A PURPOSE OF AN ONLINE PHYSICAL EDUCATION INSTRUCTION GUIDELINES TO PROMOTE THE PHYSICAL COMPETENCY OF HIGH SCHOOL STUDENTS IN CHINA

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BY

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This article aims to study 1) the development of an online physical education course aimed at enhancing physical competency. 2) the exploration of the effectiveness of promoting physical competency through online physical education teaching video courses; and 3) the proposal of instructional guidelines for effective online physical education that promote physical competency. The research methods are divided into three stages: In the first stage, 100 people were selected as samples to conduct a questionnaire survey. In the second stage, two classes were respectively used as the experimental group and the control group for the experiment. In the third stage, five teachers were selected for interviews to form the target group and sample setting of the research.

The results of this study are as follows: (1) The 10-unit online physical education courses developed were evaluated by experts, and their IOC values all exceeded 0.5, demonstrating good consistency and feasibility. They cover basic qualities, running, jumping, shooting, and ball games, adhering to student-centered principles. (2) The experimental results show that the progress of the five physical fitness tests in the experimental group is significantly greater than that in the control group. Students have a high recognition of the content and methods of online courses, and most of them agree with the integrated online and offline model. Parents mostly support home exercise. (3) Teachers recognize the role of online videos in technical demonstrations and other aspects. The teaching guidelines they propose include implementation suggestions, resources and effect measurement methods, providing references for teaching.

Keyword : Online physical education courses, Physical competency, Instructional Guideline

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INTRODUCTION

1. Background

Background of the rise of online physical education teaching

Online education, a novel teaching method, has steadily grown to be a significant addition to the conventional educational system as a result of the quick growth of Internet technology. Particularly during the COVID-19 pandemic, online education provided new possibilities for the teaching of various disciplines with its unique advantages, among which the rise of online physical education was particularly noticeable. The emergence of online education was made possible by the extensive usage of mobile devices and the popularity of Internet technology at the start of the twenty-first century. By the end of 2021, there will be 1.013 billion Internet users worldwide, with a 71.6% Internet penetration rate, according to the China Internet Network Information Center's Statistical Report on Internet Development in China. This data clearly illustrates how widely the Internet is used in Chinese social life and offers a large market for the quick growth of online learning.

Offline instruction suffered greatly during the COVID-19 pandemic. All levels of schools have implemented online teaching strategies to protect the health and safety of both teachers and pupils. Based on information made public by the Ministry of Education, in the spring semester of 2020, a total of 280 million students across the country studied through online education platforms, among which online physical education courses became an important part. In addition to avoiding crowds, online physical education instruction guarantees that students get the activity they require. Online physical education teaching is flexible and convenient. Students can study according to their own time schedule, regardless of geographical restrictions. In addition, online physical education teaching resources are rich, covering various sports and technical guidance, providing students with more choices. According to statistics, at present, the main online education platforms in China, such as Tencent Classroom

and Netease Cloud Classroom, Provide a wealth of resources for the physical education program to accommodate students' varying interests and ages.

Enhancing the teaching effect can be achieved through online physical education instruction. Teachers can more easily demonstrate sports abilities and assist students in comprehending and mastering them by using video, animation, and other media. Through data analysis, online physical education instruction may simultaneously track students' academic achievement and the impact of sports in real time, giving teachers personalized teaching recommendations. For instance, a popular online physical education platform discovered through big data analysis that students' average marks on tasks they skipped rose by 20%. The cost of education can also be decreased by using online physical education instruction. Online physical education can save educational costs by sharing resources and allocating them as efficiently as possible, whereas traditional physical education necessitates significant investments in facilities, equipment, and instructors. Online physical education is thought to be more than 30% less expensive than regular classroom instruction.

However, online physical education teaching also faces some challenges and problems. Online teaching cannot completely replace the interactivity and practicality of offline teaching. Physical education teaching emphasizes physical participation and practical operation, but online teaching is difficult to achieve this. Although the action can be shown through video and animation, students can't directly feel the strength and rhythm of the action, and they can't get immediate feedback and guidance. Therefore, in order to get the best teaching effect, online physical education instruction must be integrated with offline instruction through online theoretical study and offline practice. Students who participate in online physical education must exercise self-control. Due to the absence of in-person teacher supervision in online learning, students must possess excellent self-management skills in order to guarantee the learning outcome. In addition, online physical education teaching is also facing the limitations of network environment and equipment conditions. Some students may not be able to study online smoothly because of unstable network or unsupported equipment.

Therefore, online physical education teaching needs to be constantly optimized in technology to ensure the stability and ease of use of teaching resources. Although there are some challenges, the rise of online physical education has undoubtedly brought new opportunities to the traditional education system. It not only broadens the boundaries of education, but also provides students with more personalized and diversified learning choices. In the future, online physical education instruction is anticipated to play a larger role in the field of education and contribute more to fostering students' interest in sports and enhancing their sports literacy due to the ongoing advancements in technology and innovative teaching methods.

As a new teaching mode, online physical education showed its unique advantages and potential during the epidemic in COVID-19. It can not only ensure students' physical exercise needs in a special period, due to continuous technological improvements and creative teaching strategies, it is projected that online physical education instruction will become more prevalent in the field of education in the future and play a greater role in encouraging students' interest in sports and improving their sports literacy, online physical education is expected to be more widely used and developed in the future, and become an important supplement and innovation direction of traditional physical education.

The importance of physical education for senior high school students

Senior high school students' physical education surely holds a crucial role in the contemporary educational system. It is not only the foundation for enhancing students' physical attributes, but it is also a significant means of developing their athletic abilities and forming a healthy lifestyle. However, with the development of the times, while facing many challenges, the traditional offline physical education curriculum also exposes its limitations in time, space and resources. Therefore, it is particularly urgent to explore the importance of physical education for senior high school students and seek the way of innovation and development.

Physical education is of inestimable value to the improvement of senior high school students' physical quality. In the fast-paced modern life, the academic pressure

of high school students is increasing day by day, and long-term study often leads to their lack of adequate exercise and exercise. Physical education can provide students with comprehensive and systematic exercise opportunities through scientific curriculum and professional coach guidance, so as to effectively improve their cardiopulmonary function, enhance muscle strength and improve physical flexibility and coordination. The improvement of these physiological indexes will not only help students to maintain abundant energy and good state in their studies, but also establish a strong, healthy basis for their future careers and personal lives. According to relevant data, senior high school students who regularly participate in physical exercise are generally better than those who lack exercise, and they also show stronger adaptability and resilience when facing academic pressure and life challenges. The development of senior high school pupils' athletic abilities is significantly influenced by physical education. Senior high school is a crucial time for students' skill and physical development. By participating in the study and training of various sports, they can not only master basic sports skills, but also improve their competitive level in practice. The cultivation of this skill will not only help students to achieve excellent results in the school sports competitions, but also provide useful help for their future career development and social participation. For example, team events such as basketball and football can cultivate students' teamwork spirit and communication skills; Individual events such as track and field and swimming can exercise students' will quality and self-challenge spirit. The cultivation and exercise of these skills will undoubtedly have a far-reaching impact on students' lives.

More significantly, physical education is essential in helping high school kids develop good lifestyle choices. Many high school students are glued to the virtual world in the information age due to the ease of use of the Internet and the popularity of electronic gadgets, ignoring the sports and exercises in real life. However, physical education can stimulate students' interest in learning and enthusiasm for participation through colorful course contents and various activities, thus guiding them out of the classroom, into the playground and into nature. In this process, students can not only enjoy the fun and sense of accomplishment of sports, but also gradually realize the

importance of a healthy lifestyle and consciously practice it. For example, by participating in outdoor training, hiking and other activities, students can personally experience the beauty of nature and the charm of sports; By participating in campus sports games, sports festivals and other events, students can feel the strength of teamwork and the motivation of competitive spirit. Students will be profoundly impacted by these experiences, which will encourage them to develop sound behavioral patterns and a positive outlook on life. The time, location, and resource limitations of conventional offline physical education programs must also be taken into consideration. On the one hand, students' time for physical exercise is restricted by curriculum arrangements and venue constraints; on the other hand, it is difficult to guarantee the effectiveness and quality of physical education because of a shortage of sports facilities and equipment as well as an imbalance in the number of teachers. Therefore, we must actively research and innovate the physical education model in order to overcome these challenges and promote the long-term, healthy expansion of physical education in senior high schools.

The importance of physical education for high school seniors cannot be understated. One part of it is the development of students' physical characteristics and athletic skills; another is the creation and upkeep of a healthy lifestyle throughout their lifetimes. Therefore, we must actively introduce new teaching concepts and methods as well as examine and reform the traditional physical education model with a more open and inclusive attitude if we are to support the continued innovation and development of physical education in senior high schools and contribute more to the overall development of students.

The necessity of online video-assisted teaching

The necessity of online video-assisted teaching is particularly important in the current education system, especially in the face of the limitations of traditional physical education. With the goal of offering solid theoretical backing and useful recommendations for the reform of physical education in China, this study thoroughly examines how well senior high school students do in sports when taught via online video assistance. Students' interest in sports and physical fitness have been fostered by the

traditional physical education approach, but its shortcomings are becoming more and more obvious. First of all, many schools struggle to implement diverse sports programs due to equipment and venue constraints, which results in a single teaching topic and makes it challenging to accommodate each student's unique demands. Second, teachers frequently struggle to consider each student's training situation because of the small teaching team, which leads to inconsistent teaching outcomes. Additionally, kids find it challenging to learn and solidify on their own after class, and traditional physical education is sometimes constrained by time and location.

Online video-assisted teaching, with its unique advantages, brings new opportunities for physical education reform. Online video-assisted teaching breaks the limitation of venues and equipment, and students can learn skills and methods of various sports by watching videos, thus broadening the learning channels. This teaching approach increases students' interest and zeal for studying in addition to enriching the curriculum. Personalized instruction is made possible by online video-assisted instruction. Every learner is free to select the learning materials and advance in accordance with his or her unique circumstances. This teaching approach takes into account each student's unique characteristics and enhances their learning impact and self-assurance. Online video-assisted training also provides real-time feedback and support tools to help students better understand and learn the principles of action. This allows students to pause and play back the video at any point while they are watching it. Through the online platform, teachers may also access real-time information about students' learning issues and progress, giving them focused advice and assistance. Additionally, online video-assisted instruction fosters students' capacity for independent learning. In traditional physical education teaching, students often rely on the guidance and supervision of teachers to learn. In online video-assisted teaching, students need to arrange their own learning time and content, which is helpful to cultivate their autonomous learning ability and time management ability. At the same time, students can also make self-evaluation and reflection by watching videos, so as to continuously improve their sports skills and comprehensive quality.

Online video-assisted instruction also has the advantages of flexibility and convenience. Students are no longer constrained by time or location and can learn anywhere, at any time. This teaching method not only improves students' learning efficiency, but also provides them with more learning opportunities and resources. We carried out pertinent empirical research to confirm the efficacy of online video-assisted instruction in raising senior high school students' athletic performance. According to the study's findings, high school students who use online video-assisted instruction have seen an average increase in their sports test scores of over 15%. This data fully proves the positive role of online video-assisted teaching in improving senior high school students' sports performance. Simultaneously, we discovered that online video-assisted instruction has also produced outstanding outcomes in enhancing students' capacity for independent learning as well as their excitement and interest in studying.

Online video-assisted teaching has obvious advantages and potential in improving senior high school students' sports performance. To further advance the reform of physical education, we should make the most of online video-assisted instruction and promote pertinent research and practical investigation. To improve the information literacy and teaching abilities of educators, we also need to improve teacher training and technical assistance. We can only better fulfill the function and value of online video-assisted instruction and contribute to the growth of physical education in China in this way.

2. Objectives of the Study

1) To develop an online physical education course aimed at enhancing the physical competency of high school students.

2) To explore the promotion effect of online physical education teaching video course on physical education Physical competency for high school students.

3) To propose instructional guidelines for effective online physical education that promote physical competency in high school students.

3. Significance of the Study

Family exercise and online video teaching courses are of great importance to students, parents and teachers. However, there are not many theoretical studies on online video teaching courses at present. Taking the current situation of high school students' family online video teaching courses and the effect of online physical education teaching as the breakthrough point, this paper enriches the relevant theoretical research on high school students' online video teaching courses, and provides certain theoretical guidance for high school students to adhere to family exercise and improve online physical education teaching activities. The specific significance is as follows:

1) For students: This study can enrich the relevant theories of high school students' online video teaching courses, provide theoretical guidance for students to adhere to family exercise, and help students learn physical education knowledge and skills through online video teaching courses and improve their physical quality to obtain a healthy body and strong immunity to face life in special circumstances such as home isolation. At the same time, studying the effect of the online + offline physical education teaching mode can provide students with a better physical education learning mode, meet students' personalized learning needs, stimulate students' interest in physical education, cultivate students' autonomous learning ability and exercise habits, and promote students' all-round development.

2) For teachers: This study helps teachers deeply understand the advantages and disadvantages of online physical education video courses and the effect of the online + offline teaching mode. Teachers can optimize teaching resources, improve teaching methods, strengthen online and offline guidance for students, and improve the quality and effect of teaching according to the research results. At the same time, the study can also provide teachers with information about students' cognition and needs, helping teachers better adjust teaching strategies and enhance the pertinence and effectiveness of teaching.

3) For schools: Taking the current situation of high school students' online video teaching courses and the effect of online physical education teaching as the breakthrough point, this study can provide theoretical reference for schools to improve online physical education teaching activities and promote the innovation and development of schools in physical education teaching. According to the research conclusions, schools can strengthen the construction and management of online physical education teaching resources, optimize the integration of online and offline teaching, provide students with a better physical education environment and conditions, improve the overall level of school physical education, and promote the innovation and development of school education models.

4. Scope of the Study

This study aims to investigate the efficacy of online physical education in enhancing senior high school students' physical quality by focusing on its guiding principles. The study's focus is limited to physical education programs in Chinese senior high schools. Online physical education instructional films are made for the experimental group (online video-assisted instruction) and the control group (offline instruction only). The core of the research is to compare the sports achievements of the two groups of students before and after the implementation of the course, in order to assess the positive impact of online video-assisted instruction on senior high school students' sports learning. This study aims to support the creation of innovative teaching models and offer empirical support for physical education in senior high schools.

5. Definition of terms

online physical education course

An online physical education course refers to a model that utilizes modern information technology and online platforms to transfer teaching content and processes to the internet, enabling students to directly participate in classes via the internet and thereby achieve remote synchronous learning. The forms of online physical education courses include video courses, live online classes, online lectures, and webinars. In this

context, an online physical education course specifically refers to a teaching model where recorded physical education videos are sent to students through platforms such as Tencent Meeting and DingTalk, allowing students to participate in physical education activities via the internet.

Traditional physical education course

Traditional physical education courses are one of the traditional education and teaching modes. Under normal circumstances, students attend teaching activities at schools or training institutions at specified locations and times. Traditional physical education courses are usually taught by teachers in gymnasiums, playgrounds, or other sports teaching venues, where students can directly interact, practice sports skills, and discuss related knowledge. In this paper, traditional physical education courses refer to a teaching mode in which students go to schools or designated places at fixed times to receive face-to-face instruction from teachers in teaching venues such as gymnasiums and playgrounds.

physical competency

Sports Achievements

Sports achievements refers to a comprehensive evaluation of students' skill level, physical fitness, competitive ability, etc., in sports, covering performances in projects such as running, jumping, and ball games. It reflects students' sports learning achievements and sports ability development, and serves as an important indicator for measuring the quality of physical education teaching and students' sports literacy. Among them, running projects such as the 50-meter run and 50-meter × 8 shuttle run can be timed using a stopwatch; projects like the 1-minute skipping rope and 1-minute sit-ups can be completed with a stopwatch combined with counting tools (such as a skipping rope counter); and the sit-and-reach is measured using a sit-and-reach tester for data collection.

Good Health

Physical health refers to the comprehensive state of human body in cardiopulmonary endurance, muscle strength, speed, flexibility and coordination, which reflects individual sports ability and health level, and is the basis for daily activities and

physical exercise, and needs to be maintained and improved through reasonable exercise, nutrition and living habits. Among them, cardiopulmonary endurance can be evaluated by 50 m× 8 reentry running combined with stopwatch and polar heart rate meter; Muscle strength (such as upper limbs, waist and abdomen strength) can be measured with the help of grip and sit-up tester. Flexibility is detected by the sitting body flexion measuring instrument; The speed is recorded by running 50 meters with a stopwatch; Coordination can be comprehensively judged by skipping rope, turning back running and other items combined with stopwatch and counter.

CHAPTER 2
REVIEW OF THE LITERATURE

This chapter focuses on constructivism theory, humanistic learning theory, etc., analyzes their support for online physical education teaching, and sorts out core concepts such as physical education, online physical education and physical competency. It lays a theoretical foundation for subsequent research design and method selection, and also provides a conceptual framework for exploring the impact of online physical education teaching on high school students' physical competency.

1. Constructivism Theory

1.1 The definition of constructivism theory

Vico, an 18th-century philosopher in Napoleonic Italy, is credited with founding constructivism when he claimed that "all knowledge is built by learners." Only what they have constructed can be plainly understood by others. Constructivism, sometimes referred to as structuralism, defines "structure" as organization and "construction" as establishing. According to this theory, learning is more than just accumulating disorganized information; rather, learning new information is dependent upon prior knowledge, and the two are influenced by one another.

Constructivism is a paradigm shift in modern educational psychology that elevates learning theory above behaviorism and cognitivism. In contrast to its forebears, constructivism places a strong emphasis on how students create their own distinct understandings using their own experiences, psychological makeup, and beliefs. There are several schools of constructivism, including information processing constructivism, social constructivism, and radical constructivism. Despite their differences in knowledge and learning, these schools share a commonality.

Constructivism theory's growing acceptance represents a new educational revolution with a profound impact. In addition to discussing the issues with cognition and personal comprehension, this theory places more emphasis on "people" and the crucial role that students play. In the process of mass innovation curriculum design, the

constructivism school has long held that the traditional curriculum design must be subverted and innovated, and pay more attention to the connection with life and special situations. The constructivism school's significant shift in the research direction of learning theory after the 1990s had a significant impact on curriculum research, both theoretically and practically.

1.2 The principle of constructivism

1.2.1 Knowledge View

Knowledge is not a ruling

It should be underlined that knowledge is an authoritative representation that can provide practical solutions for every problem or provide a wide and accurate summary of the laws of the world, in addition to being a fair depiction of our physical surroundings. Although scientific knowledge does not pretend to be the ultimate solution, it does contain truthful aspects at every given level of societal development. As civilization develops, more precise and intentional explanations will unavoidably emerge. An explanation or presumption about the destination world is called knowledge, not the final solution. With the deepening of our understanding, it constantly evolves, evolves and improves, resulting in new explanations and assumptions, which are refined and copied to solve specific problems.

Sir Karl Raimund Popper, an Austrian-born philosopher of science, said: "We know that we can never be certain that we have mastered the truth, even though we strive to find it in science." In modern times, certain historical judgments have been disproved, while others have been validated by society today rather than by the past. Any era's theory is gradually being improved, rigorously examined, and sometimes even disproved as history progresses. Knowledge is not always guaranteed to be accurate.

Understanding knowledge requires learners' own experience.

Language, words, images, and other exterior forms are all part of knowledge, and they will be widely accepted during a certain historical era. Furthermore, even while all students have surely taken in information, it is possible that

they do not all create or comprehend it in the same way. If teachers cram knowledge into students, Stress that information is always right, and use your power as a teacher to control and compel students to believe it. In this so-called learning, students don't use their brains to understand and analyze, but rote learning is a copying learning from teachers.

Instead than being a "absolute reference" of information or a clear blueprint for describing reality, constructivism views textbook knowledge as a more trustworthy hypothesis about a particular event. The journey of understanding never stops. Students need to actively construct, analyze, and comprehend knowledge on their own. They place a strong emphasis on independence throughout the learning process, assess the usefulness of their knowledge using their own experiences, form new perspectives, and critically assess what they have learned. The ongoing sharing and enhancement of both new and old information is guaranteed by this participatory approach.

