



An Advanced Mixed Methodology Model for Teaching of Physical Education in the Post Covid-19 Era: A Case Study on Junior Middle School Basketball Class

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ABSTRACT

Objective: The study's primary purpose is to examine the effectiveness of physical education instruction post-covid-19, focusing on the efficacy of basketball instruction in enhancing teacher-student interaction.

Methodology: The research utilized an advanced mixture methodology. Compared to traditional blended instruction, our method considers the students' demand for basketball courses and the post-COVID-19 learning environment. **Results:** In the post-COVID-19 era, our hybrid online and offline teaching method may be effective in middle school physical education, as demonstrated by our analysis and test case. Students are more satisfied with this method of instruction, and their enthusiasm for acquiring physical education knowledge increases, resulting in enhanced physical education in junior high schools. We examine basketball

training for junior high school students and propose a hybrid online/offline training approach to improve effectiveness and satisfaction. Our hybrid teaching model, ADDIE, is designed to accomplish a combination of online and offline instruction and utilizes a neural network to detect errors in students' feedback videos and increase the efficiency of identifying wrong actions. In the final stage of case verification, experimental results indicate that the students' satisfaction with our method is 8.9, showing its potential to meet the requirements of junior middle school physical education instruction after COVID-19. **Implications:** The study will aid policymakers and educators in formulating post-covid-19 policies regarding the efficacy of physical education instruction. **Novelty:** The study is among the first to examine the efficacy of physical education instruction in the post-covid era.

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1 Introduction

Physical education is a crucial component of the education of junior middle school students, in addition to the study of fundamental subjects, to develop students' mental and emotional maturity and to instill values of great significance.

Basketball is enjoyable and beneficial to students' health and sense of community. It improves junior high school pupils' physical and mental health and is greatly appreciated by them. Zhang Ligang noted in research on the Influence of Basketball on Middle School Students' Physical and psychological health that basketball serves multiple purposes, including fostering an enduring passion for sports and increasing students' interest in athletics. In addition to enhancing students' interpersonal skills, it can also develop their tenacity, improve their overall personality, and relieve their mental stress (Zhang, 2017). Gao Long conducted a survey about basketball for students, and the results indicated that long-term participation in basketball is conducive to developing a firm will, enhancing interpersonal skills, and the improvement of students' overall quality (Gao, 2019). In turn, basketball class plays a crucial role in improving the physical health of junior middle school students and instilling a habit of physical activity, which positively affects their physical and mental health development as a whole.

The situation created by COVID-19 necessitated the development of new approaches to teaching various disciplines, aiming to increase teaching effectiveness by combining online and offline instruction. The same can be said about physical education. During the COVID-19 pandemic, the symbiotic relationship between online and offline sports instruction has become a trend (Wang & Wang, 2020). More generally, because basketball is a popular sport among junior high school pupils, its teaching methods are subject to change. In the post-COVID-19 era, "Internet + basketball teaching" will likely be the predominant method of education for a considerable amount of time. Zhou (2011) has designed a theoretical model of a basketball teaching system and developed a basketball network learning mode based on the principle of "teaching, network, and game in one." Through teaching experiments, it was determined that students who benefit from information-based instruction increase their physical fitness, offensive understanding, defensive ability without the ball, and defensive ability with the ball (Zhou, 2011). Yang (2018) noted that using the WeChat app to teach basketball has distinct advantages over traditional methods. Particularly, there are positive effects on students' interest in learning, enthusiasm, cooperation skills, independent learning abilities, and basketball skill mastery (Yang, 2018). Jia (2015) discovered that "Internet + basketball teaching," as a new paradigm of basketball instruction in schools, is gradually accepted by students and destined to become the norm. Internet + basketball education proponents emphasize that, in contrast to conventional teaching methods, online and blended online/offline training of students enhances the educational effect. In conclusion, studying high school basketball instruction during the epidemic has specific theoretical and practical significance for promoting the reform and growth of high school basketball instruction. This paper was motivated by prior research findings indicating that blended instructional methods for basketball are beneficial.

