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Experimental Research on the Integration of "Internet+" into Middle School Basketball Teaching-A Case Study of the WeChat Platform

Xuelin Yang [1], *Piyapong Sumettikoon* [2*]

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Abstract

Impacted by the Coronavirus (COVID-19) pandemic at the beginning of 2020, offline collective teaching was suspended in schools. Consequently, offline physical education teaching has been resumed, after COVID-19 while spawning rapid development of online and offline "mixed" teaching. The object of this research is to examine the effect of the integration of "Internet+" into middle school basketball teaching compared to traditional basketball teaching. The methodology was to investigate the issue via the control group method. In this research, a total of 80 students from two 2020 classes (that is, where students were admitted in the year 2020) in XX Middle School were selected as the main research objects regarding the integration of WeChat into middle school basketball teaching. The 80 students were divided into an experimental group and a control group, (small classes 1 and 2 represented the experimental group and the control group, respectively). Each contained 40 students (20 male and 20 female students). The research discovered that compared with traditional basketball teaching method, the "Internet+"-based method was important in improving students' basketball learning performance. In addition, it enhanced students' interest in basketball learning, as well as to a significant extent their autonomous learning ability. However, no obvious differences were observed between the two teaching methods in increasing the frequency of when students played basketball.

Keywords: Internet+; Middle School Physical Education; Basketball; WeChat; MOOC Cognitive-Affective Processing System (CAPS)

[1]*Ph.D Candidate, Department of Industrial Education, King Mongkut's Institute of Technology Ladkrabang (KMITL), Bangkok, Thailand, 63603164@kmitl.ac.th*

[2*]*Assisant Professor, Department of Industrial Education, King Mongkut's Institute of Technology Ladkrabang (KMITL), Bangkok, Thailand, piyapong.su@kmitl.ac.th*

Introduction

As economic globalization develops, public health emergencies, caused by the transmission of various infectious diseases, are now frequent. The outbreak of Coronavirus (COVID-19) at the beginning of 2020 posed uncontrollable and uncertain impacts on the world's economic and social order. According to data from the United Nations Educational Scientific and Cultural Organization (UNESCO), around the globe, schools in 15 countries and regions were faced with comprehensive class suspensions in March 2020. As a result, a total of 290 million students were discouraged from attending classes in schools. In China, the class suspension policy was implemented in numerous schools. When introduced into the schedule of traditional school teaching, "Internet+" endowed middle school physical education (PE) with opportunities of innovation. With this background, the integration of "Internet+" into middle school basketball teaching is explored in this research.

"Internet+" is defined as a behavior pattern or a movement process, both reconstructing and fusing with traditional industries. Specifically, "Internet+" refers to unifying the internet and traditional industries in economic society via internet information technology and completing an economic transformation and upgrading by optimizing production factors, updating business chains, and reconstructing business models. In addition, "Internet+" also works in relation to quality improvement and upgrading of traditional industries or fields towards increased digitalization, informatization, networking, and intelligence.

"Internet+"-based PE teaching is an educational practice of PE curriculum. In this context, PE teachers integrate offline PE curriculum with online ones using internet technology by utilizing both abundant internet resources and their experience in traditional PE teaching. The aim is to improve PE teaching and enhance students' physical quality. In sum, "Internet+" PE teaching is characterized by mobility, multiple interactions, multi-mode means, and individuality.The object of this research is to examine the effect of the integration of "Internet+" into middle school basketball teaching compared to traditional basketball teaching.

Literature Review

Cheng, L. et al. (2017) proved that the Internet and other forms of contemporary communication have had far-reaching effects, as have innovations in the realm of education. Taobao, an online marketplace, has weakened the dominance of brick-and-mortar outlets. Didi taxi has shattered the monopoly that previously existed in the taxi sector, forcing drivers to up their game. Whereas conventional physical education fostered a sense of rigidity and exclusivity, the "Internet +" age emphasizes openness and collaboration. China's Curriculum Teaching

Samala, A. D has seen fast growth in the use of interactive and highly visible new modes, techniques, and resources for teaching in the classroom, such as micro-classes and massive open online courses (MOOCs). Changes in physical education's pedagogical approaches are crucial because of the role they play in translating classroom knowledge into real-world application. As our society evolves, there is a greater need than ever before for individuals with the ability to think critically and creatively across disciplines. As a result, the focus of today's classrooms has shifted away from the development and exploration of students' mastery of a select group of specialized disciplines.

