scores of the experimental group (Class 1) and the control group (Class 2). The results showed no significant difference in the mean scores between the two classes ($t = -0.928$, Sig. $= 0.357$, $p > 0.05$), with standard deviations of 1.202 and 1.213, respectively. This indicated that the baseline levels of physical education performance were consistent between the experimental and control groups before the team-teaching, eliminating the interference of baseline differences between the two groups on the study's conclusions (Pande & Bharathi, 2020). Team-teaching was more effective than traditional teaching in improving the academic performance of middle school physical education learners (Sindhu et al., 2019). The study's conclusions align with those of Sozer et al. (2019), Gomes & Jelihovschi (2019), and Fung et al. (2018).

After implementing team-teaching, data tests were conducted on the physical education scores of both groups, revealing that team-teaching had significantly

superior effects than traditional teaching. The post-test mean score for the experimental group was 19.97, while the control group's was 17.30, yielding a mean difference of 2.67. The independent-samples t-test ($t = 4.059$, $df = 32.508$, Sig. = 0.000) showed a p-value of less than 0.05, indicating that the performance improvement in the experimental group was statistically significant. Further analysis revealed a 95% confidence interval for the mean difference of [1.330, 4.006], which was entirely positive, further validating the conclusion that the experimental group's scores were significantly higher than those of the control group. The higher mean score in the experimental group indicated that team-teaching significantly improved student learning outcomes. The standard deviation of the experimental group (0.875) was significantly lower than that of the control group (1.495), indicating that team-teaching not only improved overall scores but also reduced variability within the group, resulting in more balanced learning outcomes. This is because team-teaching emphasizes cooperation and interaction, enabling students of different abilities to understand and master physical education skills, thereby bridging individual differences (Sindhu et al., 2019). In contrast, traditional teaching modes focus more on unilateral knowledge transmission, resulting in a more dispersed distribution of student scores within the group (Zeilhofer, 2020).

The study results demonstrate that team-teaching has significant advantages over traditional teaching in improving the physical education performance of middle school students (Liang & Li, 2018). This teaching method significantly enhances learning efficiency and outcomes by strengthening collaborative learning among students and diversifying teacher guidance, particularly in physical education courses that require teamwork (Sozer et al., 2019). This finding provides data support for team-teaching in middle school physical education and offers insights into traditional teaching modes (Liang & Li, 2018). Teachers should pay more attention to the differentiated needs among individuals.

Part 2: To Answer Research Question No. 2

2. What are students' attitudes toward team-teaching as an approach to improving the Academic achievement of middle school physical education learners?

The study results indicate that students generally hold positive attitudes toward team-teaching, with mean scores for all items ranging from 3.23 to 3.74. This indicates that the participants' ratings on the 5-point Likert scale are at a mid-to-high level. The results show that students recognize the role of team teaching in improving physical education performance. This outcome reflects the potential advantages of team-teaching for students' learning experience and effectiveness, and indirectly validates its applicability in physical education. This viewpoint is consistent with the research by Liang & Li (2018) and Pande & Bharathi (2020). Students' high satisfaction with team-teaching is closely related to the characteristics of this teaching method. By facilitating collaboration among teachers and students, team-teaching creates a more dynamic and engaging learning environment. In such an environment, students can overcome learning difficulties through communication and mutual support (Zeilhofer, 2020). Team-teaching significantly enhances students' learning experience and sense of engagement. It offers students more personalized guidance and feedback, and this teaching approach, which focuses on students' needs, further boosts their learning confidence and recognition of the teaching method (Paauwe, 2022).

