Application of MOOC in Physical Education Teaching Mode
Under the Background of Big Data

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Abstract: With the continuous development of network technology, the application of Internet technology in education mode is becoming more and more closely. MOOC education method that should be applied to online teaching platform is called the current mainstream hot topic. Applying big data technology to online teaching platform can effectively solve the problems of numerous and confusing teaching resources, difficult user selection, weak management of online learning process and teaching. The resources can not be efficiently utilized, and the user's sense of role is missing. The application of big data technology in network teaching has, to a certain extent, subverted the traditional teaching system, changed the teaching mode of unified place, unified time and unified content. According to the analysis results of big data, learners can flexibly choose the time and place of class according to their own needs and characteristics, and carry out personalized and customized teaching resource learning. These decisions are not Subjective, but through the analysis of big data, on the basis of objective and reliable data, the decision is made. In this paper, through a comparative experiment of two classes of students in Physical Education in a university, the results of big data analysis show that the application of MOOC in physical education teaching mode can improve students' learning enthusiasm to a certain extent, and the satisfaction degree of students to MOOC is as high as 92%; it can also assist students to improve their academic performance, and the average score of classes using MOOC is 10 points higher than that under the traditional education mode about.

Key words: Big Data, Internet Technology, MOOC Education Mode, Sampling Survey

1. Introduction
Since the beginning of the 21st century, the traditional education model concept has gradually failed to keep up with the modern teaching speed, and the integration of network technology and education has become a new opportunity. With the continuous deepening of big data technology, it opens up a new...
world for the development of MOOC. The progress of science and technology and the application of multimedia technology bring opportunities for the reform of traditional classroom teaching. The rapid development of educational informatization provides an opportunity for the in-depth study of MOOC. MOOC education has become a hot topic in the development of education informatization.

The rapid development of cloud technology and Internet of things technology promotes the maturity of big data technology, and also provides a new opportunity for the combination of education and big data, artificial intelligence and other technologies. With the advantages of big data platform and machine learning technology, online teaching can truly "teach students in accordance with their aptitude" and "thousands of people and thousands of aspects", which has completely changed the traditional teaching method [2]. Personalized and standardized teaching based on big data technology has become an inevitable trend in the future development of teaching, and has been valued by many authoritative experts and institutions [3]. For a long time, the problem that the traditional teaching always faces is that there is no match between the massive teaching data and the complex learning needs. The traditional teaching must be a unified learning content, a unified learning time and place. After the emergence of network teaching platform, although students can choose more flexible learning time and place, the teaching content is the same. Students must find out what they want to learn from the huge and chaotic teaching resources. The emergence of big data technology provides a method for finding and perceiving the information of users' needs from the massive network teaching resources, and provides the basic foundation for online teaching to obtain data in real time, analyze data, demand discovery and recommendation decision-making Users' perception of teaching resources demand [4].

In addition, the emergence of MOOC also highlights the key points and difficulties in teaching. Through the integration of technology and network technology, the original boring classroom becomes intuitive and easy to understand and master, strengthens classroom interaction and improves students' interest in understanding and learning the course content. In this paper, big data is integrated into MOOC, which enables teachers to collect, statistics, process and analyze students' learning data by means of technical means, so as to improve and improve students' individual learning behavior in classroom, which has become a development trend.

2. The Application of MOOC in Physical Education Under the Background of Big Data

2.1 Concept And Application Method of Big Data
Since the birth of big data, it is generally believed that it represents a large number of data, a wide variety of data that can not be quickly processed by traditional software. Big data itself is not important, but its authenticity, importance and potential value are the key. In terms of the scope involved, big data in the field of education can be divided into broad sense and narrow sense. In a broad sense, all data closely related to educational activities can be defined as educational big data, while learning behavior data generated by relevant online learning systems, curriculum management systems, and student performance management systems can be called educational big data in a narrow sense.

(1) Use big data technology to optimize the allocation of teaching resources and improve the quality of teaching. We can optimize the teaching resources of the platform and realize the sharing of high-quality resources. We can excavate high-quality teaching resources through users' evaluation, search or collection, and push high-quality resources to users, which can greatly improve the utilization rate of teaching resources and realize the mutual benefit of teaching and learning.

(2) Using data statistics to achieve personalized learning. The realization of personalized management of learning tasks, personalized push of learning content, etc., and the realization of customized service function through big data technology will greatly improve the efficiency and quality of teaching and learning.

(3) Real time data is used to monitor the learning process effectively. Real time monitoring of learning process is to discover students' current learning tension through big data analysis in the
learning process, understand students’ current demand points, mine the points that users understand or don’t understand the teaching content in the learning process, and accurately guide each learning stage and process of each user.

(4) Using role clustering to achieve effective interaction. Assign learning roles to platform users, cluster analysis of user characteristics, strengthen user interaction, divide classes for similar users, realize accurate classification management of users, and improve fuzzy class division management of traditional teaching [5-7].