Chi, B. et al. (2020) Pedagogical theory and practise have both benefited greatly from technological advancements. The O2O teaching mode is one example of the mixed pedagogy that is gaining favour with both teachers and students.

Cui, Z. B. (2016) explained that the term "online to offline" (O2O) refers to the first use of this model in commercial marketing. The term "marketing mode" describes a strategy that uses internet channels to encourage offline actions and purchases. It's a term that applies to doing business away from the internet. The O2O teaching method employs this technology in the realm of education. There have been significant shifts in the meaning of O2O mode, which now primarily refers to the sharing of teaching and learning resources via network information technology, the modification of conventional learning and teaching practices, and the development of an

atmosphere that is open, interactive, personalized, efficient, and comfortable for students.

According to Zhang, J. (2021), the proportion of Chinese internet users is up 3.8% from the end of 2017 and the prevalence rate is at 59.6%. Thus, there was a steady growth of 56.53 million new internet users during the full year. Students make up 25.4% of all Chinese internet users. Students make up the biggest segment of Chinese internet users, and they are increasingly incorporating sports applications into their daily routines. Unfortunately, technological advancements have not always benefited our university students.

Wang X. (2017) concluded that internet addiction is a real problem among today's youth and has a devastating impact on many kids' academic and personal development. It's bad for their health, both mentally and physically. American psychologists were the first to recognise this trend, and they labelled it as a new psychiatric disorder with designations such "Internet Addiction" (IA) and "Internet Addiction Syndrome." There's no use in bringing up the hordes of theory students who sit with their heads down over their smartphones.

Li C. and Yang J. (2017) revealed that colleges and universities have already become the arena where educators and students engage in a battle for insight and bravery. The same holds true for our sports-focused PE classes. Everyone from students to professors is using their mobile devices to do physical activities. Students are often distracted by electronic devices, therefore our physical education teachers employ the "blocking" method to keep them from sitting in the vehicle. Instead, we should use the "sparse" method (Zhang Y., 2016). To make these powerful signals of the times a useful tool for our college physical education classroom teaching rather than an essential element which intervenes in the course, the author has developed a hybrid teaching mode of multimedia integration based on 5G cloud computing, which integrates computer, mobile phone, Internet, social platform, and other information.

As a result of COVID-19, new methods of training have been developed that combine online and offline components in an effort to improve the quality of education provided. Physical education is no different in this regard. The tendency of combining online and offline sports education within a single programme emerged during the COVID-19 epidemic (Z. Guo and S. Tan. 2021, Wang, Y., & Wang, H, 2020). In a broader sense, basketball's popularity among junior high school students means that basketball education practises are always evolving to meet the needs of the students. It's conceivable that "Internet + basketball teaching" will dominate the educational landscape for a long time after COVID-19. Li Qiang et al. (2017) has established a theoretical model of a basketball teaching system and created a basketball network learning mode based on the premise of "teaching, network, and game in one." Information-based education has been shown to improve students' fitness, offensive knowledge, defensive ability without the ball, and defensive skill with the ball via classroom trials (Zhang Y., 2016).

Experimental Hypotheses

While other conditions were consistent, the main experimental variable involved in this research was whether the "WeChat application-based middle school basketball teaching model" was adopted. In addition, the main irrelevant variables controlled in the experiment to reduce the experimental error as far as possible, were as follows: consistency in scorers, scoring system (WDSF2.1) and scoring method before and after the experiment, consistency between the experimental group and the control group in schooltime (72 credit hours), and teaching contents (basketball teaching contents). Moreover, the teaching behaviors during the experiment should not cause the original teaching plan to be upset, i.e., the experimental group kept consistent conditions with the control group other than strictly abiding by the "WeChat-based middle school basketball teaching model".

The experimental hypotheses were as follows:

(1) Hypothesis 1: The WeChat-based middle school basketball teaching method can improve students' basketball learning effect to a greater extent than the traditional one;

(2) Hypothesis 2: The WeChat-based middle school basketball teaching method can enhance students' basketball learning interests to a greater extent than the traditional one;

(3) Hypothesis 3: The WeChat-based middle school basketball teaching method can strengthen students' basketball learning initiatives to a greater extent than the traditional one;

(4) Hypothesis 4: The WeChat-based middle school basketball teaching method can improve students' autonomous learning ability to a greater extent than the traditional one.