Despite students' positive attitudes towards team-teaching, the distribution of mean scores across items shows some variation in their evaluations of specific dimensions of team-teaching. For example, some items have higher mean scores (close to 3.7), indicating stronger perceptions among students of the role of team-teaching in promoting academic performance and interest in learning. Items with relatively lower mean scores (such as 3.23) involve aspects that students believe need further improvement, including the balance of group cooperation and the rationality of teaching activity design. These differences provide directions for further refining the team-teaching model. Regarding the distribution of standard deviations, the discreteness of

item scores ranges from 1.006 to 1.410, indicating that although the overall attitude is positive, there are still differences in ratings among students (Liang & Li, 2018). This variation is related to factors such as students' personalities, learning habits, and experiences with teamwork. For instance, students with learning abilities tend to perform more prominently in team-teaching, while students accustomed to independent learning may require some time to adapt to the cooperative mode of team-teaching (Fung et al., 2018). Students' evaluations of team-teaching provide support for its promotion in middle school physical education courses (Paauwe, 2022). By emphasizing cooperation and interaction, team teaching significantly improves students' satisfaction and enthusiasm for learning, thereby promoting academic performance more effectively (Pande & Bharathi, 2020).

5.3 Implications for Practice

The research findings offer new directions for the design and implementation of middle school physical education curricula, while significantly enhancing teaching quality and students' learning experiences. The study demonstrates that team-teaching is an effective teaching strategy that promotes student achievement and enhances learning satisfaction by fostering stronger interactions among teachers and students. This suggests that schools should actively adopt the team-teaching model in practice to address the shortcomings of traditional teaching and fully leverage its advantages.

Team teaching can be optimized by dividing labor among teachers. Different teachers can design and guide various components of the curriculum based on their expertise. Collaboration among teachers allows for more refined and personalized classrooms, ensuring that each student receives support within their ability range. Compared to traditional teaching, this model enhances classroom efficiency, creates more opportunities for student participation and communication, and thus better

meets students' diverse learning needs.

The practice of team-teaching emphasizes group cooperation among students. This method enhances students' awareness of collaboration and team spirit, especially in learning scenarios that involve many projects requiring coordination among team members. Team-teaching can take the form of group exercises, allowing students to consolidate their learning through practical participation and improve each other's learning outcomes through teamwork. It helps students at different levels to learn from each other's strengths and weaknesses, reducing the learning gap caused by individual differences, and achieving more balanced learning outcomes.

Students' positive attitudes towards team-teaching also provide confidence for its practical promotion. The high student satisfaction with team-teaching in the study indicates its effectiveness in enhancing the learning experience. By encouraging students to take a more active role and responsibility within teams, they can better understand the teaching content and increase their interest in learning through mutual support. Schools can incorporate this feature by designing more team-based physical activities, such as team competitions or cooperative challenge tasks, that allow students to further appreciate the value of team teaching.

Applying team-teaching to physical education curricula can significantly improve students' academic performance and cultivate collaboration skills and team spirit. Team-teaching aligns with the goals of modern education. Through collaborative design among teachers and students, this teaching method can create a more efficient, balanced, and engaging learning environment in practice. Schools can further optimize team-teaching implementation by tailoring it to specific teaching needs and student characteristics, thereby providing a reference for additional courses and promoting this innovative teaching model.

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APPENDIX

Questionnaire

Dear Sir/Madam,

Thank you for your participation in this questionnaire survey. The survey will be conducted anonymously, and your relevant information will be kept confidential. Thank you again for your cooperation.

Part I:

1. Gender?
(A) Male
(B) Female

2. Age?
(A)Under 13
(B)14-16
(C) Over 17

3. How is your GPA?
(A)Under 2
(B)2.1-2.5
(C) 2.6-3.0
(D) 3.1-3.5
(E)Over3.5

Part II:

Please judge the extent to which you agree with the following statement, choose the most appropriate option, and mark the corresponding number. The questionnaire used a Likert scale, ranging from 1 to 5, in which 1 indicates strongly disagree (or strongly disagree), 2 indicates disagree (or disagree), 3 indicates neutral, 4 indicates agree (or agree), and 5 indicates strongly agree (or strongly agree)

Measurement Item						
Acceptance and Adaptation	I am willing to try learning new knowledge and skills through team-teaching methods.					
	I believe the team-teaching approach aligns with my learning style.					