However, there is a shortage of quantitative research on the current state of mixed teaching in high school basketball and how to organically integrate Internet+-based technologies with mixed education in the post-epidemic period. In addition, very little

research has been conducted on hybrid high school basketball instruction. To fill this void, we discuss Internet-based mixed education of high school basketball after the pandemic and propose a hybrid online/offline training method (ADDIE) to enhance teaching effectiveness and student satisfaction.

2 Research on online and offline mixed teaching methods of junior high school basketball classes in the post-COVID-19 era

2.1 Establish the basic principle of online distance and offline campus alternating mixed teaching

To reduce the negative impact on students' learning consistency and results when on-campus teaching is unavailable, teachers and students can communicate via the Internet, transforming offline basketball teaching into online basketball teaching, e.g., by answering questions via live broadcast, video courseware, and remote guidance (Koutelidas et al., 2022). The demands of the student movement have evolved in this context. The autonomy of students' learning and instructors' professionalism has been evaluated, and the method for receiving students' learning feedback in basketball courses has changed. Consequently, it is necessary to establish distinct hybrid teaching principles for the online and offline hybrid teaching modes of junior middle school basketball instruction.

In teaching basketball, the instructor operates following the teaching plan, the learning situation and context of the students, and the teaching objectives, which are established considering the social life situation. Teachers direct students to concentrate on outside knowledge, break down disciplinary boundaries, and integrate subject knowledge with interdisciplinary skills. The overarching objective is to arouse the students' enthusiasm for learning, participation, and curriculum content (Goodwin, Rossow-Kimball, & Connolly, 2022; Pasek et al., 2022; Sun & Ma, 2021).

In dual-line blended instruction, online and offline instruction will be utilized concurrently in the classroom. Relevant basketball events and student feedback can be used to introduce and connect teaching materials to promote coherence in students' thought processes. In reality, online and offline instruction are quite distinct. The number of offline teaching class hours is limited, and most teachers may only provide limited resources to attain the learning objective. In online education, however, the teacher may propose a variety of basketball-related online resources, from which students can select based on their advice, interests, and searches. Naturally, teachers recommend course materials to students after evaluating them based on course content. Particularly, because improper basketball actions can harm students' physical health, teachers must screen basketball video resources online during the teaching process and emphasize the importance of correct physical exercise by combining examples with sports physiological knowledge. Consequently, in contrast to teaching other theoretical subjects, when basketball is conducted online via distance learning, teachers must identify and provide remote guidance and correction based on students' basketball action learning videos.

2.2 Wrong movement recognition in basketball online teaching

During the learning of basketball techniques, several external and internal factors influence the learning process and results, resulting in motion and action deviations among

students. In online and offline mixed instruction, observing the learning process by identifying students' incorrect basketball actions is crucial. During online education, students cannot receive timely guidance from instructors; however, the movement recognition technology would enable teachers to identify students' incorrect movements and advise them accordingly.

In online education, students demonstrate their basketball skills through video recordings. Due to the influence of numerous factors, the accuracy of basketball action detection in student feedback learning videos is hindered by several factors. These elements include the difficulty of the basketball action itself, movement occlusion, lighting, shooting trajectory, background, and equipment, among others. Before being available for analysis, the student-sent learning videos and sports action video images must be preprocessed according to the workflow depicted in Figure 1 (García-Castejón et al., 2021).

