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Research Article

MOOC Education Mode of PE Public Curriculum in Colleges and Universities Based on Data Mining*

Xiaolan Ge¹

Air Force Engineering University

Yiwei Yin²

Yibin University

Ying Wang³

Air Force Engineering University

Abstract

With the in-depth development of data mining technology and quality education, the teaching of PE public curriculum in colleges and universities has become an important component in the comprehensive cultivation of students' ability and quality. However, there are many problems in the PE public curriculum in colleges and universities in China. For example, the teaching contents are outdated; the physical education teaching method is single; and it is difficult to satisfy the individualized needs of students. As the most popular courses on the Internet in recent years, MOOC has broken the fixed study time and place so that students can arrange the learning content and plan according to their own interests. This can truly realize the personalized education and open up the new mode of PE public curriculum in colleges and universities. Therefore, the paper takes data mining technology and MOOC teaching mode as the basis of theoretical research, makes a reasonable evaluation of the traditional teaching mode of colleges and universities and then establishes the flipped classroom and hybrid teaching mode of PE public curriculum in colleges and universities under the MOOC teaching mode. Finally, the specific implementation of the MOOC teaching mode is given.

Keywords

Data Mining • MOOC • Flipped Classroom • Hybrid Teaching Mode

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¹Air Force Engineering University, Xi'an 710051, China. Email: Lannycomeon@163.com

²Correspondence to: Yiwei Yin, Yibin University, Yibin 644000, China. Email: yinyiwei427@sina.com

³Air Force Engineering University, Xi'an 710051, China. Email: iot618@163.com

With the rapid development of computer communication technology, the popularity of mobile devices and the outbreak of cloud computing technology, Internet data is growing rapidly at all times. Especially the emergence of data mining technology has brought about tremendous impact on all industries and promoted the rapid development of the professional skill of the industry (Marozzo, Talia, & Trunfio, 2018).

While China's traditional education mode has been developing smoothly for many years, data mining technology has quietly penetrated into the teaching of colleges and universities. Among them, the Massive Open Online Course (MOOC) has grown at a rapid rate in China, which is called the MOOC. Students and teachers can complete all teaching and learning work on the virtual teaching platform through the Internet platform. In particular, the theoretical and practical courses of PE public curriculum in colleges and universities can be operated through the perfect online and offline combination, which has generated huge chemical reaction in colleges and universities. The evaluation given by Sun Maosong at Tsinghua University for the MOOC is: learn from the best teachers in the world and taught by the best scholars in the world. It can be seen that the emergence of the MOOC has injected new catalysts into the traditional PE public curriculum in colleges and universities and has produced a positive promotion effect. The meaningful form and interesting content deeply reflect the informatization characteristics (Souri & Hosseini, 2018).

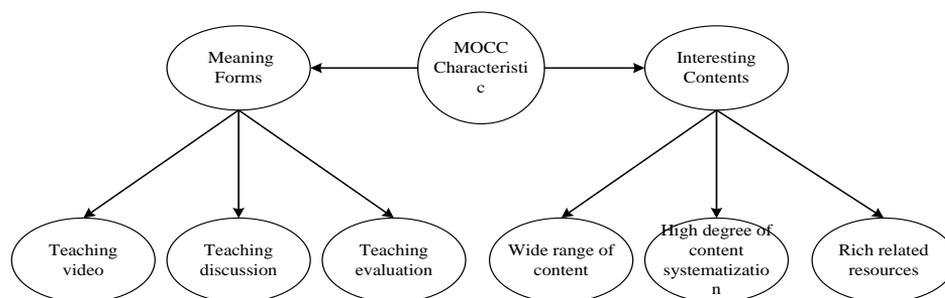


Figure 1. Characteristics of MOOC Information.

The meaningful forms of MOOC include important sections such as teaching videos, teaching discussions and teaching evaluation. Most of the teaching videos are videos from a few minutes to ten minutes, which is more attractive for students than the traditional 45-minute video; also, the MOOC provides personalized tools for students so that they can adjust the speed of the video according to the difficulty of the content and learn the content repeatedly in the periodic time, thus satisfying the personalized needs; also, there is a teachers' questioning section in the video content and students must respond accordingly, which can guide and consolidate the new knowledge and improve the enthusiasm of learning. The teaching discussion is opened by the teacher in the background. The discussion forum is not restricted by time and space and each student can freely express his own ideas, which will be retained for a long time. The discussion forum is clearly divided by topic and students can participate in the discussion following their own interests. The advantage of teaching evaluation is mainly reflected in the fact that the working intensity of teachers is greatly reduced. Many contents of objective assignment can be feedback to students in the first time through the back-end system and the

students can only submit their homework within the specified time. This requires students to have sense of time so as to effectively complete the MOCC coursework (Marozzo, Talia, & Trunfio, 2016).