Methodology

In this research, a total of 80 students from two 2020 classes (that is, where students were admitted in the year 2020) in XX Middle School were selected as the main research objects regarding the integration of WeChat into middle school basketball teaching. The 80 students were divided into an experimental group and a control group, (small classes 1 and 2 represented the experimental group and the control group, respectively). Each contained 40 students (20 male and 20 female students).

Research design on the integration of "Internet+" into middle school basketball teaching

Model design for teaching curriculum: As "Internet+" rapidly developed, WeChat become one of the primary platforms for integrating "Internet+" into middle school teaching. In this research, the model of integrating "Internet+" into middle school basketball curriculums was designed on the WeChat platform.

Pre-class Part

Before class, the teacher edits and processes content learned in the class and sends it to the WeChat public account or pushes it to the class group. The teacher asks students to complete the learning tasks before class. The contents edited by the PE teacher are mainly in the form of a video, generally running for between eight and 10 minutes. In addition, the teacher explains one or two knowledge points to the class.

In-class Part

In the opening part, the teacher organizes queue formation, randomly asking a student about the content preview, gets a brief comment, and explains the contents and requirements of the lesson. In the preparation part, the teacher leads the students, jogging and warming up around the field, undertaking basketball gymnastics on the move, stretching muscles and ligaments, and exercising their joints. In the basic part, the teacher explains both the learning contents and technical movements, and demonstrates standard movements. Following this, students exercise in groups or independently. During exercises, the teacher makes a patrol inspection and records the exercise on a cell phone in the form of both videos and photos. During the rest period, students view the contents, learning what is achieved in the class via WeChat on the phone as arranged by the teacher. In the last part, the teacher leads the students in relaxing, and summarizes the entire class, before assigning students to preview the contents to be learned in the next class on the WeChat official account or in the WeChat group.

After-class Part

During after-class hours, students may raise questions via the WeChat official account or the WeChat group so that the teacher is informed in a timely way of students' learning situation and their problems that require solutions.

Curriculum Design

The curriculum design was carried out by combining PE class planning in XX Middle School during 2020-2021, with the following three objectives. First, it was the knowledge and skill objective. This was to enable students to understand basic basketball-related knowledge and conception, master movement techniques, standardize their movements, comprehensively utilize such techniques and standard movements in physical training, and truly enhance their overall technical level. Second, there was the process and method objective. The aim was to facilitate students in proactively constructing knowledge, form active learning abilities, and try to use such abilities in other technical or sports events. Third, the curriculum design was targeted at students' emotional attitudes and values. The aim was to encourage students to experience the joy brought by autonomous learning, clarify the significance of sports activities, and cultivate strong will. After the basic curriculum design was completed, related basketball teaching materials and video resources were searched in the current semester in relation to the curriculum learning progress.

Finally, the collected video resources were redesigned according to the curriculum content arrangement, thus forming the final curriculum design.

Curriculum Implementation

Resource Application

First, students browsed and watched resources before class. The teacher sent the basketball movement video recorded the previous week to the WeChat official account or class WeChat group and assigned the preview task. Students watched the video, exercised independently, exchanged ideas, and gave feedback in the WeChat group.

Staged Test

In the staged test, after a certain learning cycle, representative teaching contents were selected to test students' technical level, and the generated data were recorded. Before the test, the students in both the experimental and control class were tested in three aspects: body shape, physical fitness, and basketball technique. Next, the differences between the two classes were statistically analyzed to understand the basic situation of students in the two groups.

Evaluation of Teaching Curriculum

According to students' use effect and their comments and feedback on video resources, the curriculum design was continuously adjusted to perfect the "Internet+"-based basketball curriculum design. This research evaluated the curriculum design mainly from two perspectives: learners' level of mastery and feedback. Students' technical levels regarding the same item were tested before and after the teaching experiment. Then, the level of mastering and improving this technical movement was analyzed through data comparisons. Learners' feedback was acquired by organizing and analyzing questionnaires on the basketball curriculum effect.