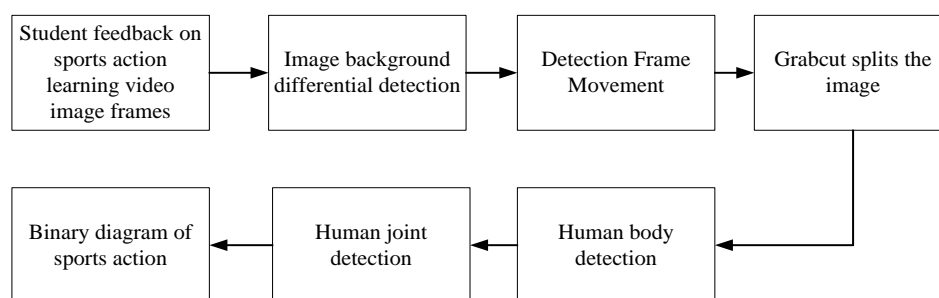


Figure 1. Preprocessing of action video images sent by students

The global MEI motion energy image and the MHI historical motion image represent the image sequence's actions. Upon drawing a line from the center of the human body to the extremities of the contour (head, feet, and hands), the angles between the pertinent lines are described using the Star skeleton positioning, and the movement of the limbs is expressed by modifying the Star skeleton edges. We use four parameters to extract image texture features: the angle second moment, correlation, contrast, and deficit moment (Huan Nan & Zhen Zhong, 2021).

The unbalanced instances in the video image of the students' sports action learning are then utilized to quantify the image's texture information change. The moments of imbalance are proportional to the uniformity of the video image and are determined by

$$F_i = \sum \sum P(i, j) [1 + (i - j)^2]^{-1} \tag{1}$$

where $P(i, j)$ is the probability when the distance between the image grayscale's pixel point and the image grayscale's pixel point j is Δ_{ij} . AUTHORS: Delta_ij is undefined.

In the gray-level co-occurrence matrix of the video image from students, the similarity of the column and row pixels' gray value determines the pixel differentiation in the target detection area. This similarity is inversely proportional to the difference of pixel area in the target detection area, i.e.

$$F_c = \sum_{n=0}^{L-1} |i - j|^2 (\sum_{i=1} \sum_{j=1} P(i, j)) \tag{2}$$

Correlation describes the similarity between column and row elements in the gray level co-occurrence matrix. The larger is the pixel value difference, the smaller is the correlation, whereas the greater is the quantity

$$F_r = [\sum_{i=1} \sum_{j=1} ij \times P(i, j) - \mu_a \mu_b] (\sigma_a \sigma_b)^{-1} \quad (3)$$

where, μ_a and μ_b are the mean values of p_a and p_b respectively; σ_a and σ_b are standard deviations respectively, representing the i -th edge probability matrix.

The angular second-moment feature measures gray pixel value distribution uniformity in the target detection area. This quantity is given by

$$F_a = \sum_{i=1} \sum_{j=1} P^2(i, j) \quad (4)$$

and is directly proportional to the uniformity of pixel value distribution in the target detection area.

Using the four characteristics mentioned above and the moving frame of the human body, a neural network is used to detect whether or not the action videos of pupils contain errors. Based on the retrieval of video image features mentioned above, the network's depth determines the detection precision. The network efficacy and effect are evaluated using ResNet101 as the basic network to determine the network depth. Between the convolutional and pooling layers of a deep convolutional neural network, ResNet residual blocks with normalized processing functions are added in batches to optimize and improve the performance of the detection network (Liang, 2022).

Let $G = \{g_1, g_2, \dots, g_n\}$ be a unit of N joints. In the depth image, each key node is extended as the center point, and the depth image is clipped with $ac \times v$ size frame to obtain the image block of this key node. To make the extracted image blocks have the same scale characteristics, the maximum motion range of the same unit is found in a video frame sequence and defined as Mask. For each unit, 0 is used to fill the unit to the size of the Mask. The activation function of the neural network is the nonlinear sigmoid function. For the dynamic depth graph of body level, all 20 nodes of the human body are kept in one unit. For the dynamic depth graph of position level, each graph contains 9 units, and each unit has 3 nodes. For the dynamic depth graph of the joint level, each graph includes 16 units, and each unit contains one node. The stochastic gradient method is used with micro batch samples to detect the depth of the student error convolution training neural network parameters. To detect network between each layer, the process of minimum output value and predictive values of the mean and variance are used as training target. If the training samples in each group after the forward calculation of error signal meet the requirements set, the network parameters continue training. Otherwise, we perform reverse calculation and continue to adjust the weights of each layer of neural network. After the video is processed by the neural network with definite parameters, the error action detection results of the video feedback from students are obtained.

