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Sports Teaching Equipment Based on Mobile Internet and Cloud Data

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Abstract:

The quality of PE teaching equipment affects the effectiveness of PE teaching. Wearable devices are the research hotspot of physical education teaching equipment. The traditional wearable equipment has low precision, insensitive response and complex data structure, which seriously restricts the normal development of physical education teaching. This paper improves the wearable device based on mobile Internet and cloud data. The results show that: after the experiment, there is little difference between the control group and the experimental group in the basic physical quality. However, there are obvious differences between the control group and the experimental group in the badminton throw and turn back events, which are closely related to badminton events. It shows that wearable technology assisted teaching can greatly improve the explosive power and coordination of students' upper and lower limbs. The wearable technology assisted teaching scheme created by teachers according to big data enables students to fully feel the dominant position in learning and fully mobilize the communication and learning among students.

Keywords*: Wearable Devices, Mobile Internet, Cloud Data, Sports Teaching Equipment.*

I. INTRODUCTION

In the 1960s, MIT Laboratory put forward the wearable technology. This technology can skillfully integrate multimedia, wireless sensor and wireless communication technology through the media, and we can conduct the experience of induction feedback interaction through our basic body movements. Wearable technology action process, also known as human computer interaction (HCI), is a technology to study human, computer and their interaction. The purpose of human-computer interaction is to make the computer system and wireless sensor technology cooperate and influence each other, and complete user instructions more efficiently and safely.

Yan Yanpointed out that "Wearab e Technology" is a related innovative science and technology proposed by the Massachusetts Institute of Technology in the 1960 s, which can effectively combine multimedia, sensors and wireless communication technologies [1-2]. A

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

new technology that combines our clothes and interacts with each other through hand-eyes. "

The early wearable device was only a conceptual product [3]. Back in 1975, Hamilton watch launched the pulsar computer watch, which opened the precedent of intelligent wearable. Limited by the social development environment and technological capacity at that time, and due to the attributes of this product, pulsar could not be widely promoted. It was not until Sony released the smart watch generation in 2012 that intelligent wearable technology came into public view [4-7].

Of course, with the advancement of science and technology and the enhancement of innovation awareness, after two years of fermentation development, wearable devices have also ushered in a blowout period of product development. Because of its more comprehensive functions, its applications are becoming more and more extensive. Only Vandrico's wearable device statistical analysis shows that there are 291 pieces, and the functions of wearable devices (taking bracelets as an example) are gradually increasing, from the initial motion monitoring to today's daily life services (heart rate, sleep quality, intelligence).

With the rapid development of wearable technology in the society, there is a diversified development trend in aerospace, military special technology, medical and health technology and sports science monitoring. Of course, the most frequent wearable technology coming into the public's view is sports wear technology, such as Huawei, Nike, Xiaomi and other electronic or sports equipment giants have launched their own brands of wearable devices, which are applied in health monitoring, sports data collection and other fields [8].

Wearable technology is in the foundation and core position in this design. The correct selection of wearable devices is the basis for the correct and smooth experimental design, and the comprehensive analysis of students' motion data is the core part of this design. In this experiment, the wearable technology equipment mainly uses millet bracelet and cool wave badminton sensor.

Xiaomi Bracelet mainly records the number of steps, heart rate curve and other related data of exercise load and intensity of students in the process of exercise, which directly shows the teaching intensity of teachers and the exercise load of students [9].

Cool wave badminton sensor mainly records the students' mastery and application of badminton skills (speed, strength, angle) in the process of practice, and effectively feedback the students' badminton acquisition through the comprehensive analysis of big data.

II. EVALUATION OF TEACHING EXPERIMENT

(1) Pre test

Before the implementation of the course, the students in the control class and the experimental class were tested for basic information. The specific content includes the basic height and weight of the students, as well as the physical fitness and flexibility test related to the jump shot of 800 meter run, standing long jump, turn back run and sit in front of the body; the basic badminton skills test includes the basic badminton techniques, such as forehand long shot,

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

forehand hit high and long ball.

(2) Post test

Through the questionnaire survey of badminton cognition and sports habits of students. Through the end of the course test, the students' mastery of badminton basic technology is tested and evaluated. Three qualified badminton teachers are invited to take the test to ensure the fairness of the test.