1.2.2 The concept of learning

Constructivism holds that learning is self-directed and learner-driven, and that students actively construct the meaning of new information within their own social and cultural contexts.

Learning is constructive.

First and foremost, transcendental knowledge is necessary to facilitate individual learning. The previously established knowledge structure serves as the foundation for the assimilation and establishment of new knowledge. Piaget, for instance, contends that existing information is transformed, reorganized, and organized to create new knowledge. Knowledge is an abstract representation of the ongoing expansion and evolution of cognitive processes rather than a straightforward reflection of reality. Although knowledge is neither right nor wrong, it does become more internally consistent and structured as a result of products. As a result, The current level of knowledge, the evolution of past knowledge, and the understanding of new information are all things that educators must be mindful of. This type of creation has two meanings:

to build additional information knowledge by going beyond the professional knowledge and expertise that already exists. Second, there is reciprocity in architecture. The fresh construction of experience is carried out in accordance with the particular situation while extracting the background and starting a new business. So, On the one hand, personal experience is the source of the unique experience. Conversely, new businesses will thrive and adapt or change current knowledge. In learning, learners must process further information and connect it with other information, so as to understand complex information while keeping a good grasp of simple information.

Second, partial comprehension aids in recognizing the overall significance of information. It is crucial to strengthen the connections between each component rather than isolate it while analyzing it separately. This method ensures that understanding particular meanings will enhance understanding of broader connections within the body of information.

Learning is active.

Pupils should actively show that they are motivated to learn on their own. Different people acquire knowledge at different degrees. Under the influence of the outer environment, learners might only retain the surface meaning of certain concepts without fully utilizing their initiative and comprehending their true significance. The "cornerstone" of students' future education is so shaky.

In order for participants to consolidate and expand their prior knowledge while simultaneously constructing innovative opinions, constructive learning necessitates that they use their unique experience framework to form new knowledge, Combine previously learned material with fresh ideas, relate recently learned information to unique insight and experience, relate academic knowledge to firsthand experience, and take part in the dynamic interplay between the past and present.

The active construction of knowledge and skills is the aim of education. First and foremost, Throughout the learning process, students should be aware that education builds their subjective initiative and improves their own knowledge and skills. Secondly, whether in teaching methods or in teaching content, teachers

should avoid imparting knowledge in a single direction. The key is to give priority to students' internal motivation, encourage their initiative and enthusiasm, and respect their personal views. This approach guarantees optimal knowledge absorption.

Teachers should promote ongoing contemplation and methodical processing of various facts while allowing students to participate in developing their own understanding and application. Learners can progressively acquire knowledge and skills and even make breakthroughs thanks to this iterative approach.

Learning in society and environment.

Learning occurs in a particular setting. Our intelligence cannot be free from isolated, meaningless, and abstract facts and theories. The relationship that exists between known entities and human thoughts and inferences is what we learn. Understanding and acquisition are made simple if the learning process is conducted in a particular setting. As a result, the constructivist learning paradigm maintains that the four components of the learning environment are "situation," "cooperation," "dialogue," and "meaning construction."

Situation: The background in the learning environment must cultivate an atmosphere conducive to students' meaningful interpretation of what they have learned.This establishes new standards for instructional design, stating that in a constructivist learning environment, good design should not only consider the goals of instruction but also create scenarios that facilitate students' construction of meaning. This places scenario creation at the forefront of instructional design.

Cooperation: Consistent collaborative efforts are made during the learning process. This procedure is crucial for gathering and assessing educational resources, elucidating and validating theories, assessing learning outcomes, and ultimately building comprehension.

Dialogue: A crucial component of the foundation for cooperation is dialogue. Study group members must to take part in the conversation about carrying out the study assignments they have been given. Furthermore, the process of collaborative learning can be thought of as an endeavor founded on communication, in which the

opinions (wisdom) of individual learners are spread in the collective learning community, thus making dialogue an important tool to realize the construction of understanding.

The final objective of the all-encompassing learning process is to comprehend construction. The essence, underlying principles, and intrinsic relationships of phenomena are all part of comprehending construction. Assisting pupils in comprehending the fundamentals of the subject and how different components relate to one another is crucial. The aforementioned "schema" or cognitive blueprint for information acquisition refers to the retention of this understanding in the brain's memory.

1.2.3 Teaching concept

According to the principle of constructivism as a learning theory, it puts forward a comprehensive teaching method.

Students are seen as the focal point and active topic of information processing in the student-centered top-down constructivism teaching approach. Under the direction of teachers, they first solve challenging challenges before identifying or learning the fundamental abilities they require. Students actively, deliberately, and consciously engage in the learning process.

Teachers should foster an atmosphere in their lessons that respects each student's individual understanding, encourages them to ask questions, and fosters curiosity. Instructors must to urge pupils to continue investigating until they discover suitable solutions. Students should be encouraged to study by independently finding concepts and principles. Allow children to comprehend the process of learning rather than the end product. Encourage pupils to think critically and solve problems on their own.

Focus on instructing in real-world scenarios.

Encourage pupils to actively develop knowledge by emphasizing the creation of scenarios; allow students to learn while they solve actual challenges; A crucial component of holistic learning is the situational learning environment. Students

can learn from a variety of contexts and viewpoints thanks to the social communication it facilitates.

Be mindful of cooperative learning.

A lot of cooperative learning is typically incorporated into constructivism instruction. This hypothesis states that cooperative problem solving increases students' likelihood of comprehending and learning complicated concepts. Furthermore, as was already noted, constructivism places a strong emphasis on the social aspect of education, in which group members simulate the correct thinking process and discover and challenge each other's misconceptions.

1.3 The types of constructivism

Under the direction of teachers, constructivist learning theory proposes a learner-centered approach with four essential components of the learning environment: situation, cooperation, debate, and meaning development. Thus, the following is a summary of the appropriate teaching strategies and learning environment that have been modified to fit this theoretical framework: Throughout the entire educational process, educators serve as commanders, instructors, assistants, and promoters. They employ scenarios, collaboration, and dialogue to pique students' interest and drive, and ultimately encourage them to successfully construct the meaning of what they already know. Students actively create knowledge meaning in this model. In the teaching process, educators serve as coordinators, consultants, supporters, and catalysts. Helping students create their own dynamic meaning is the aim of educational resources. By constructing situations, media serves as a cognitive tool to support students' active learning and exploration in group settings, encouraging debate and exchange, and fostering cooperative learning. In these situations, the roles and interactions of teachers, students, media, and educational resources alter greatly from those of traditional teaching techniques. In a constructivist learning environment, these new connections and interactions form yet another potent framework for instructional activities.

1.3.1 Scaffolding Teaching

"Scaffolding instruction should give a conceptual framework for learners to create their understanding of information,"declares the Distance Education and Training Program of the European Community (DGXIII). These ideas foster a thorough comprehension of the issue. This is accomplished by analyzing difficult learning activities beforehand in order to progressively increase comprehension. The theory of "the nearest growth zone" proposed by renowned psychologist Vygotsky of the former Soviet Union serves as its inspiration. According to Vygotsky, children's cognitive attempts may exhibit a disconnect between the current challenge and their previous level of ability. Through guidance, children can bridge this gap with the help of educators, The term "zone of proximal development" refers to this. As a result, instruction should not only meet the intellectual development of the students at this time, but also surpass it and seamlessly transition them from one stage to the next. Vygotsky's theory of scaffolding, which was first applied as a metaphorical framework in the realm of architecture, was taken up by constructivists. Utilizing this framework to assist students in their learning process is crucial.

1.3.2 Anchored Teaching

The necessity of this teaching method stems from the real environment or deep concern. Recognizing reality is like "anchoring" in that the scope and processes of the entire teaching are predetermined once certain situations or challenges are identified (like a ship anchoring its anchor). Constructivism maintains that allowing students to see and experience things in the real world—that is, to learn through first-hand experience—rather than merely hearing about them from others (like teachers) is the best way for them to fully internalize the knowledge they have learned and possess a thorough awareness of the characteristics and tenets of entities that knowledge reflects, as well as the relationships that exist between these entities and other entities. Given that anchoring relies on concrete problems or examples (serving as a "anchor"), it is sometimes called "teaching paradigm" or "problem-oriented teaching". The five phases

of anchored teaching are scenario development, problem identification, autonomous and group learning, and outcome assessment.

1.3.3 Random Access Teaching

The constructivist learning theory, a recent development in cognitive theory that incorporates the idea of "flexibility" (also known as cognitive flexibility theory), provides the fundamental idea for the random teaching approach. This idea aims to enhance students' comprehension and information transfer skills, which are essentially the ability to put what you have learned into practice.

In the traditional teaching method, educators instill knowledge, and all learners are forced to take the same view on things, and the acquisition of ability is repeated without doubt, this hinders the development of students' cognitive and learning capacities. Random input teaching method emphasizes unpredictability. In view of the complexity of the phenomenon and the multifaceted problems, it is very challenging to thoroughly understand and master the inherent nature of things and their interrelationships, that is, to truly complete a comprehensive and profound understanding of existing knowledge. Usually, different opinions will lead to different understandings.The same instructional material must be presented using several techniques in various contexts, settings, and for various learning objectives in order to resolve this conundrum. It goes without saying that by "inputting" the same educational material repeatedly, students can develop a deeper and more thorough comprehension of the subject matter. The purpose of this type of frequent interaction goes beyond merely reinforcing fundamental information and abilities, as in conventional instruction. Every entry here addresses a distinct problem focus and has a unique learning objective. Thus, in addition to the repeated consolidation of the same information content, various inputs improve learners' understanding and cognition of the entire subject. Teachers should calmly guide students to understand the same content from different perspectives and learning modes based on the learners' construction of information meaning in the learning trajectory or the learning characteristics of different learners at any given time point. This will allow different learners to acquire multifaceted

cognition and understanding of the same entity or problem. It can help students develop their creative thinking skills and successfully handle the problem of individual learning differences.

1.4 The Application of Constructivism Theory

This paper's investigation of online physical education instruction mostly reflects the use of constructivism philosophy. When testing students' physical ability, it can be regarded as a basis for students to build a self-cognition, let them know the starting point of their own physical fitness and stimulate their motivation to improve. Through questionnaire survey, students' cognition of online and offline teaching is understood, which is based on students' existing experience and concepts, and conforms to the idea that constructivism emphasizes student-centered and starts from students' cognition. The interview with teachers is to build a more comprehensive teaching cognitive system. Teachers' recognition of online video teaching AIDS reflects that they actively use various resources to build learning scaffolding for pupils during the instructional procedure. The online+offline physical education teaching mode is a vivid embodiment of constructivism. It integrates different teaching methods, builds a diversified learning environment for students, enables students to build a sports knowledge and skill system through independent exploration and interactive cooperation, and promotes the development of the competence characteristics of high school students in China.

2. Humanistic Learning Theory

In the United States, people-centered psychology emerged as a trend in the 1950s and 1960s. This school of thought differs from cognitivism and behaviorism. It highlights the worth and dignity of people, values their potential and nature, and examines them as whole individuals. The humanistic teaching approach, which has its roots in humanistic psychology, places a strong emphasis on creating the ideal setting for students to comprehend, explore, and explain the universe from their own point of view in order to foster self-realization. Rogers is the primary representative of humanist theory. According to humanistic thinkers, man is a natural being rather than a social

being; he is derived from nature, and natural humanity is the same as humanity. First and foremost,Humanism encourages the investigation of intricate experiences and paradoxes that genuinely fit into every aspect of human nature, turning the study of human psychology toward humanity, potential, value, creation, and self-realization. Second, humanism holds that people can demonstrate the worth of their own existence in accordance with their own free will, reach their full potential through their own subjective initiative and capacity for free will, and create a life that reflects this self-realization. The last point is that humanism holds that studying humans is distinct from studying animals.

Based on humanistic psychology, humanistic learning theory emphasizes that students ought to be at the center of the learning process. Create a positive learning atmosphere for students and allow them to see the world from their own viewpoint. Behaviorists disregard human traits by refusing to draw comparisons between humans and computers or animals. However, cognitive psychology also challenges the significance of people's emotions, values, and attitudes in learning, even as it acknowledges the validity of people's cognitive structures (Dai & Liu, 2004). During the learning process, Individual variances result from variations in intellect, emotion, and purpose. As a result, when doing any activity, we should be mindful of the feelings and thoughts of the students. Importantly, we view education as a whole process that aims to develop students' moral character and psychological development in addition to their cognitive acquisition. In addition, Teachers should become assistants rather than leaders, support and guide students' learning, advocate for equality between teachers and students, cherish the teacher-student bond, and set an example for student-centered classrooms around the world.

However, humanistic psychologists stress that people are born with the capacity and drive to learn, which can be unleashed in specific circumstances. Students' interest will be piqued when they believe the course material satisfies their individual demands, which will greatly increase learning effectiveness and advance education. Therefore, teachers should not just specify what pupils must learn or how

they should learn it when they are transferring knowledge. Finally, educators should provide a series of teaching resources and prospects, so that learners can choose the educational channels that meet their personal preferences and requirements.

Humanistic learning theory has many applications in this paper. In the choice of research objects, the students in grade three of Beijing No.4 Middle School International Campus are the main body, which fully reflects the concern for the physical education learning needs of specific groups of students. Testing students' physical ability is not only to obtain data, but also to understand their individual differences and development needs from their actual physical fitness, which is in line with humanism's emphasis on student-centered and attention to students' uniqueness. In order to better meet students' learning expectations, the questionnaire survey was developed with the following goals in mind: to understand how students think about online and offline instruction, to respect their subjective sentiments and readiness to make a choice, and to provide students greater control over the teaching process. Interviewing teachers to understand the recognition of online video teaching AIDS is also to better serve students from the perspective of teachers and create an environment more conducive to students' learning. In the end,In addition to offering students a superior physical education teaching model and fostering their overall growth, the conclusion that online+offline physical education instruction is more effective, which reflects the concept of cultivating a complete person in humanistic learning theory, that is, in order for children to grow and be satisfied with their physical education education, it is important to focus on developing their emotions, attitudes, and values in addition to improving their physical education skills.

3. physical education

Physical education teaching is a teaching activity guided by certain plans and curriculum standards, with physical education teachers and students as the main bodies of teaching. It takes certain teaching conditions and teaching contents as the medium, and aims at enabling students to participate in physical exercise activities to enhance their physical health and cultivate their good moral qualities (Du & Wu, 2020).

Physical education took shape in ancient Greece, However, the book "Physical Education Teaching Method" by Swedish physical education teachers (1998) was where the idea of "physical education teaching" initially surfaced. Since then, physical education has developed rapidly in modern society due to the deepening of educational research and the harm to human health caused by the intense working and living environment. In the 1970s, UNESCO raised the requirement for talent training in modern education to "sound body, noble moral sentiment, rich scientific and cultural knowledge", and for the first time regarded physical health as one of the primary standards in talent training, and physical education's standing within the educational system has improved. In 2011, China published relevant papers on curricular standards and education reform, which further increased the influence of physical education in China. Additionally, the nation reformed the curriculum system in terms of the physical education curriculum requirements and the teaching syllabus (Zhao, 2020).

According to Kim (1994), "Physical education is a combined activity of teachers' teaching and students' learning," The five primary components of the Compulsory Education Physical Education and Health Curriculum Standards (2011 version) are physical education, mental health, social adaptability, sports participation, and sports skills, target system (henceforth referred to as the "Standards"), which also highlights the importance of giving mental health and social adaptation more attention. The "Standard" is based on the achievement of goals to guide the selection of teaching content and methods, and does not make clear requirements on teaching content and teaching plan. Teachers can choose teaching methods freely and flexibly according to the actual situation, and focus on developing students' basic physical activity ability and mastering basic movements. The teaching method mainly adopts the form of games and organizes competitions. Pay attention to how sports and health are related, as well as how health care and health education are related to the body.

4. Online physical education

The development of online teaching benefits from the invention of computers and the Internet, and its concepts and forms have also evolved with the degree of coupling between the network and teaching. Online teaching originated from Computer-Assisted Instruction (CAI), which refers to the use of Internet technology as equipment support and tool assistance in teaching. From the late 1960s to the mid-1980s, the use of the Internet or electronic devices for electronic auxiliary teaching changed traditional teaching methods and means. Yu (2025) argued that "CAI, as the most remarkable achievement in 20th-century education and the crystallization of human wisdom, has become a main component of educational science and modern educational technology, as well as a major topic for scientific research and a direction for teaching innovation." In the 1970s, the Open University of the United Kingdom first used television and radio in teaching, hailed as "a great innovation in the history of British education" and also the embryonic form of "open educational resources" online teaching that disseminates courses through multimedia or Internet forms. From the mid-1980s to the mid-1990s, the network, as an auxiliary tool for students' active learning, was mostly used for information collection, self-testing, online discussions, tutoring, and question-answering. Zhuang (2023) proposed that "computers should not only assist teachers in teaching but also emphasize assisting students in learning." Since the mid-1990s, due to the upgrading and optimization of network interactive platforms, network-based interactive teaching platforms have been constructed.

The development of online teaching owes much to the invention of computers and the Internet, with its concepts and forms evolving in tandem with the degree of integration between networks and teaching. Originating from Computer - Assisted Instruction (CAI), online teaching initially referred to using Internet technology as equipment support and tool assistance in education. From the late 1960s to the mid - 1980s, the adoption of the Internet or electronic devices for electronic auxiliary teaching revolutionized traditional teaching methods and approaches. As Yu (2025) noted, "CAI, as the most remarkable achievement in 20th - century education and a crystallization of

human wisdom, has become a core component of educational science and modern educational technology, serving as a major focus for scientific research and a direction for teaching innovation."

In the 1970s, the Open University of the United Kingdom pioneered the use of television and radio in teaching, an approach hailed as "a great innovation in the history of British education" and widely regarded as the embryonic form of "open educational resources"—online teaching that disseminates courses through multimedia or Internet platforms. From the mid - 1980s to the mid - 1990s, the Internet emerged as an auxiliary tool for students' active learning, primarily used for information gathering, self - testing, online discussions, tutoring, and question - answering. Zhuang (2023) emphasized that "computers should not only assist teachers in instruction but also prioritize aiding students in their learning." Since the mid - 1990s, the upgrading and optimization of network interactive platforms have enabled the construction of web - based interactive teaching systems.

In order for students and teachers to overcome time and space constraints and engage in new teaching activities, like "online classrooms," the teaching mode examined in this paper is known as "network teaching." Through teacher-student interaction or asynchronous communication, it completes the collecting and processing of teaching information using the network as the medium and the network teaching platform or other online communication formats.

5. physical competency

5.1 Sports Achievements

Sports performance refers to the comprehensive evaluation of individual's skill level, physical fitness and competitive ability in sports. The evaluation of sports performance should be different according to different sports. In the newly revised Physical Education Law, which came into effect on January 1, 2023, the state included physical education subjects in the scope of the academic level examination for junior and senior high schools. The newly revised "Sports Law" clearly gives priority to the development of youth and school sports in the third chapter, and implements the youth

sports promotion plan; Schools must set up physical education class in accordance with regulations to ensure that physical education class is not occupied; Ensure that students participate in no less than one hour of physical exercise every day during school; The school holds at least one school-wide sports meeting every academic year; The state brings physical education subjects into the scope of academic level examinations in junior high schools and senior high schools.

The result of qualified examination is the main basis for ordinary senior high school students to graduate: the time of qualified examination is arranged at the end of the teaching tasks of the corresponding courses in senior high school, the initial examination is arranged at the end of the first semester in senior high school and the end of the third semester in senior high school.

5.2 Good Health

Physical fitness refers to various physiological and sports conditions of a person's body, including cardiopulmonary endurance, muscle strength, speed, flexibility, coordination and other indicators. It reflects a person's comprehensive physical health and sports ability level, and is the basis for all kinds of daily activities and physical exercise. Good physical fitness can help people keep healthy better, improve work and life efficiency and reduce the risk of illness.