Experiment on the Integration of WeChat into Middle School Basketball Teaching

Experimental Implementation in Experimental Group

In the preview stage before class, the teacher uploaded contents to be learned the next week to the WeChat group or the official account for preview. In the basketball class, the teacher checked both students' level of mastering the contents learned in the last class and the completion status of assignments arranged after the class. Then, students were guided to identify their current problems and questions through autonomous learning in the WeChat official account and the WeChat group. In addition, both teacher and students could directly discuss issues in the WeChat group. After the end of the basketball class, the teacher made his/her summary and evaluation, including recognizing and encouraging middle school students' performance. In addition, it was necessary to point out students' shortcomings and to offer suggestions to try to rectify them. Finally, tasks and requirements after this class was arranged. In the after-class review stage, the teacher prepared the teaching tasks and contents (mainly referring to the repeated exercise of technical basketball movements) for the next week according to the completion of teaching tasks in each class.

Experimental Implementation in Control Group

During the in-class stage, the teacher checked students' level of mastering the contents learned in the last class as well as the completion status of assignments arranged after class. The teacher also provided students with guidance, demonstration, and exercise of technical basketball knowledge. In the end stage, the teacher presented both a summary and made comments, pointing out students' shortcomings, proposed suggestions, and arranged tasks and requirements after the class.

States Analysis

All experimental objects were tested before the experiment, and their performance was scored and recorded via the WDSF2.1 scoring system. Based on four items, a homogeneity test was performed in the two groups through SPSS22.0: technical quality, dribbling technique, shooting skills, and three-step layup.

Results

In this research, a total of 80 students from two 2020 classes (that is, where students were admitted in the year 2020) in XX Middle School were selected as the main research objects regarding the integration of WeChat into middle school basketball teaching. The 80 students were divided into an experimental group and a control group, (small classes 1 and 2 represented the experimental group and the control group, respectively). Each contained 40 students (20 male and 20 female students).

The aim was to identify differences between the two groups. Next, students in both experimental and control groups were numbered successively according to the sequence of 1-20. The full score of a single test item was 10, and thus the total score was 40. The pre-test performance of each student evaluated by three scorers was obtained by calculating the average value of the single-item performance of middle school students in both the experimental and the control group (Table 1).

Table 1. Comparison of average performance between experimental group and control group before experiment (n=40)

	Technical quality	**Dribbling technique**	**Shooting skills**	**Three-step layup**
Experimental group	5.23	6.10	4.99	5.24
Control group	5.30	6.11	5.10	5.26

A homogeneity test (Table 2) was performed in the experimental and control groups according to the average scores of four items, as shown in Table 1.

Table 2. Independent-samples T test of experimental group and control group before experiment (n=40)

	Experimental group (n=20)	**Control group (n=20)**	**t**	**p**
Performance	5.40±0.84	5.44±0.69	-0.27	0.791

As Table 2 indicates, $p=0.791 > 0.05$, indicating an insignificant difference, i.e., the students in the two groups did not differ (but rather, were equivalent) at the level of basketball capacity before the experiment. Hence, the homogeneity test condition was satisfied, and the follow-up experimental research could be implemented. To improve the accuracy of the teaching experiment, before the experiment the body shape, physical fitness, and WeChat platform situation of students in the control class and the experimental class were statistically investigated. The results showed that no significant differences were manifested between the two groups. The teaching experiment lasted 18 weeks (two classes per week, 90 min per class), totaling 72 credit hours (45 min/credit hour).

Table 3. Statistical table of mastery level of basketball techniques of male students in control class and experimental class before experiment

Test index	**Male students in control class (20)**	**Male students in experimental class (20)**	**T value**	**P value**
Spot shooting (shot)	4.94±1.269	6.5±1.99	-2.491	0.019
Dribbling lay-up (second)	23.662±8.28	18.243±4.19	-2.185	0.037

Table 4. Statistical table of mastery level of basketball techniques of female students in control class and experimental class before experiment

Test index	Female students in control class (20)	Female students in experimental class (20)	T value	P value
Spot shooting (shot)	5.78±1.7	8.22±2.7	-3.24	0.003
Dribbling lay-up (second)	28.479±8.53	23.891±3.48	2.112	0.042

The tested mastery levels of basketball techniques of students in the control class and the experimental class are shown in Tables 3 and 4. Regarding one-minute set shooting, male students shot the basketball standing at the penalty line, while female students did so in the area in front of the penalty line (4.55 m from the end line). In addition, a 2×28 m reciprocal dribbling lay-up test was also taken by selected male and female students. Results showed that the basketball test performance of male students in the experimental class was significantly better than in the control class ($p<0.05$). The performance of female students in the experimental class was also markedly better than that in the control class ($p<0.05$), indicating the superiority of the WeChat-based basketball teaching method over the traditional one.