(1) Serve technical standards and technical evaluation

Right court area service (5 balls in total): candidates stand on the right side of the field area to the opposite side of the right field area continuously serve 5 balls, with the way of high and far ball to the designated area in turn; left court area service (a total of 5 balls): candidates stand on the left field area to the opposite right field area continuously serve 5 balls, with the way of high and far serve the ball to the designated area in turn.

Test requirements: Candidates stand 1.5 meters away from the front serve line and serve to the opposite court. They must serve with forehand. The teacher introduces the serve rules and scoring rules before the test, and students can practice a little; The scoring area is divided. Every score line is 30cm from the bottom line. The closer to the bottom line, the higher the score. No score is scored for failing to reach the scoring area or violating the boundary. Each ball (0-4 points).

Scoring standard: add the number of balls sent into the effective area to calculate the score. The total score is calculated as 20 points according to the proportion.

Fig 1: Division of badminton court area (half court display)

(2) Technical standard and technical evaluation of high-distance ball in backcourt

Serve on the right field (5 balls in total): the teacher will serve the high-distance ball to the students participating in the test, and the examinee will hit the high-distance ball in turn to the designated area by hitting the high-distance ball with his forehand; Serve in the left field (5 balls in total): the teacher serves the reference students with a high-distance ball, and the students hit the ball to the scoring area by hitting the high-distance ball with forehand, hitting 5 balls in a row. If the teacher fails to serve properly or makes mistakes caused by other objective

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

factors, he may request to serve again.

Test requirements: the examinee hits the ball with forehand to the opposite side of the court. While serving, the teacher observes the technical actions and records the score. Before the test, the teacher introduces the rules of serving and scoring, and the students can practice a little;The scoring area is divided into three parts: one score line every 30cm from the baseline. The closer to the baseline, the higher the score. No score will be scored if there is no score in the scoring area or out of bounds violation (0-4 points).

Scoring standard: add the number of balls sent into the effective area to calculate the score. The total score is calculated as 20 points according to the proportion.

(3) Technical standard and evaluation of backcourt forehand drop shot

Serve in the right court area (5 balls in total): the teacher will serve the high and long balls to the students participating in the test, and the examinee will stand in front of the forehand hanging net on the opposite side and hit the ball to the designated area in turn;Serve in the left court area (5 balls in total): the teacher serves high and long balls to the students who participate in the test. The students use the forehand hanging net technology to hit the ball to the scoring area and hit 5 balls in a row. If the teacher fails to serve in place or other objective factors make mistakes, they can request to serve again.

Test requirements: the examinee uses the forehand hanging net to hit the ball to the opposite side of the court. The teacher is responsible for serving while observing the technical action and recording the score. The teacher introduces the service rules and scoring rules before the test, and the students can practice a little;According to the division of scoring area, every 30cm from the baseline will be scored. The closer to the baseline, the higher the score will be. No score will be scored if there is no scoring area or out of bounds violation. The total score of each ball (0-4 points) will be calculated as 20 points.

Scoring standard: add the number of balls sent into the effective area to calculate the score (in the process of technical test, the cool wave badminton sensor synchronously tests the speed and strength of the students participating in the examination).

Comprehensive performance evaluation: through physical fitness (20%), basic technology (60%), learning attitude (10%) and emotional performance (10%), the first two scores mainly rely on the test, the last two scores rely on classroom performance, and finally calculate the comprehensive performance.

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

III. COMPARISON OF THE MASTERY OF BASIC BADMINTON SKILLS AFTER THE EXPERIMENT

TABLE I. Before and after the teaching experiment, the control group badminton basic technology test statistics

Project	Before and after the experiment	x±S	T	P
Forehand serve	Before the experiment	6.25±1.6	-20.279	P＜0.01
	After the experiment	19.75±1.6		
Forehand high shot	Before the experiment	2.83±1.749	-14.461	P＜0.01
	After the experiment	18.58±3.343		
Forehand net ball	Before the experiment	2.83±1.6	-11.062	P＜0.01
	After the experiment	11.58±2.1		

It can be seen from the statistics of badminton basic skills test in the control group before and after the teaching experiment in TABLE I that the average scores of the students in the control group before and after the forehand high-distance ball technology experiment are 6.25 and 19.75; The average scores before and after forehand hitting high-distance ball are 2.83 and 18.58; The average scores before and after the forehand net hanging experiment were 2.83 and 11.58, and the P values before and after the three technical experiments were all less than 0.01, showing significant differences.From this analysis, the control group students in the traditional badminton teaching method, the mastery of basic skills has been greatly improved, the traditional badminton teaching methods to improve the basic badminton technology has a good effect.