Physical fitness research is a wide multidisciplinary field, involving sports physiology, sports medicine, rehabilitation medicine, sports psychology, flexibility, body composition and various functional tests (Kumar, 2020). (2) Study on the relationship between physique and health: To study the relationship between different physique indexes and health problems such as cardiovascular diseases, metabolic diseases, osteoporosis and musculoskeletal system problems; (3) Research on physique and sports performance: Study the influence of physique on sports performance and competitive ability; (4) Research on training intervention and physical quality change: Study the influence of different training methods on physical quality and how to improve physical quality through training. In short, the study of physical fitness is a wide-ranging field, which is of great significance to people's health, sports performance and quality of

life (Bu, 2022). Learning and many other aspects. Its research contents mainly include the following aspects: (1) Physical fitness evaluation methods: including aerobic endurance, muscle strength and endurance.

The physical quality of senior high school students is influenced by many factors, such as heredity, nutritional status, living habits and sports. Generally speaking, the physical quality of high school students should meet the following standards:

(1) Cardiopulmonary function: able to complete a certain amount of long-term aerobic exercise, such as long-distance running and swimming;

(2) Muscle strength: it has certain explosive power and endurance, and can complete common daily physical activities, such as going up stairs and carrying heavy objects;

(3) Speed: It has good reaction speed and running speed, and can cope with unexpected situations;

(4) Flexibility: It has certain flexibility and can complete basic stretching exercises;

(5) Coordination: Being able to complete various sports with strong physical coordination, such as ball games and dancing.

Of course, these standards are only reference values, and individual differences and specific situations still need to be considered in specific evaluation. The improvement of high school students' physical quality requires reasonable diet, moderate exercise and scientific training, as well as the establishment of good living habits.

6. Conceptual Framework

The basic conceptual framework constructed in this study takes online+offline courses as the core, focuses on the impact of online teaching courses on academic performance and athletic performance in physical education, and is consistently guided by the guidelines of organizing physical education. The framework aims to explore the integration path of online teaching resources and offline teaching practice, analyze its action mechanism for improving high school students' physical competency in physical

education, and provide a systematic theoretical and practical reference for optimizing the physical education teaching model. The basic conceptual framework diagram is shown in Figure 1.

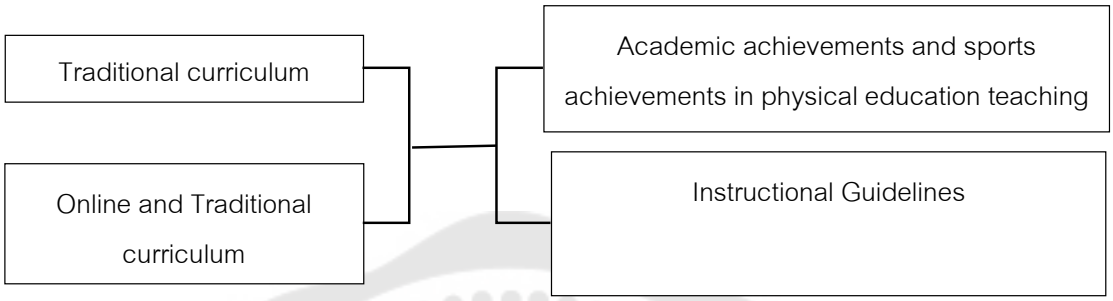


Figure 1 Research Framework

CHAPTER 3
METHODOLOGY

This chapter expounds on the methods of this study, including research design, subjects, instruments, data collection and analysis. Through comparative experiments, questionnaires and interviews, it systematically explores the impact of online physical education teaching on high school students' physical competency, providing a scientific and rigorous methodological support for presenting research results and verifying research objectives in the following sections.

Phase I: Objective 1

To develop an online physical education course aimed at enhancing the physical competency of high school students.

1.1 Research Design

This research focuses on the development of online and offline integrated physical education teaching plans. According to the physical education teaching needs of middle school students, video resources such as warm-up exercises and basic skills are released online with the help of teaching platforms, and supporting exercise manuals are provided for students to learn independently and record difficulties. In the offline class, the online learning results are first displayed by groups, the teachers demonstrate and explain the common problems, then organize group confrontation drills, analyze the students' action norms with motion capture technology, arrange online punching tasks after class, and request to upload practice videos. The teachers comment and feedback through the platform, thus forming a closed-loop teaching mode of "online preview-offline practice-online consolidation".

1.2 Participants of the Study

The overall setting of this study is 100 senior three students in Beijing No.4 Middle School International Campus. This group is in the critical stage of teenagers' physical development, with basic sports ability and the basis of using online learning equipment, and they all participate in physical education courses arranged by the

school. They are homogeneous in physical education learning background and curriculum requirements, which can better reflect the general characteristics and needs of junior high school students in physical education teaching, and provide a representative research object group for the formulation and implementation of online and offline integrated physical education teaching plans.

In this study, a simple random sampling method was used to select samples from the above 100 junior two students. In the specific operation, each student is numbered (1-100) first, and then 50 non-repetitive random numbers are generated by a random number generator, and the corresponding numbered students form a research sample. This sampling method can ensure the equal probability of each student being selected, effectively avoid subjective deviation, and ensure the representativeness of the sample to the whole population, so that the research results can be extended to all the students in the second grade of the middle school, and provide reliable data support for evaluating the effect of online and offline integration of physical education teaching plans.

In this paper, the students in two classes of Beijing No.4 Middle School (international campus) are taken as the research objects, and the physical education course network videos are made and divided into two groups. One group instructed students to watch online videos and teach in combination with offline courses (experimental group), while the other group only conducted offline courses (control group). Before and after the implementation of the course, a questionnaire survey was conducted among the students in two classes of senior three in Beijing No.4 Middle School (international campus), and the sports achievements of the two groups were compared, reflecting the beneficial influence of online video-assisted teaching on senior high school students.

After the questionnaire design is completed, the questionnaire is randomly distributed on the questionnaire star platform, and the senior three students in two classes of Beijing No.4 Middle School (international campus) are simply selected for investigation.

1.3 Research Instruments

Class recording equipment (high-definition camera and microphone) for online teaching, online teaching platform (such as Tencent classroom) and supporting interactive function modules.

1.4 Research Design

In this study, two classes of senior three students in Beijing No.4 Middle School International Campus were selected as the research objects. According to the research on online education, these students are divided into two groups: one group only receives online physical education class, and the other group receives online and offline physical education. Before and after the experiment, the students accepted five physical fitness tests to evaluate their physical fitness: 50-meter running, 1-minute skipping, sitting forward, 1-minute sit-ups and 50-meter× 8 turn-back running. Investigate the physical characteristics of two groups of students. After the experiment, students were investigated by online electronic questionnaire to understand their views on online teaching.

Phase II: Objective 2

To explore the promotion effect of online physical education teaching video course on physical education Physical competency for high school students.

2.1 Research Instruments

(1) sports testing. The students' physique was recorded with X-Scan Plus Ⅱ body composition analyzer, polar heart rate meter, sitting posture forward bucksiometer, stopwatch, watch holder, touch altimeter, German blood lactic acid analyzer, blood collection needle and other instruments. By recording and analyzing the test data displayed by the instrument, the sports achievements of the two groups were obtained. Through the evaluation of high school students' sports achievements, their sports ability is measured.

(2) Questionnaire survey. Senior three students from two classes in Beijing No.4 Middle School (international campus) were randomly divided into online and online+offline sports groups. After four weeks of implementation, the questionnaire was

distributed and recovered through the questionnaire network within the specified time. Through the analysis of the survey content, the practical problems and shortcomings of home network video teaching course are summarized.

In order to investigate the family exercise of students in North No.4 Middle School (international campus), a special questionnaire was designed, see Appendix 1. The questionnaire consists of three parts, one of which is dedicated to the methods and contents of online video teaching courses (questions 1-7), the evaluation of online video teaching courses (questions 8-13) and the cognitive attitudes of students and parents to online video teaching courses and home exercises (questions 14-20).

In order to confirm the validity of the questionnaire survey, we interviewed each head teacher of four classes in Beijing No.4 Middle School (international campus), and tested the validity of the questionnaire compiled in this study by issuing validity test forms to four head teachers. Table 1 shows the specific results. Through investigation and inquiry, the questionnaire survey has high validity: two of the two class teachers think it is effective, and two think it is basically effective and can be distributed. After collecting the feedback from the head teacher, the content of the questionnaire was improved by absorbing and integrating these suggestions. The final version of the questionnaire was distributed to 2 students and they were investigated.

Table 1 Questionnaire Validity Evaluation Form

Option	Effective	Basically Effective	Ordinary	Not Very Effective	Be Invalid
Number of People	2	2	0	0	0

In order to verify the reliability of the questionnaire, 10 students were randomly selected from Beijing No.4 Middle School (international campus) to conduct the questionnaire survey again. The two questionnaires are 10 days apart. SPSS 26.0 is

used to process the data of the correlation of B. results between two surveys. Through data analysis, the correlation value of the two survey data is 0.80-0.92, which shows that the credibility of this questionnaire survey is high.

2.2 Data Collection

This study will summarize the answers filled in by the respondents through the online electronic questionnaire, and then analyze the problems existing in online physical education teaching. In addition, students' physical examination data will be collected in the track and field of Beijing No.4 Middle School (international campus) to study the physical fitness indicators under two different teaching modes: online and online+offline.

2.3 Data Analysis

This study examines the condition of senior high school students' online video courses at Beijing No. 4 Middle School (international campus) by employing the mathematical statistics approach to generate statistics and analyze the data gathered through a questionnaire survey. The findings were analyzed using SPSS 26.0 and displayed as mean standard deviation (X±SD). The t-test is used to compare the test results of two student groups before and after the course was implemented in order to examine the effects of teaching physical education both offline and online.

Phase III: Objective 3

To propose instructional guidelines for effective online physical education that promote physical competency in high school students.

3.1 Research Design

Interview teachers to understand their recognition of online video teaching AIDS, and put forward effective teaching guides, that is, suggestions on applying research results, according to the development process.

3.2 Participants of the Study

In this study, five PE teachers were selected by purposive sampling. The selection criteria are: having more than 8 years of teaching experience, mastering online and offline teaching methods skillfully, and participating in sports lesson plan design

projects. By screening teachers' materials and combining the teaching effect, the samples are determined to ensure that they can provide professional suggestions for the development of teaching plans.

3.3 Research Instruments

This paper initially decided to design an interview outline, in-depth understanding of the PE teachers' recognition of online video teaching courses, to obtain a more intuitive understanding and feeling. The questions in the interview outline will be designed as semi-structured questions to understand their perception of the online video teaching course based on the respondents' responses.

3.4 Research process

Step 1: After the electronic questionnaire survey link is distributed to the PE teachers of the students and their parents in Beijing No.4 Middle School (International Campus), the students in two classes take advantage of the recess to ask them to fill in the questionnaire and take it back after 20 minutes.

Step 2: Use SPSS software to process the recovered data.

Step 3: Make use of the off-duty hours of PE teachers to conduct face-to-face interviews with them. See Appendix 2 for the outline of the interview, and record it with a voice recorder, and then sort out the recorded contents.

Step 4: From September 18th, 2022 to September 25th, 2022, the students' physical fitness test was conducted in the track and field of Beijing No.4 Middle School (international campus) before the experiment, and from November 22nd, 2022 to November 28th, 2022, the students' physical fitness test was conducted in the track and field of Beijing No.4 Middle School (international campus) after the experiment, and then the tests before and after the experiment were compared and analyzed.

CHAPTER 4
FINDINGS

This chapter systematically presents the empirical results of online video teaching course development, sports project testing, questionnaire surveys, and in-depth interviews based on the research design and methods in Chapter 3. Through the comparative analysis of the experimental group and the control group, it verifies the promoting effect of the online + offline physical education teaching model on the physical competency of high school students, reveals the cognitive differences among students and teachers' recognition of online teaching, and provides data support for subsequent research discussions and suggestions.

Part I: Objective 1

To develop an online physical education course aimed at enhancing the physical competency of high school students.

1.1 Online video course design scheme

1.1.1 Curriculum Principles

When creating online video courses for sports, the following curricular guidelines should be adhered to.

Student-centered. Give full consideration to students' learning needs and characteristics, such as high school students' desire for sports knowledge and differences in interest in different sports. The content of the course should be lively and interesting,which is capable of capturing students' interest and igniting their motivation to learn. For example, when introducing the history and basic knowledge of various sports, you can use story-telling methods; When explaining the technical movements, with clear demonstration videos, students can understand and master them more intuitively.

Pay attention to systematicness and consistency. The course content should be arranged in a certain logical order, from basic concepts to specific skills, to actual combat drills, and gradually deepen. In order for students to develop a

comprehensive knowledge system during the learning process, there should also be some correlation between the courses. For example, in the football course, first introduce the basic knowledge and development history of football, then explain the basic skills such as passing, stopping and shooting, and finally carry out training methods and actual combat drills.

Highlight interactivity and feedback. Although it is an online course, Equally crucial is fostering interaction with students. This can be achieved by posing thought - provoking questions and facilitating online discussions to promote active student engagement. Additionally, providing prompt and constructive feedback to students is essential for enhancing the learning experience, evaluate and guide their learning situation, and help them improve continuously. For example, in practical training courses, coaches can guide students online and correct their action mistakes in time; After class, students' learning feelings and suggestions can be understood through electronic questionnaires, so as to improve and optimize the course. Prepare.

1.1.2 The Purpose of the Course

Online video courses are meant to offer a variety of, efficient and convenient sports learning channels for senior high school students in China, so as to promote their competence in sports. Specifically, through vivid video explanations and demonstrations, students are enabled to grasp the fundamental concepts and historical evolution of various sports, thereby cultivating their intrigue and passion for physical activities. For example, in the football course, students can learn about the origin and development of football through videos and feel the charm of football. At the same time, teach the basic skills and rules of various sports, such as table tennis grip, stand and serve, as well as badminton serve, catch and swing, to help students master the correct sports methods and improve their physical fitness and coordination ability. In addition, the course focuses on cultivating students' teamwork spirit and competitive consciousness, such as team tactics explanation and actual combat drills in basketball and volleyball, which can enable students to enhance their teamwork ability in cooperation. Finally, through online video courses, students can cultivate good exercise

habits, so that they can persist in physical exercise in their busy study and life, shape a good body shape, and establish a strong basis for their future academic and personal endeavors.

1.1.3 Course Content

According to the teaching principles and objectives of the course, the online sports course is divided into 10 units. See Appendix 5 for details, which are summarized as follows:

Unit 1, basic quality sports course. The first class introduces the concept of basic quality sports and common items and methods, in order for pupils to comprehend its crucial role in physical activity and establish the groundwork for further research. The second lesson focuses on the connection between physical health and fundamental, high-quality sports training abilities, helping students master scientific training methods and cultivate good sports habits.

Unit 2, jumping and throwing course. The course content includes learning jumping skills such as standing long jump, high jump and long jump, as well as throwing skills such as solid ball, javelin and shot put. Through video demonstration and explanation, students follow the practice, master the take-off and landing posture in jumping and the key points of strength and angle control in throwing, and cultivate sports interest and teamwork spirit.

Unit 3, Running Course. In the first class, explain the running posture and skills, and analyze the skills of starting, accelerating and sprinting, so that students can master the correct running methods. In the second class, we introduce the methods of running training and the benefits of running exercise to the body, and cultivate students' teamwork spirit and competitive consciousness through group practice training under the online guidance of coaches.

Unit 4, Football Course. The first video introduces the basic knowledge and development history of football to stimulate students' interest. Video 2 teaches basic skills such as passing, stopping and shooting. Video 3 explains the rules of football

match and referee's gestures. Video 4 shows football training methods and actual combat drills to cultivate students' teamwork spirit and competitive consciousness.

Unit 5, Basketball Course. In the first class, we will explain the overview and basic skills of basketball and demonstrate them. In the second class, team tactics are explained and actual combat drills are conducted to improve students' sense of teamwork and competitive level.

Unit 6,Volleyball Course. Including the introduction of volleyball, demonstration and explanation of basic techniques, tactical analysis and actual combat drills, explanation of competition rules and referee methods, to enhance students' mastery of volleyball and teamwork ability.

Unit 7, Table Tennis Course. The first lesson introduces the basic knowledge and development history of table tennis, as well as the basic skills such as holding the racket and standing. In the second class, the skills of serving, receiving and hitting the ball, the rules of the game, the referee method and the training method are explained.

Unit 8, badminton course. The first lesson explains the basic knowledge and technical movements of badminton and cooperates with the demonstration video. In the second class, explain the basic tactics, cooperate with the game video and actual case analysis, and cultivate teamwork and competitive consciousness.

Unit 9, horizontal bar and parallel bars course. In the first class, introduce the basic skills of horizontal bar and parallel bars and demonstrate the movements for students to follow. In the second class, consolidate what you have learned, correct and guide your movements, arrange exercises after class, and cultivate your physical coordination and flexibility.

Unit 10, Aerobics Course. Video 1 explains the basic movements of aerobics, video 2 demonstrates the combined movements of aerobics, and video 3 cultivates the music collocation and sense of rhythm of aerobics, helping students shape good body shape and enhance their physical fitness.

1.2 Online video course expert evaluation

After the course design is completed, first, choose the expert group based on the specifications. Five people make up the expert group after deliberation and consensus. Once the expert group members have been selected, present the course design to experts for assessment of its coherence and relevance. The evaluation form is in Appendix 3. Table 2 provides a description of the evaluation outcomes.

Table 2 Evaluation Table of Objective Consistency Project Indicators

Course	Evaluation Dimension					Aggregate Score	IOC	Result
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 1 Basic Quality Movement	+1	+1	+1	0	+1	4	0.8	pass
	+1	+1	+1	-1	+1	3	0.6	pass
	0	+1	+1	+1	+1	4	0.8	pass
Lesson 2 Jumping and Throwing	+1	+1	+1	+1	+1	5	1	pass
	+1	0	+1	0	+1	3	0.6	pass
Lesson 3 Running	+1	+1	+1	+1	-1	3	0.6	pass
	0	+1	+1	+1	0	3	0.6	pass
	+1	0	0	+1	+1	3	0.6	pass
Lesson 4 Football	+1	+1	0	+1	+1	4	0.8	pass
	0	+1	+1	+1	+1	4	0.8	pass

Table 2 (continued)

Course	Evaluation Dimension					Aggregate Score	IOC	Result
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 5 Basketball	+1	0	+1	+1	+1	4	0.8	pass
	+1	+1	0	+1	+1	4	0.8	pass
	+1	+1	0	0	+1	3	0.6	pass
	0	+1	+1	+1	0	3	0.6	pass
	0	0	+1	+1	+1	3	0.6	pass
Lesson 6 Volleyball	+1	+1	-1	+1	+1	3	0.6	pass
	+1	+1	0	+1	+1	4	0.8	pass
	0	+1	+1	+1	+1	4	0.8	pass
Lesson 7 Table Tennis	+1	0	+1	+1	+1	4	0.8	pass
	+1	+1	0	+1	+1	4	0.8	pass
	+1	+1	+1	0	+1	4	0.8	pass

Table 2 (continued)

Course	Evaluation Dimension					Aggregate Score	IOC	Result
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 8 Badminton	+1	+1	+1	-1	+1	3	0.6	pass
	0	+1	+1	+1	+1	4	0.8	pass
	+1	+1	+1	+1	+1	5	1	pass
Lesson 9 Horizontal Bar and Parallel Bars	+1	0	+1	0	+1	3	0.6	pass
	+1	+1	+1	+1	-1	3	0.6	pass
	0	+1	+1	+1	0	3	0.6	pass
Lesson 10 Aerobics	+1	0	0	+1	+1	3	0.6	pass
	+1	+1	0	+1	+1	4	0.8	pass
	0	+1	+1	+1	+1	4	0.8	pass

From Table 2, it can be seen that the experts are more approved of the course design, with IOC scores above 0.5, and the consistency of teaching design projects is good, so the online video course can be implemented.