Comparative Analysis of Weekly Extracurricular Basketball Playing Frequency between Two Groups of Students after Experiment

Data in Table 5 do not reflect that the two groups of students differed in weekly extracurricular basketball playing frequency. Table 6, with $T=-0.64$ and $p=0.524>0.05$, also indicates an insignificant difference. Hence, it could be considered that no significant differences existed between the two groups of students in the weekly extracurricular basketball playing frequency. Given this, it was concluded that the WeChat-based basketball teaching method does not influence students' weekly extracurricular basketball playing frequency more than the traditional method.

Table 5. Statistical comparison of weekly extracurricular basketball playing frequency of students in control class and experimental class

Group	Over four times		Three times		Once or twice		No	
	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)
Control class	6	15.00	7	17.50	18	45.00	9	22.50
Experimental class	4	10.00	10	25.00	21	52.50	5	12.50

Table 6. Difference test of weekly extracurricular basketball playing frequency of students in control class and experimental class after experiment

Test index	Control class (40)	Experimental class (40)	T value	P value
Weekly extracurricular basketball playing frequency	2.16±1.051	2.31±0.896	-0.64	0.524

Comparative Analysis of Basketball Learning Interests of Students in Two Classes after Experiment

It can be seen in Tables 7 and 8 that in the experimental class, a total of 11 students were very interested in basketball, and 22 ones were relatively interested, totaling 33 students interested in basketball. In the control class, however, only seven students were very interested in basketball and 12 were relatively interested (totaling 19). Only two students were a little interested in

basketball in the experimental class, while in the control class the number was six. Thus, students in the experimental class showed greater interest in learning basketball, indicating that WeChat-based basketball teaching can enhance students' interests in learning basketball.

Table 7. Statistical table of basketball learning interests of students in control class after experiment

Category	Totally uninterested	Not much interested	Ordinary	Relatively interested	Very interested
Frequency	0	9	10	12	7
Percentage (%)	0	22.5	25.0	30.0	17.5

Table 8. Statistical table of basketball learning interests of students in experimental class after experiment

Category	Totally uninterested	Not much interested	Ordinary	Relatively interested	Very interested
Frequency	0	2	5	22	11
Percentage (%)	0	5.0	12.5	55.0	27.5

Comparative Analysis of Basketball Learning Initiatives between Students in Two Classes after Experiment

Tables 9 and 10 demonstrate students' basketball learning initiatives after the experiment. The number of students with very high learning initiatives was two in the control class, accounting for 5%, while in the control class it was eight (20.0%), six more than in the control class. In the experimental class, a total of 23 students were relatively active, accounting for 57.5%, while the figure was only 14 (35.0%) in the control class. The conclusion is that the two groups differed greatly in their relative degrees of activity. In the control class, 10 students were not very active in learning basketball, accounting for 25.0%. It was two in the experimental class, thus eight less than in the control class. In the control class, three students were very inactive in learning basketball, a phenomenon not observed among students in the experimental class. Data comparison results indicate that students in the experimental class were more actively learning basketball than those in the control class.

Table 9. Statistical table of basketball learning initiatives of students in control class after experiment

Category	Very inactive	Inactive	Ordinary	Relatively active	Very active
Frequency	3	10	11	14	2
Percentage (%)	7.5	25.0	27.5	35.00	5.0

Table 10. Statistical table of basketball learning initiatives of students in experimental class after experiment

Category	Very inactive	Inactive	Ordinary	Relatively active	Very active
Frequency	0	2	7	23	8
Percentage (%)	0	5.0	17.5	57.5	20.0

Comparative analysis of autonomous learning abilities of students in two classes after experiment

From the statistics of autonomous learning ability shown in (Table 11), it can be seen that nine students very much agreed in the control class, accounting for (22.5%), while 17 (42.5%) students did so in the experimental class. Thus, the situation in the experimental class was better than that in the control class. In the control class, a total of 25 students agreed or very much agreed, accounting for 62.5%, while the figure was 37 (92.5%) in the experimental class. The number of indifferent students was 15 in the control class, accounting for (37.5%), and three (7.5%) in the experimental class. This indicated that students in the experimental class possessed better

autonomous learning abilities than those in the control class.