2.3 Building an advanced hybrid physical education model based on the "ADDIE" model: basketball teaching as an example

The preceding section of this paper examined the efficacy and viability of integrated physical education instruction. Literature, Liang (2022) also comprehensively demonstrates

the benefits and drawbacks of online and offline integrated physical education and makes reasonable recommendations. This has been relevant for constructing the "Internet +" basketball course design model based on the "ADDIE" teaching design model and has suggested applying advanced neural network picture recognition technology to enhance the effectiveness of pre-class preview and post-class knowledge summary.

2.3.1 Theoretical basis

Piaget's constructivist learning theory asserts that learning is not a process in which teachers impart knowledge to students but rather a process in which students actively and positively construct their knowledge with the assistance of others and the use of relevant learning resources in a particular social and cultural context (Güldenpenning, Kunde, & Weigelt, 2020). Physical education learning through blended physical education can indeed enhance the subjective status of students, stimulate their innovative and creative spirit, and cultivate their practices of independent learning and self-reflection. Constructivist learning theory offers theoretical guidance for integrated physical education methods, whereas online-assisted basketball instruction is a real-world application of constructivist learning theory.

George Siemens, a Canadian scholar, proposed connectivism, which contends that people's learning styles change as the social structure changes and that learners are continually adapting to new ways of learning due to social structure changes. The emergence of new learning aids will also alter how people previously learned. Human cognitive ability is limited, and in the context of the Internet era, humans cannot store all the massive knowledge in their brains; therefore, they must practice the theory of connections for learning. Connectivism theory and online physical education are intrinsically compatible. Students could not attend classes due to the new coronavirus, and online instruction altered the learning styles of students when faced with such force majeure. The new online learning tools spawned by network information technology changed individuals' learning purposes and learning styles to some extent, and their resource interoperability and sharing made perpetual learning readily accessible.

Cognitive load theory, developed by cognitive psychologist John Swell of the University of New South Wales in Australia, emphasizes that the structure of human cognitive memory consists of short- and long-term memory and that there are three types: intrinsic cognitive load, extrinsic cognitive load, and associative cognitive load (Zamberg, Schiffer, & Stoermann-Chopard, 2021). Based on these three categories of memories, increasing associative cognitive load and decreasing extrinsic and intrinsic cognitive limitations can improve students' learning efficiency. The teaching resources provided by platforms such as MU and Wechat are both independent and interconnected, and the course duration is brief, thereby reducing the difficulty of the course, facilitating students' immediate viewing, and reducing their intrinsic cognitive burden. Using images and dynamic video resources from platforms like MU and WeChat to support instruction makes learning more intuitive and visual, thereby decreasing the extrinsic cognitive burden of students. Blended physical education aligns well with the cognitive load theory, with the addition of guidance videos to help students comprehend the knowledge in a specific situation, which increases the cognitive load and improves students' learning efficiency.

2.3.2 ADDIE Instructional Design Model

As depicted in Figure 2 (Donald, 1995), the ADDIE model is a method for systematically executing instruction, encompassing the five essential links of the instructional design process: Analysis, design, Development, Implementation, and Evaluation. The ADDIE model provides a systematic method for identifying teaching requirements, designing and developing teaching programs, and implementing and evaluating them. It is founded on a systematic analysis of teachers and students, and its primary objective is to improve teaching effectiveness and ensure that students acquire the necessary knowledge and skills to meet their learning and development requirements. Its most prominent characteristic is its systematic and germane nature. It avoids the one-sidedness of teaching by designing and developing teaching initiatives following teaching requirements, thereby preventing the blindness of education. The output quality is ensured by addressing each stage promptly and efficiently. As a result of its adaptability and flexibility, the ADDIE model is extensively utilized in various types of instructional design. In our case, the post-epidemic context permits us to combine traditional basketball instruction with "Internet +" based on the ADDIE paradigm and create a hybrid teaching method applicable to the teaching process.