Part II: Objective 2

To explore the promotion effect of online physical education teaching video course on physical education Physical competency for high school students

Based on the questions raised in this study, in order to deeply analyze and understand students' cognition of online teaching and ensure the unity of the research object, this paper selects 100 students from two classes of senior three in Beijing No.4 Middle School (international campus) as the research object. When designing the questionnaire, we can learn from scholars' research all the time and discuss the problems in the questionnaire design by using the method of expert consultation to ensure that the questionnaire can investigate students' cognition of online teaching.

2.1 Analysis of experimental results

2.1.1 Test results before and after the control group

Results of the control group students' sports aptitude tests before and after the statistics course was introduced.

Table 3 Test Results of Physical Ability of Control Group

Assessment Content	Before the Experiment	After the Test	Mean Growth	Growth Margin	T Value	P Value
50 m× 8 Turn-Back Run	64.20±16.321	78.20±14.348	14	21.81%	4.555	< 0.001
50-Meter Run	61.10±11.651	67.10±11.210	6	9.82%	2.624	0.010

Table 3 (continued)

Assessment Content	Before the Experiment	After the Test	Mean Growth	Growth Margin	T Value	P Value
1 Minute Skipping Rope	68.60±13.440	80.20±12.895	11.6	16.91%	4.404	< 0.001
Sit And Reach	61.20±11.508	66.40±11.536	5.2	8.50%	2.257	0.026
1 Minute Sit-Ups	59.15±14.545	78.90±14.712	19.75	33.39%	6.750	< 0.001

According to the control group's results, the students' performance on a variety of sports test items varied to diverse degrees before and after the experiment. Based on the particular statistics, the 50-meter ×8 turn-back race's average value grew the greatest, reaching 14, with an increase rate of 21.81%; One-minute sit-ups also increased significantly, accounting for 33.39%. 50-meter running, 1-minute skipping and sitting forward have also been improved to some extent. From this, it is not difficult to analyze that after the implementation of the curriculum, students' sports scores have improved, but the overall growth rate is relatively limited. It is mainly due to the limitations of the simple online physical education class in the teaching process, such as the lack of face-to-face interactive guidance.

2.1.2 Test results before and after the experimental group

Prior to and during the implementation of the course, statistical analyses were performed on the experimental group's students' physical ability test results.

Table 4 Results of the Experimental Group's Physical Ability Test

Assessment Content	Before the Experiment	After the Test	Mean Growth	Growth Margin	T Value	P Value
50 m× 8 Turn-Back Run	63.80±16.453	86.30±11.962	22.5	35.27%	7.821	< 0.001
50-Meter Run	61.20±11.765	88.30±10.490	27.1	44.28%	12.157	< 0.001
1 Minute Skipping Rope	68.70±13.197	94.00±2.714	25.3	36.83%	13.278	< 0.001
Sit And Reach	60.90±11.518	89.50±8.277	28.6	46.96%	14.258	< 0.001
1 Minute Sit-Ups	58.65±14.716	96.20±3.942	37.55	64.02%	14.258	< 0.001

From Table 4 it can be seen that after the implementation of the curriculum, students' sports scores have improved. This demonstrates how the combination of online and offline physical education instruction clearly improves students' physical fitness. This instructional approach integrates the benefits of abundant online teaching materials, along with its inherent flexibility and convenience, strong interactive offline teaching and timely guidance. Through online video teaching, students can know sports knowledge and skills in advance and lay the foundation for offline practice; In offline instruction, teachers can provide students with individualized advice based on their unique circumstances and encourage them to improve their athletic abilities. Students' passion for participation in sports activities is increased and their interest in sports is

piqued by this strategy, thus comprehensively improving students' physical quality and sports competence.

2.1.3 Test results are compared before and after for the experimental group and the control group.

Table 5 Test outcomes for the experimental group and the control group before and after

Assessment Content	Control Group	Experimental Group	Mean Growth	Growth Margin	T Value	P Value
50 m× 8 Turn-Back Run	78.20±14.348	86.30±11.962	8.1	10.36%	3.066	< 0.001
50-Meter Run	67.10±11.210	88.30±10.490	21.2	31.59%	9.764	< 0.001
1 Minute Skipping Rope	80.20±12.895	94.00±2.714	13.8	17.21%	7.405	< 0.001
Sit And Reach	66.40±11.536	89.50±8.277	23.1	34.79%	11.504	< 0.001
1 Minute Sit-Ups	78.90±14.712	96.20±3.942	17.3	21.93%	11.504	< 0.001

Table 5 demonstrates that the experimental group's performance in a variety of sports tests is clearly superior to that of the control group. This demonstrates how much more effective online+offline physical education instruction is at raising students' levels of physical fitness than online physical education classes. The combination of online and offline teaching modes may completely mobilize students'

interest by providing them with richer teaching resources, more interactive chances, and timely feedback and assistance, according to the discussion. In addition to offering new ideas and methods for physical education in senior high schools, this would more effectively encourage the enhancement of students' physical quality.

2.2 Questionnaire survey results

2.2.1 Investigation process

The questionnaire survey is administered anonymously and online one-on-one to guarantee that the answers are honest and that the data is accurate and legitimate. Before distributing the questionnaire, the respondents are fully informed: 1)There is no right or wrong choice of the questionnaire topic, which will not affect the respondents; 2)The results of the survey will only be used for the study report, and all information will be handled with the highest secrecy.100 electronic questionnaires were delivered during the survey's data gathering period, which ran from January to February 2024.

98 out of the 100 questionnaires that were distributed for this survey were recovered, yielding a 98% recovery rate. Of these, 96 were valid, and the effective rate was 96%.

2.2.2 Questionnaire processing

In this study, SPSS 26.0 software is mainly used for statistical analysis of questionnaire data:

1) Descriptive statistical analysis. Descriptive statistical analysis is mainly to analyze the basic information such as age, gender, length of service and position of this survey sample, and then to analyze the related variables according to the research needs.

2) Analysis of reliability. The results of the questionnaire measurement are referred to as reliable. The Cronbach coefficient value is used in this study to confirm the questionnaire's internal consistency. When the coefficient value is greater than 0.7, the questionnaire is considered to have good reliability.

3) Analysis of validity. The ability of the questionnaire measurement results to guarantee the measurement's correctness is referred to as validity. Can

accurately measure the extent of the survey content. The validity is often tested using the KMO approach, and the factor analysis method has practical significance when the KMO value is greater than 0.6.

2.2.3 Data analysis

The way and content of online video courses

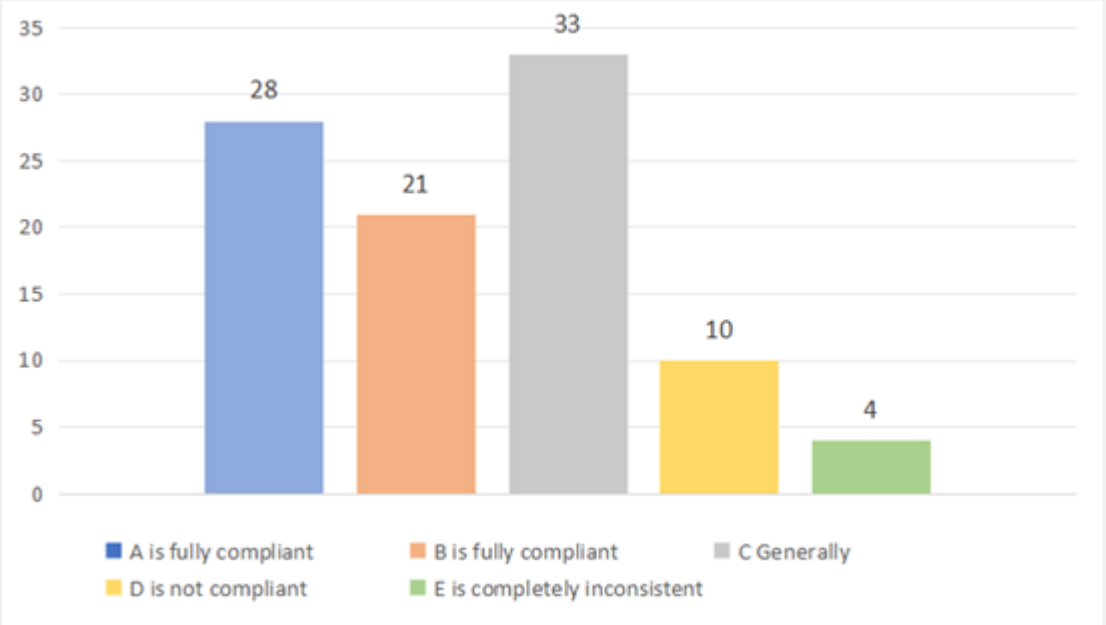


Figure 2 I think the teaching content of online video course is rich and varied

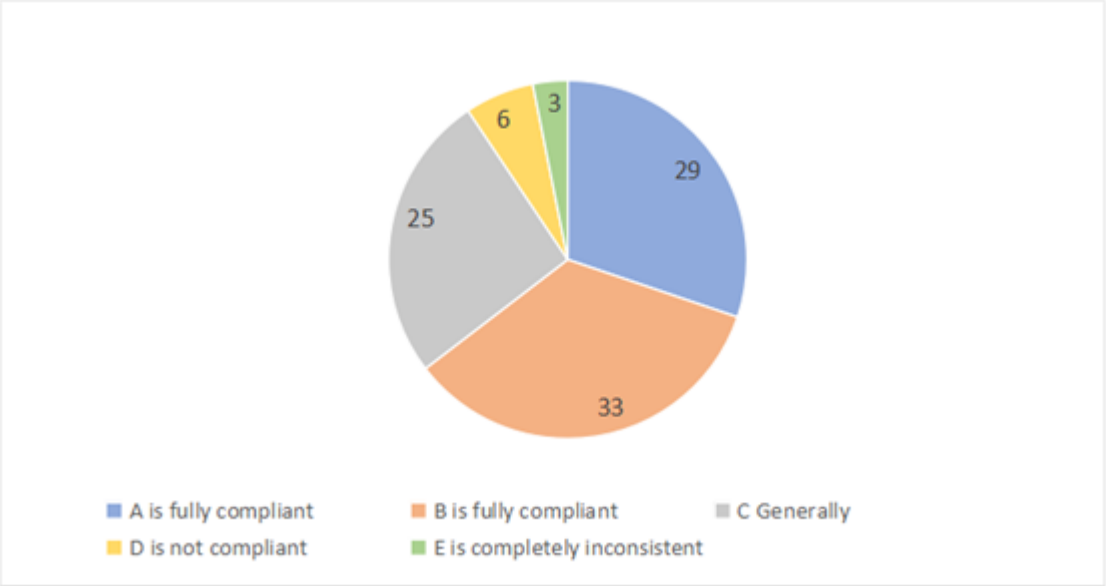


Figure 3 The teaching method of online video course is easy to understand and master

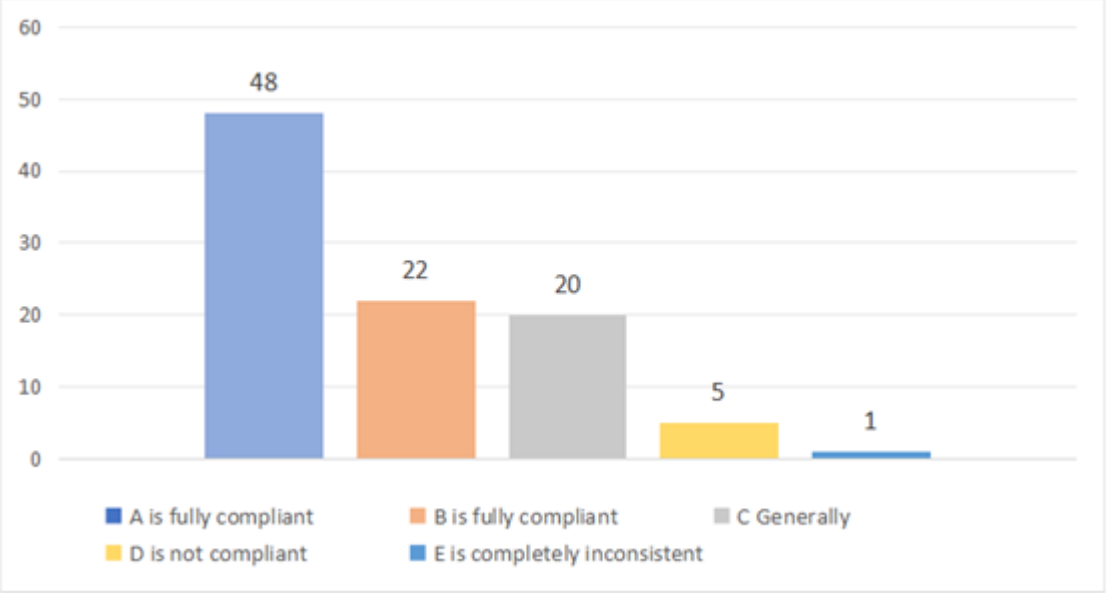


Figure 4 I can arrange the study of online video courses according to my own progress

As can be seen from Figures2, 3 and 4, when analyzing the methods and contents of online video courses, students have a high recognition of online video courses, 49 students all think that the teaching contents of online video courses are rich and varied, 62 students think that the teaching methods of online video courses are easy to understand and master, and 70 students think that they can arrange online video courses according to the actual progress.

Evaluation of online video courses

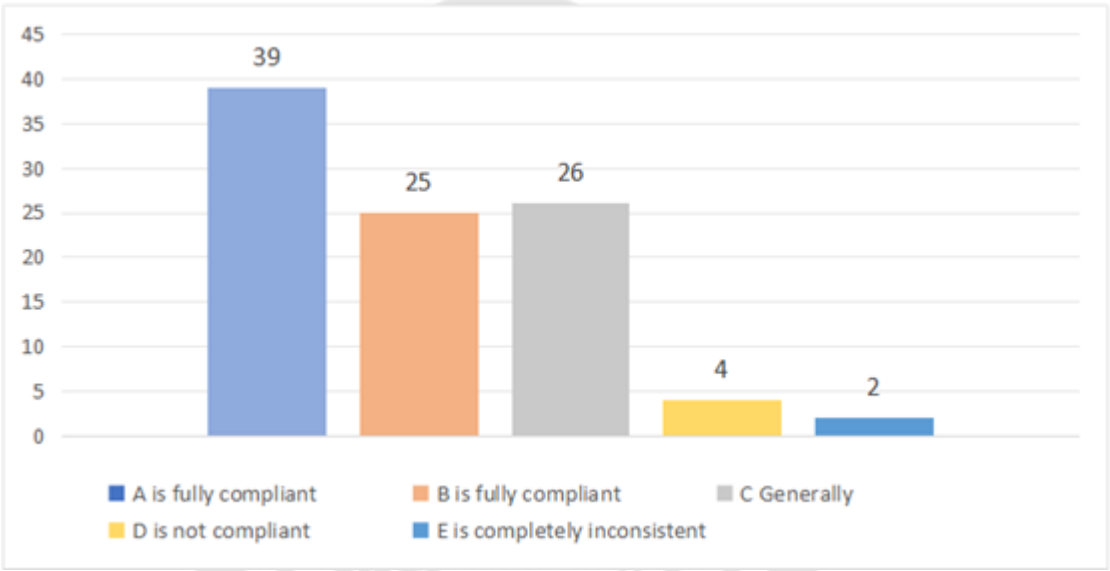


Figure 5 My overall satisfaction with online physical education courses is high

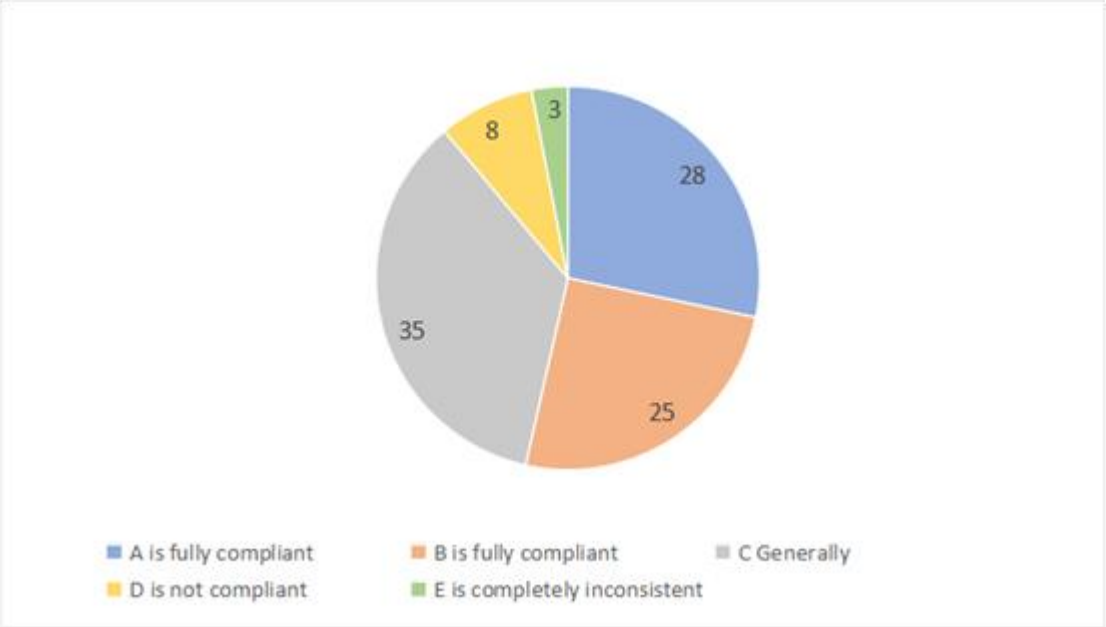


Figure 6 Online physical education courses have improved my physical education knowledge

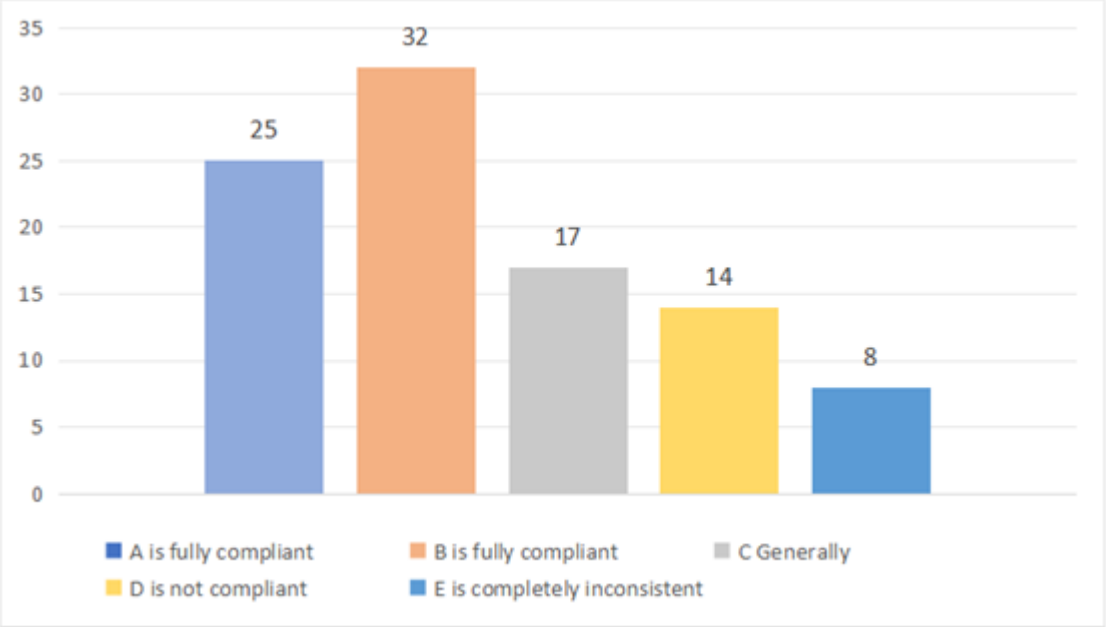


Figure 7 Online physical education class has enhanced my physical fitness

Figures 5, 6, and 7 demonstrate this while examining the assessment of online physical education courses, we can find that students have a high sense of identity and satisfaction with online physical education courses. The overall satisfaction of 64 students with online physical education courses is high, 53 students think that "online physical education courses have improved my level of physical education knowledge" is in line with the actual situation, and 57 students think that online physical education courses can improve their physical fitness.