Measurement Item						
	I can quickly adapt to the team-teaching classroom environment.					
	I feel that team-teaching effectively enhances my interest in learning.					
	I am optimistic about completing learning tasks in collaboration with my classmates.					
Participation in the Learning Process	In team-teaching, I actively participate in group discussions and activities.					
	I proactively take on tasks and responsibilities during team teaching.					
	I am eager to share my perspectives and opinions while effectively working with group members.					
	I frequently contribute to team projects and strive for their success.					
	I provide positive feedback and seek improvements for both my own and others' performance in team-teaching.					
Student Evaluation and Recognition	I believe team-teaching can fairly evaluate my learning outcomes.					
	I believe that my efforts and contributions are fully recognized within the context of team teaching.					
	I am satisfied with the feedback I received during team teaching.					
	I believe teachers provide accurate evaluations of my performance in team teaching.					
	I received positive recognition from both classmates and teachers during the team-teaching process.					
Feedback on Learning Effect	I believe team-teaching effectively enhances my mastery of subject knowledge.					
	Team-teaching helps me become more confident in problem-solving.					
	The feedback I receive during team-teaching is highly beneficial to my learning.					

Measurement Item						
	I believe that team-teaching enhances my collaboration and communication skills.					
	I feel that team-teaching strengthens my autonomous learning abilities.					

Academic Achievement Test

Information Acquisition and Analysis Ability

Question 1: Reading Comprehension

In a basketball game, each team consists of five players. The game is divided into four quarters, each lasting 12 minutes. Players can score points through shooting: each three-pointer scores 3 points, each regular shot scores 2 points, and each free throw scores 1 point. The team with the higher score at the end of the game wins. If the scores are tied at the end of regulation, overtime periods are played.

Questions:

(1) According to the text, how many minutes does each quarter of a basketball game last?

(2) How can a player score 3 points, 2 points, and 1 point, respectively?

Question 2: Data Analysis

The results of a 100-meter dash fitness test for five students (in seconds) are as follows: A = 12.5, B = 13, C = 12.8, D = 12.9, E = 13.1.

Questions:

(1) Which student performed the best in the 100-meter dash? Which one performed the worst?

(2) Calculate the average performance of all students.

Problem-Solving Ability

Question 1: Case Analysis

In a football match, poor team coordination led to frequent goals conceded. During a recent game, the team frequently lost possession due to a lack of cohesion between forwards and midfielders, resulting in gaps in both offense and defense that opponents exploited.

(1) Analyze the possible causes of the coordination issues.

(2) Propose two specific measures to improve team coordination.

Question 2: Strategy Formulation

Several students in a class basketball game showed little enthusiasm or participation.

(1) How would you design incentive measures to increase these students' engagement? Provide specific examples.

(2) How would you evaluate the effectiveness of these measures?

Collaboration and Communication Skills

Question 1: Role Play

Organize a group activity to design a new school sports competition.

(1) Describe your role in the group and how you communicated effectively.

(2) What difficulties did the team encounter when formulating rules? How did you resolve them?

Question 2: Group Discussion

Discuss ways to improve school sports activities to increase student participation.

(1) What part of the task did you take charge of in the group discussion? What was your contribution?

(2) How effective was the team's collaboration? What areas can be improved?

Reflection and Adjustment Ability

Question 1: Self-Assessment

Fill in the following self-assessment form after a football match activity:

(1) In this activity, I think I did my best in (briefly describe):

(2) I believe I need to improve in (briefly describe):

(3) My improvement plan is (briefly describe):

Question 2: Activity Summary

Write a summary report after a football match.

(1) In this sports event, what factors do you consider most successful? What aspects need improvement?

(2) Propose an improvement plan detailing how you will optimize your performance in the next sports event.

Continuous Learning Ability

Question 1: Learning Plan

Develop a one-month personal training plan for sports.

(1) What specific goals have you set in your learning plan?

(2) Describe the specific measures you will take to achieve these goals, including how you will track progress and adjust the plan.

Question 2: Learning Reflection

Reflect on the completed learning plan and answer the questions:

(1) What achievements have you made in the past month of learning?

(2) What challenges did you encounter? How do you plan to address these challenges in future learning?

Lesson Plan: Team Teaching

Total Course Duration: 3 hours

Course Objectives:

- To facilitate students' academic development through the team-based learning model, enhancing their abilities in information acquisition, problem-solving, and team collaboration.
- To strengthen students' engagement in the classroom, fostering their communication skills, critical thinking, and a collaborative spirit.