Table 11. Analytical research on autonomous learning abilities of students in experimental class and control class

Research content	Control class						Experimental class					
	Agree very much		Agree		Ordinary		Agree very much		Agree		Ordinary	
	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)	Number of students	Percentage (%)
Autonomous learning	9	22.5	16	40.0	15	37.5	17	42.5	20	50.0	3	7.5

Survey on students' general evaluations in two classes taught via "Internet+"-based teaching method after the experiment

This research statistically investigated the contributions of "Internet+"-based basketball teaching contents (with WeChat as experimental means) as considered by students in the experimental class. As seen in (Table 12), 38 students (95%) in the experimental class thought that WeChat-based teaching was helpful for their basketball learning, and 27 of them thought WeChat-based teaching was very helpful. Eleven found it relatively helpful, and only two considered it not very helpful. These data indicate that most students in the experimental class recognized the beneficial effects of WeChat-based teaching, as being helpful for their basketball learning.

Table 12. Statistical table of contributions of "Internet+"-based teaching to basketball learning as considered by students in experimental class after experiment

Research content		**Very helpful**	**Relatively helpful**	**Ordinary**
Is "Internet+" helpful for basketball learning?	Number of students	27	11	2
	Percentage (%)	67.5	27.5	5.0

Discussion

First, when applied to basketball teaching, the WeChat-based method was found to exert a more evident effect on improving students' basketball learning performance than the traditional basketball teaching method. This is because the WeChat-based basketball teaching method provides students with a multimode, all-round, and lively learning style, making it possible for students to gain opportunities to learn whenever and wherever possible.

Second, the WeChat-based basketball teaching method could enhance middle school students' basketball learning interests more than the traditional method. With dynamic learning materials like pictures, audio and videos, the WeChat-based basketball teaching method motivated students better and contributed to stronger learning initiatives.

Third, the WeChat-based basketball learning method was more capable of strengthening middle school students' autonomous learning abilities than the traditional teaching method. The traditional basketball teaching method does not provide students with a convenient discussion platform. However, such platforms are required to enhance cooperation, discussion, and learning by both students and teachers. In the WeChat-based basketball teaching model, students should do more autonomous learning. Specifically, students should preview their knowledge in this class, take initiative in thinking, understand and digest knowledge according to platform contents, and exercise new basketball movements.

Fourth, no obvious differences were observed between the WeChat-based basketball teaching method and the traditional one in increasing students' basketball playing frequency. Basketball playing frequency was affected by various factors, including teaching method, completion status of assignments, frequency of participating in other activities every other two days, number of friends, and the school's basketball atmosphere.

Conclusion

The WeChat platform-centered integration of "Internet+" into middle school basketball teaching can markedly improve the PE teaching effect, enhance students' interests and initiatives in PE learning, and strengthen their autonomous learning abilities. On this basis, the following suggestions are proposed. First, the popularization and strengthening of the application of the "Internet+" teaching technology should be undertaken, as well as increased capital investment in internet tools to construct information-based intelligent PE teaching places and to provide teachers with an appropriate network environment to implement internet-aided teaching. Second, the "Internet+"-based PE curriculum design should be optimized. PE teachers' abilities to use information-based multimedia should be enhanced, helping them to undertake more advanced "Internet+" teaching concepts. Third, online middle school PE teaching resources should be optimized. Despite very abundant PE teaching resources at present, there are only a few resources suitable for middle school PE teaching. Finally, it is suggested that a powerful teaching resource guarantee should be provided mainly through government investments for both teachers and students.

Novelty and Significance of the Study

The online teaching technology is integrated into modern teaching concepts and ideas, and efforts are made to cultivate and improve students' information literacy. The aim is to better promote the lasting and effective development of information-based education. In line with the concepts of "students are the main body of learning" and "technology supports learning", teachers and students interact via the "cloud".The aim is quickly to promote educational technology reform and realize the revolution in transforming physical education teaching methods.The study signifies that the powerful teaching resource guarantee should be provided mainly through government investments for both teachers and students.

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