Students' and parents' cognitive attitudes towards online video courses and family exercises

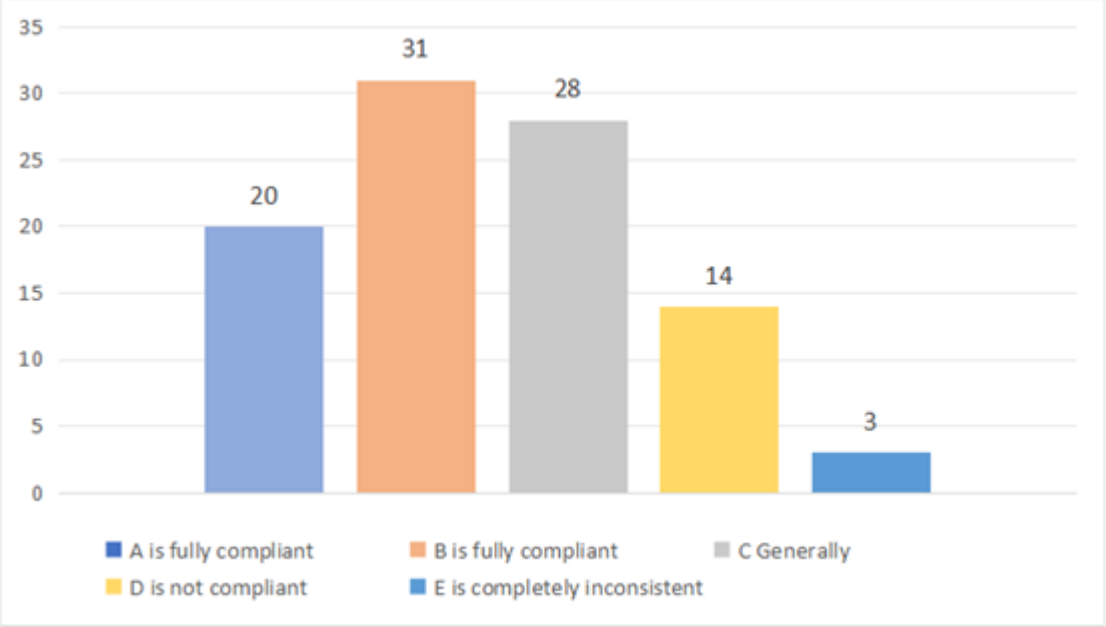


Figure 8 I think family exercise is very important for my health

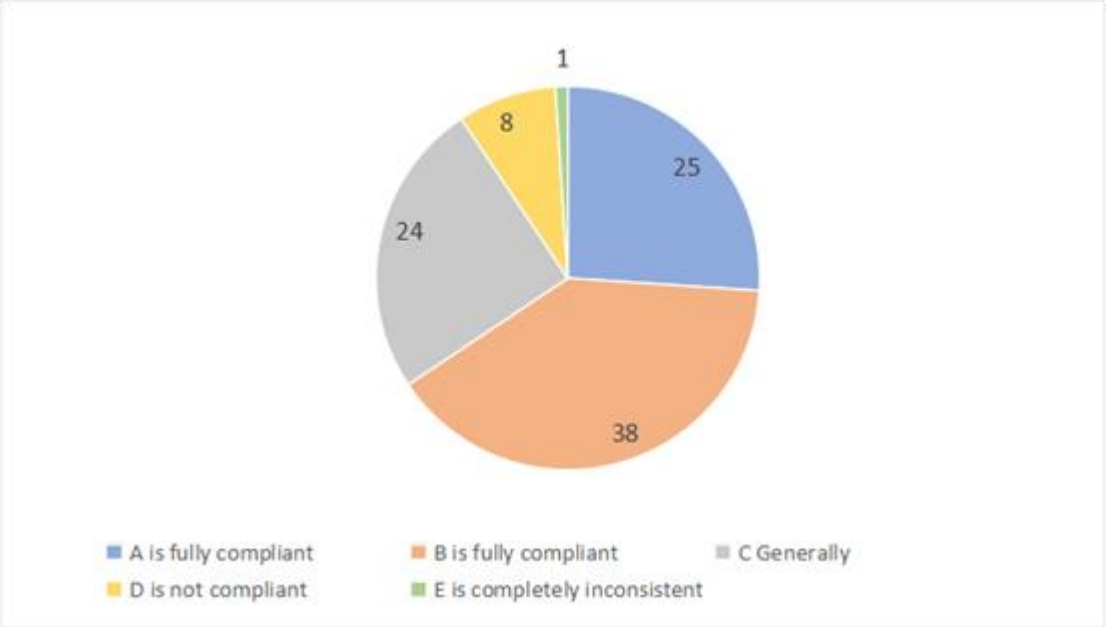


Figure 9 Parents support me to do family exercises

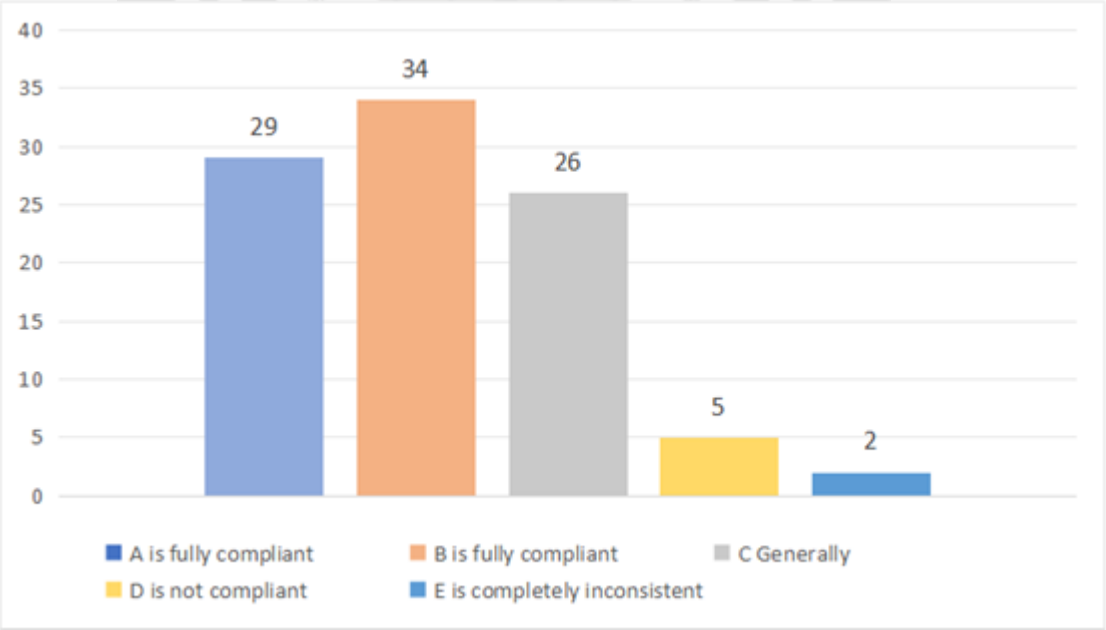


Figure 10 I agree with the advantages of online+offline physical education teaching mode

Figure 8, Figure 9 and Figure 10 demonstrate, when discussing students' and parents' cognitive attitudes towards online physical education courses and home exercise, 51 students think that home exercise is very important for their health, 63 students suggest that parents support me to do home exercise, and 63 students also agree with the advantages of online+offline physical education teaching mode.

Part III: Objective 3

To propose instructional guidelines for effective online physical education that promote physical competency in high school students

3.1 Depth interview

3.1.1 The Interview Design

Interview survey is to ask the interviewees the designed interview questions according to the needs of the survey, and collect objective facts through the respondents' replies. This survey has great flexibility. The main interview methods include face-to-face interview and online interview according to the actual work situation, and the interview duration is generally determined according to the interview questions, so as to ensure the in-depth communication between the two parties in order to accurately obtain objective information and the subjective feelings of the interviewee. In order to get a deeper understanding of PE teachers' recognition of online video courses and get a more intuitive understanding and feelings, this paper selects PE teachers in Grade Three of Beijing No.4 Middle School (international campus) as the interviewees to interview questions.

The interview questions mainly focus on the following aspects, and a total of five interview questions are designed:

1) What specific positive effects do you think online video teaching AIDS have played in physical education teaching?

2) In your teaching process, what are the main aspects of online video teaching resources supplemented?

3) Do you have any good solutions to the problem that online teaching is difficult to guarantee students' self-discipline?

4) What do you think of the disadvantage of online teaching that it lacks actual sports experience?

5) How, in your opinion, does the online+offline teaching mode enhance the effectiveness and quality of instruction while maximizing the benefits of both teaching modalities?

3.1.2 Analysis of Interview Information

In this paper, two PE teachers from Grade Three of Beijing No.4 Middle School (International Campus) are selected as the interviewees. In the week before the official interview, the interview time and place were determined with the interviewees, which made it possible for the official interview to proceed smoothly. The interview time was 10 to 20 minutes. The researcher obtains the consent of the interviewee in advance, carries out the interview with the pre-made interview outline as the theme, and makes necessary adjustments flexibly according to the actual situation of the interview. On November 22, 2022, we made use of the off-duty hours of physical education teachers to interview them face to face, and asked questions in a step-by-step manner, so as to obtain as rich and true information as possible, and then recorded it with a voice recorder, and then sorted out the recorded content and converted it into written materials.

3.1.3 Interview Results

Teaching process

In the teaching process, the integration of online video teaching resources serves as a valuable supplement to physical education. Firstly, for less common sports like horizontal bar and parallel bar skills, as well as badminton tactics, online videos offer more detailed introductions and demonstrations. This helps broaden students' sports horizons by exposing them to sports that might not be frequently taught in regular classes. Secondly, online videos cater to the learning needs of students at different levels. Students with a weak foundation can repeatedly watch basic movement explanation videos to gradually improve, while those with a certain foundation can

challenge more advanced skill videos to enhance their abilities. Thirdly, online videos act as an auxiliary teaching tool. Teachers can play relevant videos during class to aid students in better understanding the teaching content, thereby improving teaching efficiency. Additionally, the combination of online and offline teaching is emphasized. In actual physical education classes, teachers provide on-site coaching and hands-on activities, allowing students to experience sports firsthand, cultivate their interest, and develop athletic abilities. Offline instruction also fosters a positive learning atmosphere and strengthens teacher-student interaction and communication, complementing the online learning resources.

Instructional Problem

A prominent instructional problem in online teaching, as pointed out by the two teachers, is the difficulty in ensuring students' self-discipline. When students engage in online video learning independently, especially outside the classroom, there is a risk that they may not take the learning seriously, skip videos, or get distracted, which affects the learning effect. This issue hinders the full potential of online teaching from being realized, as the effectiveness of independent study relying on online videos largely depends on students' self-discipline.

Disadvantage

One of the main disadvantages of online teaching is that it cannot fully replace the actual sports experience provided by offline physical education classes. While online videos can demonstrate sports movements, skills, and related content in detail, they lack the hands-on practice and on-site guidance that are crucial in physical education. Students need to physically perform sports movements, receive real-time feedback from teachers on their posture, force application, and coordination, and engage in face-to-face interactions with peers during group activities. These actual experiences are essential for developing sports skills, improving physical fitness, and fostering a deep understanding and love for sports, which online teaching alone cannot fully compensate for. Moreover, the lack of in-person supervision in online settings, coupled with the difficulty in ensuring self-discipline, further adds to its disadvantages

as students may not actively participate in the learning process as they would in a structured offline class.

3.2 Teaching guide design

3.2.1 Teaching implementation suggestions

When other teachers use the online and offline integrated physical education teaching scheme, it is suggested that they study the 10 units of the course systematically first and grasp the closed-loop logic of "online pre-study+offline practice". Before online teaching, it is necessary to be familiar with the key and difficult points of teaching videos in advance, design guiding questions for different sports (such as basketball dribbling and running posture), and urge students to record learning questions; Offline classes should give priority to solving common problems and strengthen action correction through group exercises, such as using slow-motion playback to compare the differences between students and video demonstrations. At the same time, it is necessary to combine the tasks of students' physical foundation to provide simplified training videos for students with weak foundation and increase tactical combination content for advanced students. After class, it is necessary to correct the practice videos through the online platform in time to ensure the pertinence of the feedback, and share the "online error correction highlights" once a week to improve the overall teaching efficiency.

3.2.2 Resources for teaching

The implementation of this course requires online and offline resources. Online resources include: complete 10-unit teaching videos (including action decomposition and rules explanation), online teaching platform (supporting video playback, homework submission and interactive discussion) and electronic questionnaire tool (used to collect students' cognitive feedback). Offline resources include: basic physical fitness testing instruments (X-Scan Plus II body composition analyzer, heart rate meter, stopwatch, sitting posture forward flexion measuring instrument, etc.), sports equipment (basketball, football, parallel bars, skipping rope, etc.), motion capture auxiliary tools (high-speed camera, marker pen, meter ruler), and portable equipment for data recording. In addition, it is necessary to prepare an

interview outline for teachers and a questionnaire for students (see Appendices 1 and 2), and ensure that sports venues (track and field, indoor gymnasium) meet the needs of group teaching and actual combat drills.

3.2.3 Teaching effect measurement method

The measurement of course effect should be carried out from three aspects: physical fitness, cognition and teaching recognition. Physical fitness was measured before and after the experiment. Through five indicators: 50m running, 1min skipping rope, sitting forward, 1min sit-ups and 50m× 8 turn-back running, the results were recorded by stopwatch, meter ruler and other tools, and the data differences between the two groups were analyzed by SPSS 26.0. Students' cognitive measurement is based on online electronic questionnaire (including 20 questions such as course content satisfaction and autonomous learning experience), and the reliability and validity (Cronbach coefficient $\geq$0.7, KMO value $\geq$0.6) are calculated after recovery, and the proportion of each item is counted. Semi-structured interviews were used to measure teachers' identity, focusing on five issues, such as the auxiliary role of online video and the difficulties of offline guidance. The interview contents were recorded and key points were refined, and finally the effectiveness of the teaching scheme was comprehensively evaluated by combining three types of data.

CHAPTER 5
CONCLUSION AND DISCUSSION

After clarifying the positive role of online physical education teaching in enhancing the physical fitness of high school students, the cognitive differences among students and the recognition attitudes of teachers, in order to further leverage the advantages of integrated online and offline teaching, it is necessary to combine the principles of course design and practical experience to construct a scientific and effective teaching guidance plan, so as to effectively promote the innovation and optimization of high school physical education teaching models.

1. A Brief Summary of the Study

This study focuses on the online physical education teaching guidance plan for improving the physical fitness of Chinese high school students. Methods such as literature review, Questionnaire survey, and interview were adopted. Data were collected in combination with Questionnaire Star and analyzed by SPSS to explore the promoting effect of online physical education teaching video courses on the physical fitness of high school students, students' cognition, and teachers' recognition. Form relevant teaching guidance suggestions.

(1) This study developed a set of online physical education courses consisting of 10 units, covering basic physical fitness exercises, running, jumping and shooting, ball games and other projects. It adheres to the principles of student-centerness, systematicness and interactivity. After expert evaluation, the course design has good consistency, with IOC values all exceeding 0.5, and is feasible to implement. It provides structured online learning resources for the physical fitness improvement of high school students. Meet the learning needs of students with different sports interests and skill levels.

(2) Through experiments and questionnaires, this study found that the integration of online and offline teaching has a significant effect on improving the physical fitness of high school students. The experimental group made much greater

progress in physical fitness tests such as the 50-meter run and one-minute rope skipping than the control group that only received offline teaching. Students had a high recognition of the richness of online course content and the ease of understanding of teaching methods, and most of them agreed with the advantages of the integrated online and offline model. Parents also strongly support home exercise, which confirms the positive role of online video-assisted teaching in improving physical education performance.

(3) This study proposes an effective online physical education teaching guidance plan, including teaching implementation suggestions, such as systematically grasping the course logic, designing guiding questions, and strengthening offline movement correction, clarifying the required online and offline resources and the teaching effect measurement methods from the aspects of physical fitness, cognition, and teaching recognition, providing practical references for the innovation and optimization of high school physical education teaching models. Help improve teaching quality and students' physical fitness.

2. Discussion and reflection

2.1 Discussion on the results of course development

This study, through empirical analysis, clarifies the promoting effect of online physical education teaching video courses on the physical fitness improvement of high school students. This is in line with the constructivist theory's emphasis on learners actively constructing knowledge and achieving meaning construction through context and collaboration, that is, students preview independently through online videos and engage in offline practical interaction. Form a personalized understanding of motor skills (Vygotsky's "Zone of Proximal development" theory supports this process). Meanwhile, students' positive cognition of online courses is consistent with the concept of student-centered and focusing on individual needs in humanistic learning theory, and echoes the viewpoint proposed by Du & Wu (2020) in Chapter Two that physical education teaching should take into account both skill cultivation and the formation of a healthy lifestyle. This verifies the promoting effect of the integrated online and offline model on

the all-round development of students. Moreover, it is consistent with Kim's (1994) statement that physical education teaching should combine teacher guidance with students' autonomous learning, indicating that the results of this study correspond to the existing literature at the theoretical level.

2.2 Discussion of the Statistical Results

The integration of online and offline teaching has significantly improved students' physical education performance. The progress of the experimental group in events such as the 50-meter run and one-minute sit-ups far exceeded that of the control group, with an average improvement rate of over 35%. This is consistent with the positive role of computer-assisted instruction (CAI) in academic improvement pointed out by Yu (2025), confirming the effective supplementation of online resources to traditional teaching. Students are highly satisfied with online courses. 64% of them recognize the richness of the course content, and 70% believe that they can arrange their learning progress independently. This is in line with Zhuang's (2023) viewpoint that "technology should assist students in active learning." Meanwhile, most students recognize the advantages of the integrated online and offline model, believing that it not only resolves the time and space limitations of traditional teaching but also makes up for the deficiencies of online practice through offline interaction. This is consistent with the discussion in Chapter Two that online physical education teaching should be combined with offline practice, indicating the effectiveness of this model in meeting students' personalized needs and improving learning outcomes.

2.3 Discussion on the design results of teaching guidelines

Teachers generally recognize the value of online video courses in technical demonstration and resource supplementation, believing that they can help students repeatedly study the details of movements. This is consistent with the view proposed by Mao Zhenming et al. (1998) that the physical education teaching model requires the support of multiple resources. In response to the problems of insufficient self-discipline and lack of practical experience in online teaching, the countermeasures proposed by teachers, such as parental supervision and offline spot checks, are in line with the conclusion pointed out by Han Shihao et al. (2020) in Chapter Two that process

management needs to be strengthened in online teaching during the epidemic. The teaching guidelines based on the research design emphasize the closed-loop logic of "online preview + offline error correction", and clarify the methods of resource integration and effect measurement. This is consistent with the suggestion of Wang Huiru et al. (2019) that college physical education MOOCs should pay attention to the coordination of online and offline, providing an operational practical framework for high school physical education teaching. The feasibility and scientificity of the integration model were further verified.