TABLE II. Test statistics of badminton basic skills in experimental group before and after teaching experiment

Project	Before and after the experiment	x±S	T	P
Forehand serve	Before the experiment	6.5±1.7	-15.52	P＜0.01
	After the experiment	24.4±3.5		
Forehand high shot	Before the experiment	3.92±1.3	-23.02	P＜0.01
	After the experiment	24.92±2.8		
Forehand net ball	Before the experiment	4±1.8	-9.67	P＜0.01
	After the experiment	15.83±3.8		

It can be seen from the statistics of badminton basic technology test in the experimental group before and after the teaching experiment in TABLE II that the average scores of the students in the control group before and after the forehand high-distance ball technology experiment are 6.5 and 24.4; The average scores before and after forehand hitting high-distance

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

ball are 3.92 and 24.92; The average scores of the ball before and after the forehand net hanging experiment were 4 and 15.83, and the P values of the scores before and after the three technical experiments were all less than 0.01, showing significant differences.

From this analysis, the experimental students in the wearable technology assisted badminton teaching mode, the mastery of basic technology has been greatly improved, wearable technology assisted badminton teaching has a significant effect on the improvement of basic badminton technology.

TABLE III. After the teaching experiment, the control group and experimental group badminton basic technology test statistics

Group (project)	Control group x±S	Experience group x±S	T	P
Forehand serve	19.25±1.6	24.42±3.5	-4.098	P＜0.01
Forehand high shot	18.58±3.3	24.92±2.8	-4.976	P＜0.01
Forehand net ball	11.58±2.1	15.83±3.8	-3.333	P＜0.01

According to TABLE III, the test statistics of badminton basic skills of the control group and the experimental group before and after the teaching experiment show that the scores of the control group and the experimental group in the three basic skills (forehand high and long shot, forehand hit high and long ball, forehand hanging net small ball) after the experiment were 19.25 and 24.42, 18.58 and 24.92, 11.58 and 15.83 respectively. It can be seen that the average test scores of the experimental group in the forehand high and long shot, forehand hit high and long ball, forehand hanging net ball test link is better than the control group. Through t-test, it is found that there are significant differences between the experimental group and the control group ($P < 0.01$),this also indirectly shows that the students in the control group and the experimental group have made progress in mastering basic technical actions through teaching experiments. Compared with the experimental group, the students in this group have made more obvious progress in technical actions that are difficult to master through wearable technology-assisted teaching. This also confirms that wearable technology-assisted teaching plays an effective role in grasping the key difficulties and students' wrong actions and classroom design during daily teaching experiments. It also shows that wearable technology-assisted teaching is more effective than traditional teaching methods for students in badminton.

IV. CONCLUSION

After the experiment, there was no significant difference in basic physical quality between the control group and the experimental group. However, there are obvious differences between the control group and the experimental group in the badminton throw and turn back events, which are closely related to badminton events. It shows that wearable technology assisted teaching can greatly improve the explosive power and coordination of students' upper and lower limbs.

ISSN: 0011-9342
Issue: 1 | Pages: 456 - 463

In college badminton elective teaching class, on the basis of traditional badminton elective teaching, using wearable technology to assist teaching, collecting students' practice big data (swing times, speed, strength, sports trend, etc.) according to classroom content, referring to teaching objectives, making corresponding teaching plans, giving full play to students' dominant position in learning, and carrying out flexible and targeted teaching design can improve badminton basic skills such as forehand and high ball at the bottom line.

The wearable technology aided teaching scheme created by the teaching and learning department has made the students fully feel the dominant position in their study and fully mobilized the communication and learning among the students. Wearable technology assisted teaching can stimulate students' initiative in learning, enhance their interest in learning and improve their learning ability. Emotional experience can cultivate students' ability to find and solve problems in the process of learning.

Through wearable technology assisted badminton elective course teaching, students gain confidence and interest. Badminton elective class from "full class" to "I want to learn", and gradually cultivate students "lifelong" sports consciousness.

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ISSN: 0011-9342
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