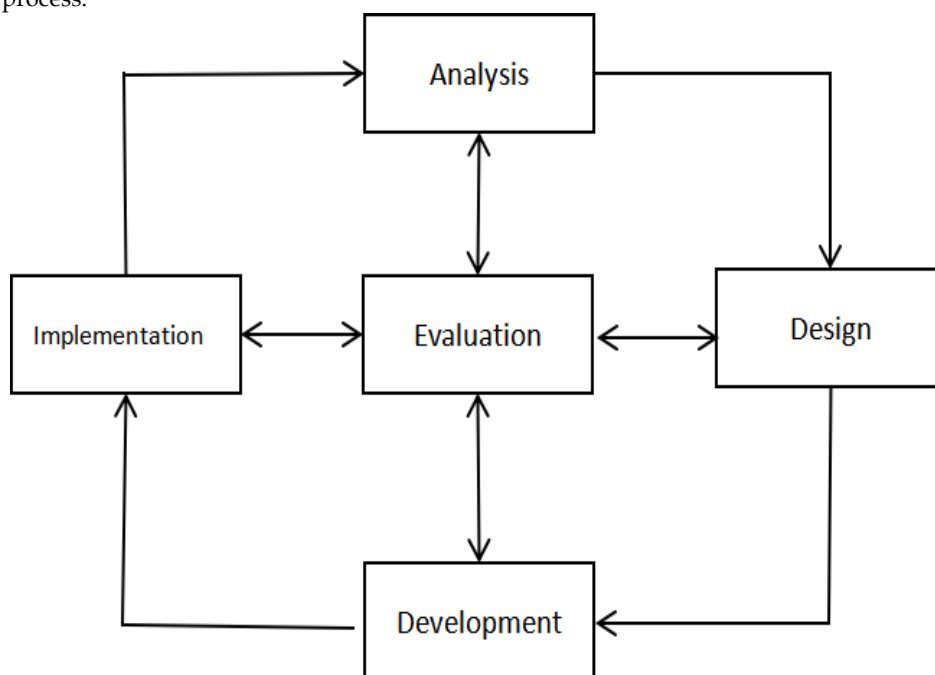


Figure 2. ADDIE Instructional Design Model

Based on the ADDIE instructional design model and the related theoretical support, this work develops an "Internet+" design model of basketball curriculum based on the five stages of analysis, design, development, implementation, and evaluation, combined with the laws of physical education, as depicted in Figure 3.