3. Research suggestion

3.1 Optimize online teaching resources

3.1.1 Enrich the diversity of course content

Increasing teaching videos of different sports events is a key measure to enrich the course content. It can cover a wide range of sports, as well as competitive sports like swimming, track and field, gymnastics, and various ball games like volleyball, football, basketball, and others, and can also be included in yoga, Pilates, Tai Chi and other sports with fitness and health preservation effects. For each sports event, make detailed and professional teaching videos, from explaining basic movements to training advanced skills, and gradually guide students to master them. For example, in the basketball teaching video, it can include the demonstration and explanation of basic movements such as dribbling, passing and shooting, as well as the display of more advanced contents such as tactical cooperation and actual combat. In this way, no matter what kind of sports students are interested in, they can find suitable learning content in online teaching resources to meet their different hobbies.

Introducing sports culture content is also an important aspect of enriching the curriculum. By making videos introducing sports history, sports celebrity stories and sports spirit, students can understand the development process and cultural connotation of sports. For example, tell the origin and development of the Olympic Games, introduce the struggles and achievements of sports stars such as Jordan and Yao Ming, and explain the values of struggle, unity and fair competition in sports spirit.

These sports cultural contents can not only increase students' love and respect for sports, but also cultivate their humanistic quality and values.

It is also indispensable to add sports health knowledge. Make teaching videos about sports nutrition, prevention and treatment of sports injuries, and making reasonable sports plans, so as to expand students' sports horizons and help them carry out physical exercise scientifically. For example, explain the nutritional supplements required by different sports, such as running needs to pay attention to carbohydrate intake, while strength training needs to increase protein intake. At the same time, teach students how to prevent sports injuries, such as preparing for warm-up before strenuous exercise and paying attention to correct posture and movements during exercise. If sports injuries occur, how to deal with them promptly and effectively. Additionally, it can help students create an appropriate workout schedule, and choose exercise items and intensity reasonably according to their physical condition, goals and time schedule. Professional PE teachers and specialists in relevant subjects might be gathered by schools to take part in the creation of instructional movies. Teachers can ensure the accuracy and practicability of video content according to their own teaching experience and professional knowledge. At the same time, students can be invited to participate in the evaluation and feedback of the video, and constantly improve and perfect the teaching video according to their needs and suggestions. To help students locate and study, the school can also set up a unique online physical education teaching platform to organize and manage these extensive and varied teaching materials. With these initiatives, we can genuinely increase the variety of online physical education programs and give students access to more thorough and superior physical education.

3.1.2 Improve the quality of teaching videos

The foundation of delivering a satisfying viewing experience is guaranteeing the video's stability and clarity. In order to fulfill this objective, the following measures can be taken. In terms of shooting equipment, professional cameras with high resolution are chosen to guarantee that crisp images may be taken. Meanwhile,

it is equipped with a stabilizer to reduce the jitter during shooting and ensure the stability of the picture. In the shooting environment, choose a site with sufficient light and simple background to avoid shadows and interference factors. For the post-production of video, professional video editing software should be used to adjust the color and noise of the picture to improve the clarity of the video. In addition, the fluency and stability of video can be improved by increasing the code rate and frame rate of video. For example, the bit rate of the video is set at a high level to ensure that there will be no jamming during the playback. At the same time, the frame rate is increased to 60 frames per second or even higher, which makes the picture smoother and more natural.

Improving the explaining process is a key strategy for raising students' learning outcomes. We can begin with the following elements to make the explanation clearer and more vivid. The first is to adopt diversified forms of explanation. In addition to the traditional oral explanation, it can also be combined with pictures, charts, animations and other forms for auxiliary explanation. For example, when explaining the essentials of sports movements, students can understand the process and key points of movements more intuitively through animation demonstration. The second is to use vivid language and image metaphor. Avoid using too professional and obscure terms,but explain in straightforward, understandable terms. Meanwhile, we can use image metaphor to transform complex sports movements and concepts into things that students can easily understand. For example, comparing the dribbling action of basketball to "magic wand in hand" makes it easier for students to remember and master. The third is to increase interactive links. Create interactive links in the movie, such as discussion sections and questions, to motivate students to take an active role and boost their initiative and excitement for learning. For example, after explaining a sports event, you can pose some queries to get feedback from students in the comment section. and teachers can give feedback and evaluation in time. Based on the curriculum and the real needs of the students, teachers can choose the material and methods of explanation for the instructional videos. The video production team is

responsible for shooting, post-production and additional technical tasks to guarantee the video's quality and impact. At the same time, the school can regularly evaluate and improve the teaching video, collect students' feedback, and adjust and optimize the video according to their suggestions. In addition, the school can also conduct teacher training programs to raise the level of video production and explanation skills among teachers and offer substantial assistance in raising the caliber of instructional videos.

3.1.3 Enhance the interaction and feedback mechanism

Creating interactive links is a great approach to encourage student participation and communication. The online teaching platform can be configured to allow students to ask questions of both teachers and other students at any moment when they run into difficulties throughout the learning process. This can stimulate students' thinking and exploration spirit, and also promote exchanges and mutual assistance among students. For example, when explaining the skills of a sports event, students can ask questions they encounter in the practice process, other students can answer them according to their own experience and understanding, and teachers can supplement and guide them at an appropriate time. In addition, discussion areas can be set up for students to discuss specific sports topics. For example, discuss a wonderful sports competition, a new sports training method or the successful experience of sports stars. Students can expand their knowledge of sports, comprehend other points of view, and simultaneously develop their expressive and critical thinking skills through conversation. To guarantee that online forums for discussion and questioning run smoothly, some rules and guiding measures can be formulated. For example, students are required to clarify the focus and background of questions when asking questions, so that other students and teachers can better understand and answer them. In order to guarantee the direction and caliber of the conversation, teachers or student administrators might be assigned to monitor and steer the conversation while some themes are chosen to help students talk.

Establishing timely feedback mechanism is the key to improve students' learning effect. Teachers' timely reply and evaluation of students' problems and homework can make students feel the attention and support of teachers, and simultaneously assist pupils in identifying their own issues and shortcomings in a timely manner, and make adjustments and improvements in time. For students' questions, teachers can reply in text on the online teaching platform or answer them by recording videos. For students' homework, we can make detailed comments and grades, point out the advantages and disadvantages of students, and put forward suggestions for improvement. For example, after the students submit a physical training plan, teachers can evaluate the rationality and feasibility of the plan, and at the same time, they can also make specific suggestions on the students' training objectives and methods. To guarantee the promptness and efficiency of the feedback system, a set of perfect feedback processes and systems can be established. For example, Within a specific time frame, teachers must respond to and assess students' inquiries and assignments. To help educators keep refining their methods of instruction and provide feedback, students can also set up feedback channels where they can comment on and assess teachers' responses and assessments.

3.2 Strengthen offline teaching guidance

3.2.1 Personalized Training Plan

A comprehensive physical fitness test is the basis of making a personalized training plan. Physical fitness test should include many aspects, such as endurance, strength, speed, flexibility and so on. Through 50-meter running, 1-minute skipping, leaning forward, 1-minute sit-ups and 50-meter ×8 turn-back running, we can get a comprehensive understanding of students' physical fitness. To properly understand the strengths and weaknesses of their pupils, teachers should take into account not only the individual test results but also the way students perform on various tasks. For example, some students perform well in endurance events, but their strength is relatively weak; Some students are faster, but their flexibility is not good. These particular circumstances will serve as a crucial foundation for creating individualized training programs.

Make a personalized training plan for each student according to the test results. For students with good endurance but insufficient strength, the proportion of strength training can be increased in the training plan. For example, arrange regular strength training programs such as weightlifting and push-ups, and gradually increase the training intensity. Simultaneously, to preserve students' endurance edge, we can appropriately reduce the frequency of endurance training, but improve the quality of training, such as increasing the difficulty of interval training. For students with fast speed but poor flexibility, focus on strengthening flexibility training, such as yoga and stretching. At the same time, To increase speed's stability and durability, pay attention to how technology is developing in speed training. The precise training objectives, topics, techniques, and schedule should all be made explicit when creating a training plan. For example, it is set to carry out strength training three times a week, and each training includes three different weight lifting movements, each of which is repeated a certain number of times; Twice a week, flexibility training is held, and each session lasts a specific amount of time. Teachers should provide focused assistance and instruction as part of the implementation of a personalized training plan. Respond promptly to and illustrate the issues that trainees face. Students may exhibit erratic motions during strength training, for instance, and teachers should correct them promptly to guarantee that students understand the fundamentals of movement and prevent injuries from improper movement. Simultaneously, educators should closely monitor students' training progress and promptly modify the training plan to reflect the students' real circumstances. If students make rapid progress in a certain project, they can increase the difficulty appropriately; If students encounter difficulties or stagnate, it is necessary to analyze the reasons and adjust the training method or intensity.

Teachers can establish students' training files to record students' physical fitness test results, training plans and training progress. By comparing the test results and training situation in different stages, teachers can better evaluate the training effect and provide reference for further adjusting the training plan. In addition, teachers can also encourage students to monitor themselves and record their training feelings,

such as physical changes and training difficulties, so that teachers can better understand students' needs and feedback. Provide each student with a practical and personalized training plan, efficiently enhance students' athletic prowess and encourage the development of Chinese high school students' physical attributes in sports.

3.2.2 Increase Interaction and Interest

Organizing group activities and sports competitions is an effective way to increase interaction and cooperation among students. Diversified group activities can be designed according to different sports and teaching contents. For example, in basketball teaching, groups can be organized to carry out tactical drills, and each group is responsible for designing and implementing a specific basketball tactic, and then a competition between groups can be held. In football teaching, teams can be arranged for passing relay competitions to test their tacit understanding and passing skills. Through these group activities, students can not only improve their sports skills, but also learn to cooperate, communicate and coordinate with others. Sports competitions in schools can be held regularly, such as basketball games, football games and track and field games. In the competition, students can participate in the competition on behalf of the class or school and work hard for the common goal. Additionally, the competition can foster contact and communication between classrooms and schools, and enhance students' sense of collective honor and belonging. In order to ensure the fairness and impartiality of sports competitions, detailed competition rules and referee systems can be formulated, and professional PE teachers or coaches can be invited as referees.

By adding gamification components, offline instruction can become much more engaging and students will be more eager to participate. For example, in running training, a "chasing game" can be designed to divide students into several groups, and the members of each group start in turn, and the students behind should try to catch up with the students in front. In the teaching of skipping rope, we can play the game of "skipping rope to catch the dragon". Each student skips rope in turn to see which group skips the rope the most times within the specified time. These gamification

activities can not only make students do physical exercise in a relaxed and pleasant atmosphere, but also enhance their capacity for coordination and response. In addition, Offline instruction can be made more engaging by utilizing contemporary scientific and technical methods. For instance, students can experience studying in a virtual stadium setting by utilizing virtual reality (VR) technology. For example, students can simulate participating in the Olympic Games through VR equipment and feel the real competition atmosphere and pressure. Or use motion sensors and data analysis software to monitor and analyze students' sports performance in real time and provide students with personalized training suggestions.

Teachers should reasonably design the contents and rules of activities and competitions according to students' age, gender, sports level and other factors. Ensure that activities and competitions are both challenging and can involve most students. Secondly, to guarantee that activities and competitions run smoothly, teachers should set up the necessary sporting goods ahead of time. Teachers should simultaneously advise students to be mindful of safety throughout competitions and events in order to prevent mishaps. Teachers should evaluate and feedback students' performance in time. After group activities and sports competitions, teachers can organize students to sum up and reflect, so that students can share their gains and experiences. At the same time, teachers should evaluate students' performance, praise outstanding students and groups and encourage other students to learn from them. Through evaluation and feedback, students can raise their level of athletic performance and overall quality while also better understanding their own strengths and shortcomings.

3.2.3 Strengthen Technical Guidance

Teachers should make full preparations before on-site teaching. In-depth study of the technical points and common mistakes in various sports events, and formulate detailed teaching plans. For different sports, such as running, jumping, throwing, ball games, etc., the key technical movements and the links that are prone to problems are clearly defined. For example, in basketball teaching, the technical

essentials of dribbling, passing and shooting, as well as the mistakes that students may make in walking and dribbling with both hands; When instructing long jump, the key techniques of run-up, take-off, flying and landing, and the common problems such as improper take-off angle and unstable landing are discussed. Teachers may only effectively assist and correct students during the educational process if they are intimately familiar with these topics. When teaching on-site, instructors should provide clear demonstrations so that students can feel the proper technical motions naturally. When demonstrating, teachers should pay attention to the standardization, accuracy and consistency of actions, and show them from multiple angles so that students can observe them in all directions. For example, when teaching volleyball serve, teachers can first demonstrate from the front, showing the position of serving, throwing height, swinging movement, etc., and then demonstrate from the side and back, so that students can clearly see the body posture and movement track in the whole serve process. At the same time, teachers can appropriately slow down and highlight key action links in the demonstration process, so that students can better understand and imitate.

When students are practicing, teachers should closely observe, promptly identify and correct the students' incorrect behavior. We might concentrate on elucidating and illustrating certain typical issues so that pupils can comprehend the errors and appropriate procedures. For individual students' problems, teachers should give one-on-one guidance and patiently help students adjust their movements. For example, when students practice sprinting, teachers find that some students have incorrect starting postures, so they can immediately ask students to stop practicing, demonstrate the correct starting postures in person, and go over important details like the starting point and the location of the body's center of gravity. After that, let pupils practice until they are proficient in the proper starting procedures. Teachers should arrange for pupils to practice frequently in order to help them better understand the proper technical movements. Students' practice chances and passion can be increased through competitive, group, and individual practice. Teachers should continuously

provide students with comments and encouragement during the practice process so that they can sense their progress and boost their confidence. For instance, teachers can assign pupils to groups and hold group competitions during football shooting practice. After each group gets a turn shooting, the instructor provides feedback on each student's shooting technique, highlights its benefits and drawbacks, and assigns scores accordingly. In addition to increasing students' motivation for practice, this can help them advance their technical proficiency throughout the competition.

The development of pupils' capacity for self-correction should also be a priority for educators. Encourage pupils to observe both their own and other people's behavior during the educational process, find problems and try to solve them by themselves. For example, teachers can organize students to have group discussions after students practice, so that students can point out the advantages and disadvantages of each other's actions and put forward suggestions for improvement. In this way, students can gradually learn self-reflection and self-correction, and improve the learning effect. Teachers can effectively strengthen technical guidance in on-site teaching, help students master correct technical movements, and improve sports effect and safety.

3.3 Promote Online and Offline Integration

3.3.1 Establish a Unified Teaching Platform

The requirements of combining online and offline teaching resources should be carefully taken into account while developing a comprehensive physical education teaching platform. In terms of online resources, the platform can include a wealth of sports teaching videos, covering the basic action explanation, advanced skill demonstration and actual competition analysis of various sports. At the same time, you can also set up an online course module. Teachers can record and upload course videos according to the teaching progress,and students are able to view and learn at any time and from any location.In addition, the platform can also provide extended learning resources such as popular sports articles and sports health tips. In terms of offline resources, the platform can be connected with the school's sports facilities management system, and students can query the opening hours of venues and reserve

venues for physical exercise through the platform. The platform also allows teachers to post offline educational activities, like the time and location of physical education classes and details about sports associations. The platform should contain a number of features to make managing teachers' instruction easier. Teachers can arrange homework and tests on the platform, and the system automatically corrects objective questions and counts the results, thus reducing the workload of teachers. Teachers can also track students' learning progress through the platform, and know how long students watch teaching videos and how they finish their homework, so as to give personalized guidance in time.Teachers may simultaneously examine student information and administer classes on the platform, including adding and removing students. In the management of teaching resources, teachers can upload their own teaching materials, or select suitable teaching content from the resource database of the platform to integrate and form a personalized teaching plan.

For students, the platform should provide a convenient learning experience. Students can make their own learning plans on the platform and choose online courses and learning resources according to their interests and needs. The platform can set up a study reminder function to help students arrange their study time reasonably and avoid procrastination. Students can also interact with teachers and classmates on the platform, such as asking questions and sharing learning experiences in the discussion area. In addition, the platform can establish students' personal learning files, record students' learning process, changes in grades, etc., so that students can intuitively see their progress. The platform should focus on the integration of online and offline to achieve a smooth connection of the instructional process. For example, after watching the online teaching video, students can make an appointment for the offline physical education practice course on the platform, and the teachers will conduct on-site guidance and consolidation exercises. Teachers can also adjust the focus and difficulty of offline teaching according to students' online learning. In terms of evaluation, the platform can comprehensively and objectively evaluate students by integrating online learning performance and offline practice performance. In terms of technical

implementation, the platform should ensure stability and security. To guarantee the reliable transfer of instructional materials and the security of student data, sophisticated server technology and data encryption techniques are used. At the same time, the platform's interface design should be simple and straightforward so that both teachers and students can get started right away. Through the user feedback mechanism, the functions and experience of the platform can be continuously improved.

3.3.2 Synchronize the Teaching Progress

Teachers must create thorough lesson plans at the start of the semester to guarantee the steady advancement of both online and offline instruction. The objectives, topics, and associated online and offline teaching arrangements for each level should all be clearly stated in this lesson plan. For example, in the basketball teaching unit, teachers can divide the teaching plan into several stages, such as basic theoretical knowledge learning, basic technical training and tactical cooperation drills. For the learning stage of basic theoretical knowledge, online teaching can be arranged to let students know the origin, development and rules of basketball through video explanation and online discussion. In the stage of basic technical training and tactical coordination drills, offline teaching can be arranged for students to practice in the actual field. Through such a teaching plan, teachers can clearly grasp the teaching progress and ensure that the online and offline instructional materials are interconnected.

Teachers should establish an effective communication mechanism to keep abreast of students' learning under different teaching modes. You can use the feedback function of online teaching platform and class group chat to collect students' learning problems and suggestions.Teachers can simultaneously plan frequent offline learning exchange activities to allow students to share their online learning successes and challenges. Teachers can promptly modify their teaching strategies and progress to accommodate students' learning demands by using these communication channels. For instance, if professors believe that most students struggle to understand a particular concept online, they can focus on this knowledge point in offline teaching or arrange additional online tutoring courses. When arranging online and offline teaching content,

Teachers ought to focus on the content's coherence and complementarity. Online teaching can focus on the teaching of theoretical knowledge, video demonstration, and the arrangement of autonomous learning tasks. For example, teachers can make beautiful teaching videos, explain the technical essentials of sports in detail,and pose some queries in the films to let students reflect and have conversations. Students can assess their learning impact by completing online tests and turning in assignments after seeing the video. Offline teaching can focus on practical training, group cooperation activities, on-site guidance and so on. For example, in football teaching, teachers can organize students to compete in groups, so that students can use the tactics and techniques they have learned in actual competitions. Teachers can simultaneously provide immediate feedback and performance guidance to assist pupils make necessary corrections.

Teachers can use the advantages of online teaching platform to integrate and share teaching resources. Teachers can upload teaching courseware, video materials and exercises to the platform, so that students can review and consolidate at any time and place. At the same time, teachers can also use the statistical function of the platform to understand students' learning progress and mastery, in order to better modify instructional methods. Teachers can also foster a positive learning environment by encouraging students to engage with one another on the online platform and share their learning experiences.

3.3.3 Interactive Communication and Complementarity

Online teaching can take various concrete measures in paying attention to the interaction between students. For example, set up a special online discussion area to launch discussion topics for different sports or teaching topics. For example, in the basketball teaching unit, the topic of "how to improve the shooting percentage" can be put forward, and students can share their own practice methods, experiences and lessons and skills summarized from watching the game in the discussion area. Teachers can regularly participate in discussions, guide students to think deeply and communicate, and stimulate students' thinking collision. At the same time, group work is

also an effective way of interaction. Divide the students into several groups and assign tasks related to sports, such as analyzing the tactical application of both teams in a basketball match and making a physical exercise plan suitable for the groups. Team members collaborate through online communication tools to complete tasks together and cultivate students' teamwork and communication skills.