In recommendation system, correlation coefficient is often used to measure the similarity between users. The formula is as follows:

\[
\text{sim}(a, b) = \frac{\sum_{i \in I} (r_{ai} - \bar{r}_a)(r_{bi} - \bar{r}_b)}{\sqrt{\sum_{i \in I} (r_{ai} - \bar{r}_a)^2} \sqrt{\sum_{i \in I} (r_{bi} - \bar{r}_b)^2}}
\]

Evaluation formula:

\[
p(a, i) = r_a + \frac{\sum_{b \in N} \text{sim}(a, b)(r_{bi} - \bar{r}_b)}{\sum_{b \in N} \text{sim}(a, b)}
\]

Similarity formula:

\[
\text{sim}(\vec{a}, \vec{b}) = \frac{\vec{a} \bullet \vec{b}}{|\vec{a}| |\vec{b}|}
\]

Improved cosine similarity formula:

\[
\text{sim}(a, b) = \frac{\sum_{u \in U} (r_{au} - \bar{r}_u)(r_{bu} - \bar{r}_u)}{\sqrt{\sum_{u \in U} (r_{au} - \bar{r}_u)^2} \sqrt{\sum_{u \in U} (r_{bu} - \bar{r}_u)^2}}
\]

2.2 Concept And Application of MOOC
MOOC is a newly introduced online course learning mode, which integrates a variety of teaching resources, learning management system and various network open resources. MOOC characteristics:

(1) Openness. MOOCS platform is open to all the public, not limited to formal learners of a school or institution. Openness is also reflected in curriculum construction or activity organization. Everyone can provide learning resources and topics for MOOC and participate in various learning exchange activities.

(2) Flexibility. The traditional network course video courseware is usually recorded in the form of classroom teaching, and its length is generally longer. MOOC is more open in content and form. Video, text, flash and HTML5 can be used to make MOOC courseware. The common forms include embedded test questions in video, classroom material discussion, virtual experimental platform, etc., which is much better than the simple one-way video teaching, because learners are not passively accepted, but can actively participate and get feedback. In addition, the video format is generally short and concise. Each video is targeted at specific problems and targeted. The video length is controlled within the time range of students’ attention, which is in line with the characteristics of students’ physical and mental development, and the evaluation method is more flexible.

(3) Interactivity. MOOC attaches great importance to the interaction in the teaching process. Students or teachers can discuss and communicate with each other and learn together in the discussion area. After students submit their homework on the platform, there will be feedback from the teacher. On the MOOC platform, everyone is a student and a teacher. They can obtain knowledge from others and also be the output of knowledge, which can satisfy different students. At the same time, learners’ needs also greatly mobilize the enthusiasm and initiative of learning, so as to improve learning efficiency to a great extent [8-9].
2.3 Mixed Education
According to the definition of scholars, this study believes that the essence of blended learning is to present and transmit knowledge by adopting appropriate technical means and teaching methods, different media and information transmission modes for different teaching contents and learners' needs and problems, so as to achieve the purpose of optimizing learning effect. The research content of this paper is based on the definition of blended learning given by Professor He Kekang to design and explore the teaching mode.

3. Research and Experiment of MOOC in Physical Education Under the Background of Big Data

3.1 Purpose and Object of The Experiment
This experimental study mainly explores whether the flipped classroom teaching mode based on MOOC is superior to the traditional classroom teaching in college sports basketball course teaching, and can obtain better teaching effect. In this paper, through the real teaching practice, we use the teaching mode based on MOOC to test the feasibility and superiority of this teaching mode.

In this study, 50 students of a university in our city from 2017 to 2018 were selected as the research object. Two classes were divided into two groups with 25 learners in each group. Class A was the control group, and the traditional classroom teaching mode was adopted. Class B was the experimental group. The MOOC based Teaching mode was used to conduct an empirical study from the final examination results Test the implementation effect of MOOC based teaching mode in teaching. Among them, a bottom-up assessment is conducted for them as the pre-test results, and the effect of the MOOC teaching mode in practice is analyzed through the pre-test results and final assessment results.

3.2 Experimental Methods
The experimental methods include control experiment, questionnaire survey and statistics.

4. Experimental Results and Analysis of MOOC in Physical Education Under the Background of Big Data

4.1 Test Results And Analysis
Before the whole course arrangement, the two classes of physical education were tested in basketball skills, shooting score, physical fitness test and physical fitness score.

|                | Basketball performance | Shoot score | Physical performance | Physical fitness score |
|----------------|------------------------|-------------|----------------------|------------------------|
| Class A        | 68                     | 72          | 85                   | 84                     |
| Class B        | 64                     | 69          | 87                   | 86                     |

According to table 1, there is little difference between the two classes in the four scores. The average score of basketball skills of class a students is 68 points, the average score of shooting is 72 points, the average score of physical fitness test is 85 points, and the score of physical fitness is 84 points. In the control group, class B has 64 points of basketball skills, 69 points of shooting, 87 points of physical fitness test and 86 points of physical fitness. It can be seen that the difference between the two classes in the various assessment is not big, because the choice is physical education students, so the students have a certain basic physical quality and physical quality, so the two scores are higher and the four assessment scores are small, so it can better reflect the role of MOOC Education mode in
physical education.