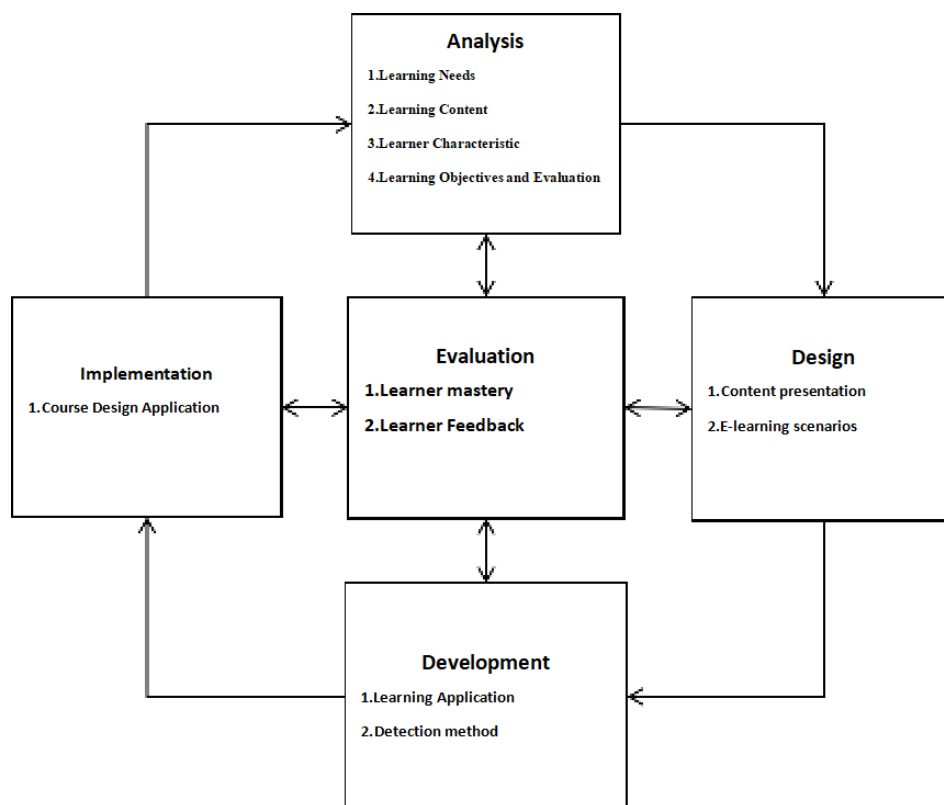


Figure 3. "Internet+" basketball class design model

1. Analysis stage

The design and development of the basketball course must begin with a preliminary analysis that focuses primarily on four factors: learning requirements analysis, learner characteristics analysis, learning content analysis, learning objectives, and evaluation analysis. The teaching needs analysis consists of analyzing the necessity of students using the online platform; the learner characteristics analysis aims to understand the primary factors affecting students' learning and comprehension and mastery of the learning content to serve as a reference for the design and development of the basketball course. Particularly relevant are two factors: skill level and learning attitude. The learning content analysis aims primarily to refine the course material and identify its key points and challenges. To pave the way for the content organization structure of the resources, the learning content analysis focuses primarily on refining the course content and identifying its key points and challenges. The final objective of the learning objective and evaluation analysis is for students to have a systematic understanding of basketball techniques, to assess their level of understanding and mastery through a quantitative test of action techniques, to evaluate the effects of the video resources based on this information, and to draw conclusions and make recommendations.

2. Design stage

First, based on the analysis of learning needs, learner characteristics, and learning contents in the analysis phase, we determine how to present learning contents; second, we design the content organization and structure from two perspectives: 1. the selection of appropriate online basketball resources, and 2. the content structure of basketball courses. Finally, we design the online learning environment to provide students with a suitable environment for information resources.

3. Development stage

Two phases comprise the development phase: curriculum design and Internet resource selection. According to the analysis and design of learning content in the first two stages, the pertinent basketball course content is organized into a sensible teaching path. Then, relevant content such as an excellent catechism, a famous teacher's classroom, and a video demonstrating an excellent athlete's technique is accumulated and selected.

4. Implementation stage

This phase consists primarily of two components: application and phase test. The devised basketball curriculum is implemented in secondary schools and via an online platform in the application phase. After the video resources have been developed, they are made available to students via an online platform, and they use them following the requirements. According to the teaching content schedule, three content items are designated as test items for the phase test, students are tested, and test data are recorded.

5. Evaluation stage

The evaluation phase consists of two components: learner mastery and learner feedback. Its purpose is to assess the rationality and efficacy of the video resource application. The mastery of learners is determined by statistical analysis following quantitative assessment of students on selected portions of the content. In contrast, learners' feedback is obtained via a questionnaire survey to collect student feedback on the efficacy of various paths of basketball courses. The evaluation of teaching efficacy is used to adjust and enhance the basketball course's instructional design continuously.

Teachers use the teaching platform to upload the syllabus, teaching plan, teaching video, PPT, and other relevant teaching resources when implementing online and offline blended instruction in junior middle school basketball. Teaching process design should be centered on students, with an emphasis on allowing students to fully explore their ideas, placing them at the center of curriculum development, designing the course from the students' point of view, taking into account their experience in learning sports, and requiring students to assimilate what they have learned and improve their skills truly (Zamberg et al., 2021).

The design of the teaching process places students at the forefront. It maximizes their position as leaders to maximize students' assimilation of course material and improvement of their o Teachers can obtain information about students' primary issues through online video homework and discussion and teach with these issues in mind. In contrast, students enter the offline phase of targeted learning with homework, enhancing the effect of students' technical learning and extending the time they spend practicing their skills. After each course, students submit video-recorded feedback, and teachers, based on the test results, provide a personalized

adjustment scheme and specific guidance to aid students in accurately grasping the technical movement, thereby reducing the risk of bodily injury resulting from the many factors involved in autonomous learning. Students must utilize the platform's resources to consolidate, summarize, and refine their knowledge. Students also evaluate the application effect of teaching methods, allowing teachers and the PE curriculum design team to enhance the teaching process, plan, and technical means and methods based on student feedback.