The in-person interactions between teachers and students should be strengthened via offline instruction. Teachers can set up more interactive linkages in physical education classes. For example, after explaining a new sports action, invite students to demonstrate, other students observe and comment, and then the teacher summarizes and corrects. In this way, students' problems in understanding and mastering actions can not only be found in time, but also their sense of participation can be enhanced. Regarding the queries posed by pupils during the educational process, teachers should answer them in time and be patient and meticulous. You can reserve some time in class for answering questions, or ask students whether they have any questions to answer during the gap between sports activities. In addition, teachers can also organize small-scale sports competitions or activities, and interact with students in the activities to enhance the feelings between teachers and students, and at the same time improve students' learning enthusiasm.

Apply the results of online discussion to offline teaching. For example, teachers can give key explanations and practical guidance on the issues that everyone is generally concerned about in online discussions. If students put forward some innovative physical exercise methods in the discussion, teachers can organize students to try them in class and see how the effect is. On the other hand, feedback the experience in offline teaching to online. Teachers can organize students' performance, problems and solutions in class into cases after class and share them on the online teaching platform for students' reference and study. In order to enhance the caliber and applicability of the work, students are also urged to use the knowledge and abilities they have acquired in offline classes to online group projects. In order to better promote interaction and complementarity, schools can establish a perfect evaluation mechanism.

Comprehensive evaluation of students' performance in online and offline interactive communication, including the enthusiasm of participating in the discussion, the completion of group work, and the interactive performance in offline classroom. Encourage students to participate in interactive communication more actively through evaluation, and enhance the learning outcome. Simultaneously, teachers can continuously enhance their teaching strategies and quality based on input from student evaluations.

3.3.4 Evaluation System Integration

When establishing the evaluation system, we should make clear the contents and standards of the evaluation. Students' learning attitudes, involvement, and teamwork abilities should be taken into account in addition to their proficiency in sports knowledge and skills. We may assess how long students spend watching instructional videos, how enthusiastically they participate in online chats, and how well they complete online assignments as part of the online teaching component. For example, students are required to watch teaching videos for no less than a certain period of time every week, and corresponding scores are given according to the number and quality of students' speeches in online discussions, and the completion of online homework is corrected and graded in detail. For the offline teaching part, we can evaluate the performance of students in physical education class, the enthusiasm of participating in sports activities and the actual mastery of sports skills. For example, observe students' participation in physical education class, whether they abide by classroom discipline, and their performance in sports competitions, and actually test and grade students' sports skills.

Adopt diversified evaluation methods. To guarantee the thoroughness and impartiality of the review, teachers' assessments, students' self-evaluations, and students' mutual assessments might be integrated. Teachers can evaluate students according to their performance in class and the completion of their homework. Students' self-evaluation can make students reflect and evaluate their learning attitude, efforts and progress. Students' mutual evaluation can promote communication and learning among students, and let students know their own strengths and weaknesses from the

perspective of others. For example, in the sports skill test, students can make self-evaluation, then group mutual evaluation, and finally teachers can make comprehensive evaluation. In this method, students may have a more thorough grasp of their learning achievements, and at the same time, they can also build their self-management and teamwork skill.

utilizing information technology to improve evaluation efficiency and accuracy. Specialized physical education teaching assessment tools can be used to integrate and analyze students' offline and online learning data. Using the software, students' time spent studying, their completion of assignments, test scores and other data can be automatically counted, and detailed evaluation reports can be generated. Based on the evaluation report, teachers may stay up to date on students' learning circumstances, identify issues, and promptly modify their teaching methods. In order to better modify their study programs, students can also use the software to view their own evaluation results and identify their own strengths and weaknesses. bolster teacher preparation programs. Teachers should be trained in the various evaluation techniques and the use of information technology, as well as the contents and criteria of the evaluation system. At the same time, a strong supervision system must be put in place to guarantee the evaluation's justice and impartiality. A special evaluation and supervision team can be set up to supervise and inspect the evaluation process of teachers to prevent unfair evaluation.

According to the evaluation results, it provides the basis for teaching improvement. Teachers can analyze the problems and deficiencies in students' learning according to their evaluation reports, and adjust the teaching contents and methods accordingly. For example, if students are found to have common problems in mastering the skills of a certain sports event, they can strengthen the training of this event in subsequent teaching; If students' learning attitude is not positive, we can improve their learning enthusiasm by carrying out incentive activities and strengthening ideological education.

4. Recommendations for Future Study

Online physical education instruction offers a wide range of future development opportunities and exploration space due to the ongoing advancements in information technology and the ongoing revitalization of educational concepts. The following perspectives can be used to better examine the issue of this study: how Chinese senior high school students' physical condition can be enhanced by online physical education teaching guidelines.

In the development of innovative teaching strategies and models, we can continue to explore more effective ways of online and offline integration. The current research has shown that online+offline physical education teaching is better, but there is still much room for improvement in the specific integration details. For example, we can further develop an intelligent teaching platform, and tailor personalized online and offline teaching programs for each student according to the students' physical fitness test results and learning progress. Using cutting-edge technologies like virtual reality and augmented reality to create more realistic and vivid sports learning experiences also increases students' interest and involvement in the material.

Continually enhance and improve online physical education teaching resources as part of the optimization of teaching resources. Along with the current instructional DVDs and cultural understanding of sports, more interactive teaching resources can be introduced, such as sports games and online competitions. These resources can not only increase students' learning fun, but also more effectively foster pupils' feeling of rivalry and teamwork. Simultaneously, improve the quality control of instructional materials to guarantee their correctness, usefulness, and appeal in order to satisfy the various learning requirements of students.

There is need for improvement and refinement in the system used to evaluate pupils' physical attributes. Although the current five tests can reflect students' physical quality to a certain extent, they are not comprehensive enough. In the future, more test indicators, such as cardiopulmonary function and muscle endurance, can be implemented to create a method for evaluating physical fitness that is more thorough

and scientific. Simultaneously, the data of students' physical fitness is thoroughly examined using big data analysis technology, giving teachers a more reliable foundation for lesson planning and students a better way to control themselves.

As part of teacher preparation and professional development, we should enhance the information technology training provided to physical education instructors. In order to effectively implement online and offline integrated teaching, teachers must possess a greater level of information technology literacy due to the ongoing growth of online physical education instruction. Teachers can stay up to date on the newest teaching techniques and educational technologies and continuously enhance their professional skills and teaching level by attending regular training sessions, seminars, and other events.

REFERENCES

Cao, L., & Liu, C. (2020). Practice of the "Trinity" Blended Teaching Model of MOOC+Lecture Class, Muketang, and Face-to-Face Class: Taking the Evaluation of Classic Chapters of A Dream of the Red Mansions as an Example. *China University Teaching, 12,* 6.

Chen, C., & Gu, X. (2019). The Impact of Online Games on Students' Disciplinary Literacy and Social Integration: An Analysis Based on PISA2015 Test Data from Four Provinces and Cities in China. *Open Education Research, 25*(5), 15.

Chen, L., & Li, J. (2019). Construction and Application of PBL and TBL Methods in Cheerleading Teaching Based on Blackboard Platform. *Sichuan Sports Science, 38*(4), 122-126.

Chen, Y., & Yang, B. (2019). Analysis and Research on Information-based Classroom Teaching Based on "Internet+" Data. *Shaanxi Education: Higher Education Edition, 4*, 3.

Dong, X. (2020). *Research on the Application of Internet Resources in Middle School Physical Education Teaching* [Dissertation]. Qufu Normal University.

Du, X., & Wu, X. (2020). Development of Curriculum System for Cultivating Excellent Vocational Teachers under the STEM Education Concept. *China Higher Education Research, 10*, 6.

Gao, Y. (2022). Necessity Analysis and Implementation Strategies of Internet Application in College Physical Education Teaching. *Fitness & Beauty, 6*, 106-108.

Gong, Z. (2019). *Analysis of User Needs for Paid Online Sports Dance Courses* [Dissertation]. Beijing Sport University.

Han, S., & Ge, S. (2020). Investigation on the Current Situation of Online Teaching Models for Physical Education under the Background of COVID-19 Prevention and Control. *Heilongjiang Science, 11*(23), 158-159.

Hu, Y. (2020). Research on Strategies for Online Primary School Physical Education Teaching during the Epidemic. *Beijing, China, 3*.

Huang, X. (2024). Research on the Promotion Strategies of the "Flipped Classroom + Blended Teaching" Model for College Swimming. *Contemporary Sports Technology, 14*(2), 47-50.

Jin, Q. (1994). Adhering to Reform and Developing Disciplines: A Brief Talk on the Construction of Teaching Materials for the Discipline of School Physical Education in Physical Education Majors of Ordinary Colleges and Universities in China. *Zhejiang Sports Science, 4*, 5-8.

Ju, M., Wang, Z., Liu, X. et al. (2020). Study on the Influence of Physical Function Training on FMS Scores and Injury Risk Prediction of Competitive Aerobics Athletes. *Liaoning Sport Science and Technology, 42*(6), 6.

Kang, S., & Shao, F. (2020). A Survey on the Current Situation of "Suspending Classes without Stopping Teaching" in Primary Schools during the Epidemic. *Educational Review, 4*, 41-45.

Lei, W. (2019). Characteristics and Reference of Teaching Models in Australian Universities under the Background of Cultural Diversity: Taking Queensland University of Technology in Australia as an Example. *Education Modernization, 44*, 203-205.

Li, J. (2020). On Online Physical Education Teaching under the COVID-19 Epidemic. *Journal of Taiyuan Urban Vocational and Technical College, 11*, 87-89.

Li, L., & Sun, Y. (2025). Research on the Modernization Reform of Teaching Contents and Methods of College Tennis Courses. *Contemporary Sports Technology, 15*(9), 49-52.

Li, W. (2023). *Application Research of SPOC Blended Teaching Method in College Badminton Teaching: Taking Harbin Normal University as an Example* [Dissertation]. Harbin Normal University.

Liu, H. (2022). Exploration and Prospect of Physical Education Teaching Models Based on the "Metaverse" Environment. *Higher Education Exploration, 1*, 75-79.

Liu, Y. (2021). Characteristics and Platform Construction of Intelligent Physical Education Teaching in Colleges and Universities. *China Educational Technology, 4,* I0005-

I0006.

Lü, Y., & Zhang R. (2023). A Review of Online Learning Research at Home and Abroad in the Past Decade: A Visual Analysis Based on CiteSpace. *Adult Education, 43*(6), 47-58.

Mao, Z., Wu, J., & Ma, Z. (1998). On the Physical Education Teaching Model. *China Sport Science, 6*, 5-8.

Miao, X. (2023). *Research on the Design of Online Track and Field Courses for Grade 7 Students from the Perspective of Blended Teaching* [Dissertation]. Tianjin University of Sport.

Shang, N. (2021). Introduction and Analysis of Online Teaching in South Korea under the COVID-19 Epidemic. *Journal of Higher Education, 8*, 189-192.

Shi, X., Huang, G. (2024). Research on Strategies for Improving Teachers' Practical Teaching Ability under the Background of Integrating "Innovation and Entrepreneurship" with Information Technology. *Scientific Consultation, 7*, 142-145.

Wang, D., Wang, H., Zhang, W, et al. (2020). Research on Online Teaching during the Period of "Suspending Classes without Stopping Learning": Based on a National Online Questionnaire Survey of 33,240 Copies. *Modern Educational Technology, 30*(3), 12-18.

Wang, H., Zhao, H., Yu, J. (2019). Current Situation Analysis and Development Countermeasures of Physical Education Courses in China University MOOC. *Journal of Wuhan Sports University, 53*(8), 7.

Wang, J. (2019). Application and Trend of Modern Educational Technology in Physical Education Teaching. *China Educational Technology, 10*, I0008-I0009.

Wang, J., Qi, Z., & Han, J. (2019). Practice and Exploration of Interactive Geography Classroom Based on Mobile Internet Technology: Taking the Open Class of "Beijing Geography Education Mobile Teaching" as an Example. *Reference for Middle School Geography Teaching, 12*, 3.

Wang, L., & Ma, L. (2019). Flipped Classroom Teaching Model of Medical Information Retrieval Course Based on "Yu Class". *Chinese Journal of Medical Library and*

Information Science, 28(9), 6.

Wang, X., Ding, H., & Zhang, H. (2019). Construction and Practical Research on the Evaluation System of Information-based Teaching Quality: Taking the Theoretical Courses of Physical Education Major in Linyi University as an Example. *Journal of Harbin Sport University, 37*(3), 6-10.

Wang, Y., Li, C., & Yin, X. (2019). Research on the Current Situation and Countermeasures of College Teachers' Competence in Flipped Classroom: A Survey Based on Front-line Practice Teachers in University S. *Higher Education Exploration, 11*, 5.

Wang, Z. (2020). Research on the Effectiveness of Online Primary School Physical Education Teaching under the Epidemic. *Examination Weekly, A3*, 15-16.

Wang, Z.. (2023). Teaching Innovation and Practice of English Major Courses in Colleges and Universities under the Smart Teaching Environment of Disciplines. *Journal of Higher Education, 9*(36), 113-116.

Wu, P., & Yang L. (2022). What is the Value of Online Education?—Knowledge Communication Model of Online Education Based on Value Co-creation Theory. *China Educational Technology, 12*, 61-67.

Wu, Y. (2020). On the Exploration of Online Primary School Physical Education Teaching under the Epidemic. *Education Circle, 13*, 26-27.

Xie, J. (2019). Application Analysis of Network Multimedia Technology in Primary School Physical Education Teaching. *Chinese Ci and Fu, 1*, 224-225.

Xu, G. (2021). Application of Multimedia Technology in College Public Physical Education. *Sports & Leisure: Mass Sports, 7*, 219.

Xu, Y., & He, X. (2023). Research on the Design of Network Teaching Platform Supported by AI Technology. *China Information Technology Education, 15*, 88-91.

Yan, S. (2020). Theoretical Review, Realistic Reflection and Practical Approach of Online Physical Education Teaching under the Background of COVID-19 Epidemic—Review of the Cloud Interview on "School Physical Education under Epidemic". *Sports & Science, 41*(3), 9-16.

Yao, Y. (2022). Exploration and Practice of Online and Offline Blended Teaching Mode:

Taking the Teaching of "Computer-Aided Design (AI)" Course as an Example. *Wireless Internet Technology, 19*(8), 164-165.

Yu, L., An J., & Liu, X. (2024). Analysis on the Pedagogical Status of Knowledge Comprehension Objectives and Information Acquisition and Utilization—An Experimental Study Based on Library Informatics Research Findings and Case Courses. *Journal of the China Society for Scientific and Technical Information, 6*, 123-126.

Yuan, J. (2020). Training Model of Language Assessment Literacy for College Foreign Language Teachers. *China Educational Technology, 12*, 2.

Zhang, G., & Li, X. (2024). Design of Project-Driven Computer Network Course Teaching Model under the TPACK Framework. *Journal of Higher Education, 10*(4), 131-134.

Zhang, H. (2024). Research on the Implementation Dilemma and Promotion Strategies of Large-unit Teaching in Physical Education of Primary and Middle Schools under the Background of Core Literacy. In Proceedings of the 2nd Sichuan Provincial Sports Science Congress. School of Physical Education, Hubei University.

Zhang, Y. (2020). Discussion on the Effectiveness of Online Primary School Physical Education Teaching under the Epidemic. *Literature and Art Navigation (Lower), 11*, 82-85.

Zhao, C. (2020). Historical Origin and Development of Physical Education Teaching Theories in China and the West. *Youth Sports, 5*, 101-102, 104.

Zhong, S. (2019). Design of Physical Education Safety Education Teaching System Based on Moodle Platform. *Microcomputer Applications, 9*, 3.

Zhou, F. (2024). Influencing Factors and Countermeasures of Knowledge Sharing Behavior in Virtual Learning Communities—Taking Campus Auxiliary Virtual Learning Communities as an Example*. Journal of Zhangzhou Polytechnic College, 26*(2), 91-96.

Zhou, K., Guan, T., Zhou, Y., et al. (2024). From Learning Progression to Content Reconstruction: Internal Construction of Large Units of Physical Education and Health Courses Based on Context Chains. Journal of Capital University of Physical

Education and Sports, 36(1), 68-77.

Zhou, S. (2022). Restricting Factors and Development Approaches of Online Line Dance Courses in Colleges and Universities in the "Internet+" Era. *Journal of Chengdu Sport University, 48*(S01), 173-175.

Zhu, X. (2002). Analysis of the Basic Development Trend of American Distance Higher Education. *Distance Education in China, 3*, 147-149.

Zhuang, X. (2023). Discussion on the Application of Artificial Intelligence in Computer-Aided Instruction and Student Academic Evaluation. *Science & Technology Information, 21*(11), 212-215.

APPENDIX

APPENDIX A

Questionnaire Survey

Cognitive Questionnaire on Physical Education Teaching of Senior Three Students in Beijing No.4 Middle School (International Campus)

Dear students:

Hello! At present, I am investigating senior high school students' cognition of online physical education teaching. In order to collect relevant data, this questionnaire survey is specially conducted. This questionnaire is only used for the research needs of graduation thesis, and I hope to get your support and cooperation. thank you

1. The way and content of online video courses

1. I think the teaching content of online video course is rich and varied.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

2. The teaching method of online video course is easy to understand and master.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

3. I can arrange the study of online video courses according to my own schedule.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

4. The course duration of online video course is reasonable.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

5. The teaching resources of online video courses are of high quality.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

6. Online video courses have enough interactive links.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

7. Online video courses can meet my physical education learning needs.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

2.The evaluation of online video courses

8. My overall satisfaction with online video courses is high.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

9. Online video courses have improved my sports knowledge.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

10. Online video courses have enhanced my physical fitness.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

11. Online video courses have cultivated my interest in sports.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

12. Online video course assignments and assessment methods are reasonable.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

13. I will actively participate in online video courses.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

3.Students' and parents' cognitive attitudes towards online video courses and family exercises

14. I think family exercise is very important for my health.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

15. I have enough time for family exercise.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

16. My parents support me to do family exercises.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

17. I can exercise at home consciously.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

18. Online teaching is convenient and autonomous.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

19. The interactivity and sociality of offline teaching appeal to me.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

20. I agree with the advantages of online+offline physical education teaching mode.

A completely conforms to B, conforms to C, generally does not conform to D, and completely does not conform to E.

APPENDIX B

Interview Outline

Teacher interview outline

Dear teacher:

Hello! In order to deeply understand the recognition of online video courses by physical education teachers and gain a more intuitive understanding and feeling, we need to interview you. Your outstanding teaching experience will provide important reference for my research. Thank you for your cooperation!

(1) What specific positive effects do you think online video teaching AIDS have played in physical education teaching?

(2) In your teaching process, what are the main aspects of online video teaching resources supplemented?

(3) Do you have any good solutions to the problem that online teaching is difficult to guarantee students' self-discipline?

(4) What do you think of the disadvantage of online teaching that it lacks actual sports experience?

(5) In your opinion, how does the online+offline teaching mode give full play to the advantages of the two teaching methods and improve the teaching quality and effect?

APPENDIX C

Results of the Interview Outline

Interviewees: Mr. Wang and Ms. Li, senior high school physical education teachers at the International Campus of Beijing No. 4 High School

Interview Date: November 22, 2022

Question 1: What specific positive effects do you think online video teaching AIDS have played in physical education teaching?

Mr. Wang:

Online videos have been extremely helpful. For example, when teaching the basketball three-step layup, some movement details are clearer in a slow-motion video replay than ten verbal explanations in offline classes. Students can review the videos after class, especially those with weaker foundations, who essentially have a "personal coach" at hand. For rhythmic coordination in aerobics, decomposed movements in videos are highly intuitive, and students can practice more efficiently than relying solely on the teacher's verbal instructions.

Ms. Li:

Yes, and they also supplement teaching resources. For projects with limited venue access, such as horizontal bar and parallel bar exercises, videos can showcase more advanced movements, broadening students' horizons. During the pandemic, when offline classes were impossible, online videos sustained teaching, allowing students to maintain basic exercise habits instead of stopping completely.