4.2 Big Data Statistics Students' curriculum Enthusiasm

Through the data statistics of the results of the data of the two classes of students, the specific items are the average number of sports steps of students in each course, the number of interactive discussions, the number of interaction with teachers and the average number of pre review before and after class, so as to analyze the students' learning interest and autonomous learning ability.

![Figure 1. Statistics of Learning Interest And Autonomy of Students in Two Classes](image)

According to figure 1, 23 students in class A of the experimental group had an average number of more than 3000 steps in each class, with 82 interactive discussions, 45 interactions with teachers, and 24 students who could pre review after class; 17 students in class B of the control group had more than 3000 steps in each class, with only 31 interactive discussions and 52 interactions with teachers. The average number of people who can preview is only 9. From this, we can see that through the number of students who exercise more than 3000 steps, the learning interest of students in class A is relatively higher than that of students in class B, but the difference is not obvious; through the number of interactive discussions, the number of interaction with teachers and the situation of pre review after class, we can see that the learning autonomy of students in class A of experimental class is significantly higher than that of students in class B of control group. Therefore, compared with the traditional teaching mode, the new teaching mode based on MOOC can improve students' autonomous learning ability and stimulate students' interest in learning to a certain extent. This is exactly what is lacking in the traditional education mode. Teachers can not take into account all students and take care of the learning ability, learning situation and sex of each student Personality, so only through a unified teaching method to teach, leading to a thousand people one side of the educational results, this new teaching mode can be well solved.

4.3 Final Assessment Results And Analysis

After a month of curriculum education, the final assessment of the two classes of students unified assessment standards, through the results of MOOC education mode in the application of physical education.
Table 2. Final Average scores of students in two classes

|                   | Basketball performance | Shoot score | Physical performance | Physical fitness score |
|-------------------|------------------------|-------------|----------------------|-----------------------|
|                   | Scores | Percentage | Scores | Percentage | Scores | Percentage | Scores | Percentage |
| Class A           | 92     | 100%       | 84     | 96%        | 91     | 96%        | 85     | 92%        |
| Class B           | 72     | 84%        | 78     | 88%        | 82     | 88%        | 86     | 92%        |

According to table 2, the final assessment is the most objective and fair result to show the effect of MOOC education mode. In the experimental group, the basketball skill score of class A students is 92 points, and the passing rate of the examination is 100%; the score of shooting is 84 points, and the pass rate of physical examination is 96%; the average score of physical fitness is 91 points; the average score of physical quality is 85, and the passing rate is 92%. In the control group, the basketball skill score of class B students was 72 points, the pass rate was 84%; the shooting score was 78 points, the pass rate was 88%; the physical fitness examination pass rate was 88%, the average score was 82 points; the average score of physical quality was 86, the pass rate was 92%.

It can be analyzed that after one month of course teaching, the experimental group a class students through the MOOC based teaching mode, the learning effect is better than the control group B class, the physical fitness scores of all assessment scores are higher than that of class B, so this new teaching mode can improve the students' academic performance to a certain extent.

4.4 Investigation And Analysis of Students' satisfaction With the Teaching

Through questionnaire survey and interview, the main content is whether they are satisfied with the teaching, if not, what are the reasons for dissatisfaction.

![Figure 2. Students' satisfaction With the Teaching](image)

As shown in Figure 2, the number of students who are very satisfied with the teaching method of MOOC is 23, the number of students who are more satisfied is 1, and the number of students who are not satisfied is 1. The satisfaction of class B in the control group is relatively unsatisfactory, with 11 students satisfied, 9 more satisfied, 2 dissatisfied and 3 very dissatisfied. Through the investigation of three students who are very dissatisfied, the main reasons are as follows: 1. The teaching methods of teachers are not the methods they like, which leads to low learning enthusiasm; 2. Teachers can not estimate their own learning situation, which leads to giving up learning later; 3. The learning content is
5. Conclusion
With the increasing maturity of Internet technology, network teaching has become the choice of more and more colleges and universities. Through the research and analysis of big data in this paper, we can draw a conclusion that the teaching method based on MOOC can more effectively improve students' learning enthusiasm, and can effectively improve students' academic performance. Through the rich online teaching resources and content, students can according to their own learning progress and situation to choose the corresponding learning path. The new teaching mode based on MOOC can avoid the teaching results of one thousand people under the traditional education mode, and lay a good technical foundation for college education.

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