Planning and Course Explanation

This course plan consists of six steps, each with defined instructional objectives and corresponding activity arrangements. The total course duration is 3 hours, aiming to achieve optimal teaching effectiveness through transparent task allocation, active student participation, and practical guidance from the teacher.

The first part of the course introduces the course and sets goals, helping students understand the course objectives, content, and the fundamental principles of the team-based learning model. The second part clarifies task division to ensure each student's roles and responsibilities are clear, reinforcing group cooperation. The third part deepens students' understanding of the course content through group discussions and activities. In contrast, the fourth part requires students to summarize the discussion results and present them, facilitating digestion and reflection on the learning material. Ultimately, the course encourages students to reflect on and share their accomplishments, thereby further enhancing their learning outcomes. The timing and design of activities enhance students' engagement, deepen their understanding of the

material through various interactive forms, and provide continuous feedback to support their learning. Detailed Step-by-Step Course Design:

Step 1: Introduction to the Curriculum

Duration: 30 minutes

Content:

Introduce course goals, content, and structure.

Explain the fundamental principles and expected outcomes of the team-teaching approach.

Outline the main activities and division of labor for the session.

Activities:

Use slides to present the course syllabus and objectives.

Distribute course introduction materials.

Conduct a brief Q&A session to address student queries.

Teacher's Tasks:

Convey course information clearly to ensure students understand learning goals and expectations.

Students' Tasks:

Listen attentively, ask relevant questions, and comprehend course content and requirements.

Step 2: Division of Labor for Teaching

Duration: 20 minutes

Content:

Divide students into groups, each responsible for specific teaching tasks or activities.

Clarify roles and responsibilities within each group (e.g., material preparation, discussion facilitation, presentation).

Activities:

Organize group discussions for task allocation.

Ensure each group understands their tasks and role assignments.

Teacher's Tasks:

Guide students in distributing tasks equitably and transparently.

Students' Tasks:

Participate in task allocation and understand individual roles and responsibilities.

Step 3: Encourage Student Participation in Discussions

Duration: 40 minutes

Content:

Facilitate group discussions on designated topics or issues (e.g., enhancing teamwork in sports activities).

Circulate among groups to encourage active participation.

Activities:

Intra-group discussions with viewpoint sharing.

Group representatives present the discussion outcomes to the class.

Teacher's Tasks:

Pose discussion questions, guide discussions, and provide support and feedback.

Students' Tasks:

Actively engage in group discussions, share opinions, and listen to others.

Step 4: Guiding Students to Summarize

Duration: 30 minutes

Content:

Instruct students to summarize the discussion content and key learning points.

Assist in organizing summary reports, including key findings and recommendations.

Activities:

Groups compile discussion outcomes into summaries.

Each group presents its summary, with teacher feedback and commentary.

Teacher's Tasks:

Help students organize their discussion outcomes by providing a summary framework and offering constructive feedback.

Students' Tasks:

Compile and present summaries, highlighting main findings and recommendations.

Step 5: Reflecting on and Improving the Teaching Process

Duration: 30 minutes

Content:

Jointly reflect on the teaching process with students.

Discuss aspects that worked well, areas for improvement, and propose enhancements.

Activities:

Conduct a class-wide discussion and feedback session.

Collect student and teacher feedback, and document improvement suggestions.

Teacher's Tasks:

Facilitate reflection discussions, record feedback, and consider improvement plans.

Students' Tasks:

Participate in reflection discussions, provide honest feedback, and offer suggestions.

Step 6: Sharing and Exchanging Outcomes

Duration: 30 minutes

Content:

Allow groups to share their summaries and discussion results.

Facilitate student-to-student exchange of outcomes, with the teacher summarizing class performance.

Activities:

Groups present their achievements.

Organize student exchanges on experiences and learning outcomes, followed by the teacher's summary and encouragement.

Teacher's Tasks:

Organize outcome presentations, encourage sharing, and conclude the class.

Students' Tasks:

Share group achievements, exchange learning experiences, and receive feedback.

BIOGRAPHY

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