Question 2: In your teaching process, what are the main aspects of online video teaching resources supplemented?

Mr. Wang:

First, technical details. For example, in instep passing in football, videos show close-ups of leg swings and ball contact points, which are difficult for students to see clearly due to angle limitations in offline demonstrations. Second, personalized learning: some students want to practice rope skipping tricks, and videos provide specialized advanced tutorials they can choose to watch, unlike offline classes with uniform progress. Additionally, theoretical content is enhanced—for example, animations in videos demonstrate sports injury prevention more vividly than pure theoretical explanations.

Ms. Li:

There is also post-class reinforcement. For instance, after teaching the breathing rhythm for the 50m ×8 shuttle run, students watched the video at home and practiced, showing significantly more coherent movements the next day. Training clips of sports stars in videos also motivate students: after showing Su Bingtian's starting training video, many students actively imitated the practice, greatly increasing enthusiasm.

Question 3: Do you have any good solutions to the problem that online teaching is difficult to guarantee students' self-discipline?

Mr. Wang:

This is indeed a challenge. We now ask parents to assist with supervision, such as assigning "home check-in tasks" where students record 3-minute practice videos and send them to the group, with parental signatures for confirmation. We also organize "cloud competitions" in the class, such as a rope skipping check-in leaderboard, and award a "Self-Discipline Star" weekly to drive competition through group points. During online classes, we also conduct sudden roll calls and questions to prevent students from idling.

Ms. Li:

Yes, we can also combine offline spot checks. For example, after learning sit-up techniques online, we randomly test students in offline classes—those who did not practice seriously are immediately noticeable, prompting them to study自觉 (conscientiously). Additionally, we design tiered tasks: students with weaker foundations can first complete low-intensity exercises, with corresponding slow-motion tutorials in videos, allowing them to achieve goals with effort and avoid giving up.

Question 4: What do you think of the disadvantage of online teaching that it lacks actual sports experience?

Mr. Wang:

This is a major limitation of online classes. For example, students may understand basketball crossover moves when watching videos, but they fumble when practicing offline. Therefore, we now adopt the approach of "teaching methods online, refining details offline." For instance, students learn shooting gestures online in the first week, and in offline classes, teachers correct wrist force one-on-

one and use resistance bands for auxiliary training, allowing students to physically feel the key points of the movements.

Ms. Li:

Offline practice is essential for supplementation. For example, when teaching long jump landing cushioning, we explain center-of-gravity shift online, but offline, students must practice repeatedly in sandpits while teachers manually adjust their postures. Additionally, for exercise intensity control—since online classes cannot measure heart rate in real time—we use fitness testing equipment offline to ensure training volume is met.

Question 5: In your opinion, how does the online+offline teaching mode give full play to the advantages of the two teaching methods and improve the teaching quality and effect?

Mr. Wang:

Online classes lay the theoretical foundation, while offline classes focus on practical application. For example, when teaching volleyball passing, students first learn the theoretical hand posture ("insert, clamp, lift") online, then practice paired passing in groups during offline classes, with teachers巡回指导 (circulating to provide guidance) and immediate error correction. This allows students to have both a theoretical framework and practical digestion, leading to remarkable progress.

Ms. Li:

It also caters to students of different levels. Advanced students can self-learn advanced content online and practice tactical coordination offline; beginners can repeatedly watch basic videos online and focus on making up weaknesses offline. For example, in rope skipping training, we share tutorials of varying difficulties online and organize "mutual assistance groups" offline, where faster learners guide novices—combining online personalization with offline interactivity.

Interview Summary:

Both teachers recognize the advantages of online videos in technical demonstration, resource expansion, and autonomous learning but emphasize that issues of self-discipline and experiential learning must be addressed through parental supervision, offline spot checks, and other measures. The online+offline model achieves complementary advantages through "theoretical pre-learning online, practical reinforcement offline," significantly improving teaching efficiency.

APPENDIX D

Online Video Course Design

Lesson 1 Basic Quality Movement

Class hours: 2 class hours

Course objectives:

1. Let students master the concept and importance of basic quality sports.

2. Cultivate students' good exercise habits and improve their physical fitness.

3. Cultivate students' team spirit.

Course content:

1. Introduction to the concept of basic quality sports

2. Common basic quality sports events and methods

3. Basic quality sports training skills

4. The relationship between basic quality exercise and health.

Important and difficult points:

1. Selection and training methods of basic quality sports

2. Cultivate students' habit of persisting in sports.

Online video course content:

1. The first class: introduction to the concept of basic quality sports, common basic quality sports events and methods.

2. The second class: the relationship between basic quality sports training skills, basic quality sports and physical health.

Lesson 2 Jumping and Throwing

Class hours: 2 class hours

Course objectives:

1. Learn the basic skills of jumping and throwing.

2. Improve physical coordination and flexibility.

3. Cultivate sports interest and teamwork spirit.

Course content:

1. Jumping skills: learn standing long jump, high jump, long jump and other jumping actions.

2. Throwing skills: learn throwing actions such as solid ball, javelin and shot put.

3. Practice method: Let students follow the practice through video demonstration and explanation.

Important and difficult points:

1. Take-off and landing posture in jumping skills.

2. Strength and angle control in throwing skills.

Online video course arrangement:

1. The first lesson: the teaching and practice of jumping skills.

2. The second class: teaching and practice of throwing skills.

Lesson 3 Running

Class hours: 2 class hours

Course objectives:

1. Let students master the correct running posture and skills.

2. Improve students' running speed and endurance.

3. Cultivate students' team spirit and competitive consciousness.

Course content:

1. Explain the running posture and skills

2. Analysis of running skills such as starting, accelerating and sprinting.

3. Introduction of running training methods

4. The health benefits of running exercise

5. Practical training: running training in groups, online guidance by coaches.

Important and difficult points:

1. Correct running posture and skills

2. Mastering the running skills such as starting, accelerating and sprinting.

3. Practical application of running training methods

Online video course arrangement:

1. Video 1: Explanation of running posture and skills (duration: 30 minutes)

2. Video 2: Analysis of running skills and introduction of training methods (duration: 30 minutes)

3. Video 3: Practical Training Guidance (Duration: 60 minutes)

Lesson 4 Football

Class hours: 2 class hours

Course objectives:

1. Let students know the basic knowledge and development history of football.

2. Cultivate students' interests and hobbies in football.

3. Master the basic skills of football, such as passing, stopping and shooting.

4. Cultivate students' team spirit and competitive consciousness.

Course content:

1. Basic knowledge and development history of football

2. Basic football skills: passing, stopping and shooting.

3. Football match rules and referee gestures

4. Football training methods and actual combat drills

Important and difficult points:

1. Mastering football skills, such as passing, stopping and shooting.

2. The cultivation of team spirit and competitive consciousness.

Textbook design of online video course;

1. Video 1: Basic knowledge and development history of football (duration: 30 minutes)

2. Video 2: Basic skills of football: passing, stopping and shooting (duration: 45 minutes)

3. Video 3: Football Match Rules and Referee's Gestures (Duration: 20 minutes)

4. Video 4: Football training methods and actual combat drills (duration: 30 minutes)

Lesson 5 Basketball

Class hours: 2 class hours

Course objectives:

1. Let students know the basic rules and skills of basketball.

2. Cultivate students' interests and hobbies in basketball.

3. Improve students' sense of teamwork and competitive level.

Course content:

1. Overview of basketball: the origin, development, rules and competition forms of basketball.

2. Basic skills: dribbling, shooting, passing, defense, etc.

3. Team tactics: attack, defense, cooperation, etc.

4. Training methods: physical quality training, technical training and psychological quality training.

Important and difficult points:

1. Normality and accuracy of technical actions.

2. Teamwork and the cultivation of tactical awareness.

Online video course arrangement:

1. The first lesson: basketball overview, basic skills explanation and demonstration.

2. The second class: team tactics explanation and actual combat drills.

Lesson 6 Volleyball

Class hours: 2 class hours

Course objectives:

1. Let students know the basic rules and skills of volleyball.

2. Cultivate students' interest in volleyball and improve their teamwork ability.

3. Enhance students' physical fitness and improve their sports ability.

Course content:

1. Introduction of volleyball: origin, development, rules, etc.

2. Basic volleyball skills: serve, spike, pass, defense, etc.

3. Volleyball tactics: attack, defense, organization, etc.

4. Rules and judging methods of volleyball match.

Important and difficult points:

1. The mastery and application of basic volleyball skills.

2. Understanding and application of volleyball tactics.

3. Mastering the rules of volleyball match.

Online video course content:

1. Introduction and basic rules of volleyball.

2. Demonstration and explanation of basic volleyball techniques.

3. Volleyball tactical analysis and actual combat drills.

4. Explaining the rules and judging methods of volleyball match.

Lesson 7 Table Tennis

Class hours: 2 class hours

Course objectives:

1. Let students know the basic knowledge and development history of table tennis.

2. Master the basic skills and rules of table tennis.

3. Cultivate students' interest in table tennis and improve their physical quality and coordination ability.

Course content:

1. Basic knowledge and development history of table tennis

2. The basic skills of table tennis: grip, stand, serve, catch and hit the ball, etc.

3. Table Tennis Competition Rules and Referee Methods

4. Table tennis training methods

Important and difficult points:

1. The correct posture of grip and stance

2. Serve and catch skills

3. Understanding and application of table tennis rules

Online video course arrangement:

1. The first lesson: the basic knowledge and development history of table tennis, basic skills (grip and stand).

2. The second lesson: basic skills (serving, catching and hitting), rules of the game, judging methods and training methods.

Lesson 8 Badminton

Class hours: 2 class hours

Course objectives:

1. Let students know the basic knowledge and technical movements of badminton.

2. Cultivate students' interest in badminton and improve their sports quality.

3. Cultivate students' team spirit and competitive consciousness.

Course content:

1. Basic knowledge of badminton: history, venue, equipment and rules of badminton.

2. Badminton technical movements: serve, catch, swing, pace, etc.

3. Basic badminton tactics: singles and doubles tactics.

4. Badminton competition rules and judging methods.

Important and difficult points:

1. Mastering the technical actions such as serving, catching, swinging and stepping.

2. Teamwork and the cultivation of competitive consciousness.

Online video course content arrangement:

1. The first class: explain the basic knowledge and technical movements of badminton, and cooperate with the demonstration video.

2. The second class: explain the basic tactics of badminton, cooperate with the game video and actual case analysis.

Lesson 9 Horizontal Bar and Parallel Bars

Class hours: 2 class hours

Course objectives:

1. Let students know and master the basic skills of horizontal bar and parallel bars.

2. Cultivate students' physical coordination and flexibility.

3. Improve students' self-confidence and sense of teamwork.

Course content:

1. Basic skills of horizontal bar: hanging, swinging, looping, turning, etc.

2. Basic skills of parallel bars: support, swing, loop, twist, etc.

3. Safety precautions and self-protection methods.

Important and difficult points:

1. Mastering basic skills such as hanging, swinging and looping of horizontal bar and parallel bars.

2. Cultivating students' physical coordination and flexibility.

Online video course arrangement:

1. The first class: Introduce the basic skills of horizontal bar and parallel bars, demonstrate actions, and let students practice with the video.

2. The second class: consolidate the content learned in the first class, correct and guide the movements, and arrange the exercises after class.

Lesson 10 Aerobics

Class hours: 2 class hours

Course objectives:

1. Let students know the basic concepts and action essentials of aerobics.

2. Cultivate students' sense of rhythm, coordination and athletic ability.

3. Help students shape a good body shape and enhance their physical fitness.

Course content:

1. Basic movements of aerobics: including movements of the head, shoulders, waist and legs.

2. Aerobics combination action: connect the basic actions in series to form a complete aerobics combination.

3. Aerobics Music: Introduce the types and rhythms of music suitable for aerobics.

Important and difficult points:

1. Correctness of basic movements: To ensure that students can master the correct movement essentials during the practice.

2. Harmony between music and action: cultivate students' sensitivity to music, so that action and music are in harmony.

Online video course content:

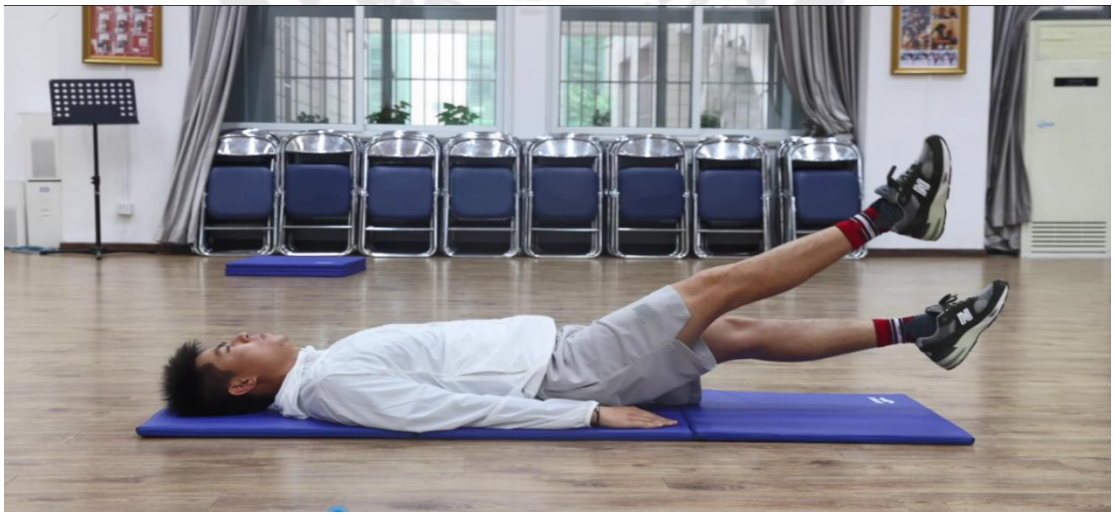
1. Video 1: Explanation and demonstration of basic movements of aerobics.

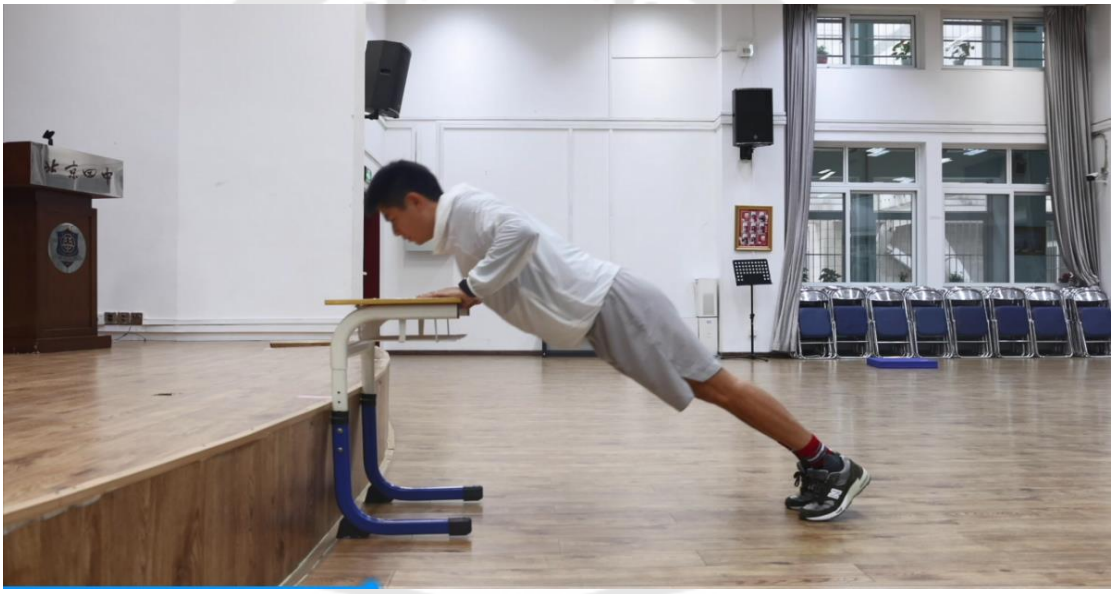
2. Video 2: Explanation and demonstration of aerobics combination movements.

3. Video 3: Aerobics music collocation and rhythm cultivation.

APPENDIX E

Recorded Videos (Partial Screenshots)





APPENDIX F

Expert Evaluation Form

Course	Knowledge Content	Evaluation Dimension					Aggregate Score	Ioc	Result
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 1 Basic Quality Movement	Class								
	Program Objective								
	Course Content								
Lesson 2 Jumping And Throwing	Class								
	Program Objective								
	Course Content								
Lesson 3 Running	Class								
	Program Objective								
	Course Content								
Lesson 4 Football	Class								
	Program Objective								
	Course Content								
Lesson 5 Basketball	Class								
	Program Objective								
	Course Content								
Lesson 6 Volleyball	Class								
	Program Objective								
	Course Content								
Lesson 7 Table Tennis	Class								
	Program Objective								

Course	Knowledge Content	Evaluation Dimension					Aggregate Score	Ioc	Result
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
	Course Content								
Lesson 8 Badminton	Class								
	Program Objective								
	Course Content								
Lesson 9 Horizontal Bar And Parallel Bars	Class								
	Program Objective								
	Course Content								
Lesson 10 Aerobics	Class								
	Program Objective								
	Course Content								

APPENDIX G

Evaluation Results of Teaching Plan

Course	Knowledge Content	Evaluation Dimension					Aggregate Score	IOC	Result
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 1 Basic Quality Movement	Class	+1	+1	+1	0	+1	4	0.8	pass
	Program Objective	+1	+1	+1	-1	+1	3	0.6	pass
	Course Content	0	+1	+1	+1	+1	4	0.8	pass
Lesson 2 Jumping And Throwing	Class	+1	+1	+1	+1	+1	5	1	pass
	Program Objective	+1	0	+1	0	+1	3	0.6	pass
	Course Content	+1	+1	+1	+1	-1	3	0.6	pass
Lesson 3 Running	Class	0	+1	+1	+1	0	3	0.6	pass
	Program Objective	+1	0	0	+1	+1	3	0.6	pass
	Course Content	+1	+1	0	+1	+1	4	0.8	pass
Lesson 4 Football	Class	0	+1	+1	+1	+1	4	0.8	pass
	Program Objective	+1	0	+1	+1	+1	4	0.8	pass
	Course Content	+1	+1	0	+1	+1	4	0.8	pass

Course	Knowledge Content	Evaluation Dimension					Aggregate Score	IOC	Result
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 5 Basketball	Class	+1	+1	0	0	+1	3	0.6	pass
	Program Objective	0	+1	+1	+1	0	3	0.6	pass
	Course Content	0	0	+1	+1	+1	3	0.6	pass
Lesson 6 Volleyball	Class	+1	+1	-1	+1	+1	3	0.6	pass
	Program Objective	+1	+1	0	+1	+1	4	0.8	pass
	Course Content	0	+1	+1	+1	+1	4	0.8	pass
Lesson 7 Table Tennis	Class	+1	0	+1	+1	+1	4	0.8	pass
	Program Objective	+1	+1	0	+1	+1	4	0.8	pass
	Course Content	+1	+1	+1	0	+1	4	0.8	pass
Lesson 8 Badminton	Class	+1	+1	+1	-1	+1	3	0.6	pass
	Program Objective	0	+1	+1	+1	+1	4	0.8	pass
	Course Content	+1	+1	+1	+1	+1	5	1	pass

Course	Knowledge Content	Evaluation Dimension					Aggregate Score	IOC	Result
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Lesson 9 Horizontal Bar And Parallel Bars	Class	+1	0	+1	0	+1	3	0.6	pass
	Program Objective	+1	+1	+1	+1	-1	3	0.6	pass
	Course Content	0	+1	+1	+1	0	3	0.6	pass
Lesson 10 Aerobics	Class	+1	0	0	+1	+1	3	0.6	pass
	Program Objective	+1	+1	0	+1	+1	4	0.8	pass
	Course Content	0	+1	+1	+1	+1	4	0.8	pass

VITA