3 Case verification

The uniqueness of our basketball teaching method requires validation to demonstrate its practicability and prospective application in educational settings. In this section, we use the example of a middle school to corroborate the evolution of the post-COVID-19 environment and the comprehensive implementation of the mixed teaching method.

3.1 Instance Parameters

After selecting a junior high school, two classes are randomly selected, one serving as the experimental class and the other as the comparison class. Both courses share the same characteristics, such as the number of students (70), gender ratio, etc. Table 1 contains the pre-test results for specific basketball courses the two classes took.

Table 1

Pre-test data of basketball class

project	Experimental classes	Controlled class
The proportion of good and bad basketball knowledge level	12:33:25	11:36:23
High, medium, and low percentages of sports ability	15:38:17	14:37:19
The number of people with relatively skilled basketball skills	8	10
Physical fitness score >80	12	14
Physical fitness score >65	41	42
Physical fitness score <65	17	14
The number of people who are active in basketball	21	20

At the end of the case verification, we repeat the test on the students participating in the case verification according to the pre-test data to verify the application effect of the teaching method.

3.2 Validation process design

Example verification is conducted through comparison. The experimental class employs the teaching technique proposed in this paper, while the control class employs the conventional method of basketball instruction. The basketball instruction curriculum and teaching requirements for both types are identical. Using the pre-test data as a point of reference, we compare the basketball course learning situations of the two classes using the two distinct teaching methodologies and the students' basketball knowledge, basketball skills, and physical quality. After weighted processing, the satisfaction scores of the

teaching methodologies are also compared. To ensure the reliability of the results of this experiment, the pre-test results were compared to the re-test results.

3.3 Verification of results and analysis

Table 2 below shows the comparison between the experimental and control class test results after the example verification.

Table 2

Comparison of students' learning effects of basketball courses

project	Experimental classes	Controlled class
The proportion of good and bad basketball knowledge level	18:36:16	13:34:20
High, medium, and low percentages of sports ability	20:38:12	16:34:19
The number of people with relatively skilled basketball skills	17	13
Physical fitness score >80	18	16
Physical fitness score >65	46	43
Physical fitness score <65	6	11
The number of people who are active in basketball	32	25

Examining Table 2 reveals that after completing a course based on the proposed teaching method, the students' physical fitness, sporting ability, and enthusiasm for learning have significantly increased. In general, the experimental class pupils perform better than their counterparts in the control class. The preceding analysis demonstrates that the proposed teaching method is effective in real-world settings and represents a useful resource for basketball instruction in the post-COVID-19 era. The hybrid method is more appropriate for contemporary education, and its results align with the current basketball instruction standards.

Figure 4 shows the comparison of students' satisfaction scores of the two teaching methods, collected in different moments.

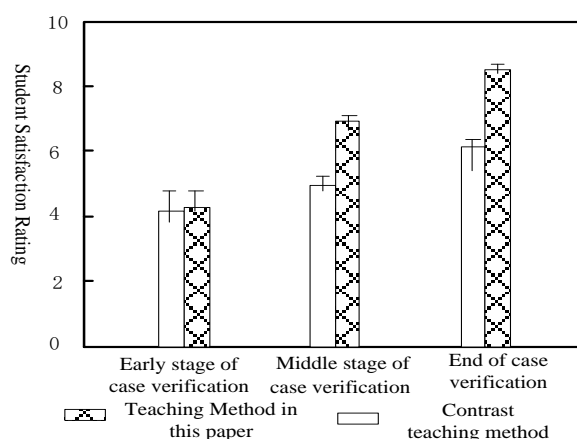


Figure 4. Comparison of teaching method satisfaction score

According to [Figure 4](#), in the early stage of case substantiation, the method's student satisfaction score is 4.21, compared to the traditional method's score of 4.36. The scores for the medium stage are 7.15 and 5.06, respectively. The final grades for the course are 8.9 and 6.2. In other words, the hybrid method is consistently more popular and results in greater student satisfaction, according to the data presented above.

4 Conclusion and discussion

The online, hybrid teaching method for basketball may enhance the interaction between teachers and students by encouraging closer interaction and allowing teachers to receive student feedback. This enables the teacher to have information about the learning situation before class and online teaching, allowing for a better understanding of the students' needs, a clearer identification of the differences in students' learning, and timely tracking of those students having difficulty learning. It also allows a teacher to personalize instruction, at least to some extent, and provides an efficient method for addressing students' varying understanding abilities and driving them toward the same learning progress.

In the post-COVID-19 era, our hybrid online and offline teaching method may be effective in middle school physical education, as demonstrated by our analysis and test case. Compared to traditional blended instruction, our approach considers the students' demand for basketball courses and the post-COVID-19 learning environment. Students are more satisfied with this method of instruction, and their enthusiasm for acquiring physical education knowledge increases, resulting in enhanced physical education in junior high schools.

We use neural networks to detect errors in students' video feedback and design effective teaching activities and instructional materials with students as the focal point of our research. In the final stage of case verification, experimental results indicate that the student satisfaction score for this method is 8.9, indicating that this teaching method leads to high student satisfaction and learning enthusiasm and can meet the requirements of junior middle school physical education teaching after COVID-19.

We have only discussed the hybrid method's application to a basketball instruction program. Our results are encouraging and pave the way for applying our findings to various sports programs and schools to enhance and optimize the teaching methods for multiple disciplines.

Recommendation and implications

The findings and experimental results indicate that a hybrid approach to basketball coaching that combines digital and conventional instructional techniques is effective. Based on the provided data, recommendations, and conclusions were drawn. The positive results of the basketball pedagogy initiative imply that the blended method of instruction should be applied to other sports. Implementing this specific strategy can increase student-teacher interaction, facilitate individualized instruction, and raise the overall quality of physical education curricula.

- The hybrid methodology can be evaluated in various disciplines beyond physical education. By utilizing multiple digital platforms and tools, instructors can increase student engagement, provide valuable resources in advance, and collect constructive feedback.

- The hybrid education model provides educators and students with more face-to-face and virtual communication opportunities. Allowing students to ask questions, participate in classroom discourse, and provide constructive feedback may increase student participation in such interactions. This measure will enable educators to intervene quickly with students experiencing difficulties.
- The implementation of neural networks to identify errors in student feedback recordings exemplifies the potential of technology for error detection and grading. Educators may investigate additional resources and techniques to automate providing feedback, evaluating performance, and customizing instruction to strengthen this concept. Consequently, it is possible to enhance the effectiveness and quality of education. This guidance is essential because optimizing the hybrid teaching method requires ongoing evaluation and improvement. Through the accumulation of feedback from educators and students, it is possible to assess the efficacy of instructional strategies and identify areas for improvement. It is recommended to regularly incorporate these insights into one's instructional approach to preserve its novelty and relevance. The hybrid educational approach aims to improve both student satisfaction and academic motivation. Personalized physical education instruction increases students' likelihood of being engaged and enthusiastic about their coursework. It is prudent to monitor the emotional health of your pupils and make any necessary adjustments to your pedagogical approach. It is essential to have a plan in place in anticipation of prospective classroom scenarios that may occur. COVID-19 The emergence of the COVID-19 pandemic acted as the impetus for the development and implementation of the hybrid instructional strategy. Even if circumstances change, distance and online education components may continue to be useful. Implementing a mixed approach may result in increased adaptability, enhanced accessibility, and enhanced learning opportunities.

A blended approach to physical education instruction, incorporating both online and offline modalities, has increased student engagement, satisfaction, and achievement. By extending the use of technology and broadening the scope of sports programs and academic disciplines, it is possible to increase the efficacy of pedagogical approaches and the benefits for students in diverse educational contexts.

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