The interesting content of MOCC mainly includes extensive educational content, more systematic content and other relevant important resources. The extensive educational content not only includes the PE public curriculum of thesis, but also life sciences, computer technology, human resource management, art, data analysis and other courses. According to incomplete statistics, the MOCC courses in China's universities is as many as 999 and the width and breadth of the content is extremely extensive. The more systematic content is to connect the fragmented knowledge into a system. Teachers publish important instructions such as teaching announcements, teaching videos, discussion topics, assignments, corrections and tests according to the requirements of the curriculum so that students can systematically complete the learning content. Other relevant rich resources are mainly that the website can push relevant courses according to the learning content. The teacher will extract the main knowledge points in the course and expand and deepen the content so that competent students can carry out more extensive learning and discussion (He, He & Peng, 2018).

Research on Traditional Teaching Mode of PE Public Curriculum in Colleges and Universities

Research on Traditional Teaching Mode of Colleges and Universities

The traditional teaching mode of colleges and universities emphasizes the cultivation of students' ability, which cultivates the type of talents according to the needs of the society and the development of economy. The educational content for students not only emphasizes the knowledge, but also emphasizes the practicality. The cultivation objectives formulated by the university are closely related to the local characteristic economy. In teaching, the theory is related to reality. When increasing the knowledge capacity of students, the social practice ability of students is also emphasized so that effective cultivation can be conducted for the future career planning for students (Stenling and Sam, 2017).

However, there are several shortcomings in the traditional education mode in colleges and universities. The first is the faculty, software and hardware facilities and capital allocation, which are common problems in many colleges and universities; the second is that the teaching content is outdated; the sports facilities are not updated in time; and the teaching mode is single, resulting in insufficient communication between teachers and students in teaching; the third is that the professional skills and knowledge expansion of teachers needs to be strengthened. Under this kind of teaching mode, students are no longer the center in the teaching so that students are not keen in participation, lack thinking initiative and have insufficient learning motivation (Nunnally, Ballarini, Liao & Fisher, 2016).

Questionnaire Survey

The questionnaire survey selects 460 students in colleges and universities with unregistered and non-responsible arrangements and 455 valid questionnaires are collected, with an effective rate of 98.91%.

The inspiration for the questionnaire is derived from Professor LI Yunhuo's LICC teaching mode. According to the twenty observational perspectives of four main elements, namely Learning, Instruction, Curriculum and Culture, so that the content of the questionnaire is more scientific (Bayeck, Hristova, Jablowk & Bonafini, 2016).

Table 1
Questionnaire Survey Basic Situation Statistics Table

Basic situation of students		Group	Number	Percentage
Grade		Freshman	40	8.8
		Sophomore	60	13.2
		Junior	25	5.5
		Senior	330	72.5
Major		Liberal arts	130	28.6
		Science	105	23.1
		Engineering Course	105	23.1
		Medical Science	65	14.3
		Arts	50	10.9

The content of the questionnaire survey is mainly divided into four parts: statistical survey of students' basic information, survey of classroom teaching method and quality, student's classroom performance and students' suggestions for the teaching mode. The first three parts are mostly presented in an objective way while the last part is summarized by the subjective description of students (Xiong and Suen, 2018).

Analysis of the Survey Results

Judging from the basic information of students in the questionnaire, the majors of the survey objectives include arts, science, engineering, medicine and art (key point is public sports major) distributed from freshman year to senior year. The juniors and seniors account for relatively large proportion. The specific statistics are shown in Table 1.

It can be seen from the analysis of the classroom teaching situation in the questionnaire survey that teachers are mainly imparting the knowledge in the classroom in the form of PPT courseware and blackboard-writing. From the interaction between teachers and students in the classroom, only 3.3% of students and teachers can interact frequently, 40.66% and 37.36% of students often interact or interact frequently with teachers; 17.58% of students occasionally interact with teachers; 1.1% of students hardly interact with teachers. It can be seen from the statistical analysis of interaction effect that only 4.44% of students think that the effect is very good; 45.56% and 46.67 students think that the interaction effect is better and average; 1.11% and 2.22% of students think that the interaction quality is poor and of no effect. The specific statistics are shown in Table 2.

Table 2
Questionnaire on the Number of Interactions between Teachers and Students and Satisfaction

Variable	Group	Percentage of satisfaction					Percentage
		No	Very bad	Common	Good	Very Good	
Interaction frequency	Never	1.1	0	0	0	0	1.1
	Occasion	2.2	1.1	14.28	0	0	17.58
	Sometimes	0	0	20	17.36	0	37.36
	Often	0	0	12.22	28.44	0	40.66
	Frequently	0	0	0	2.2	1.1	3.3
Percentage	Total	3.3	1.1	46.5	48	1.1	100

Through the analysis of the correlation between the frequency of classroom interaction and interaction effect by software, it can be seen that its significance is 0.620, which is a positive correlation at the 0.01 level, indicating that the increase in interaction frequency between teachers and students will produce better interaction effect. The correlation analysis of the interaction effect and frequency is shown in Table 3.

Table 3
Analysis of the Correlation Between Interaction Frequency and Effect

	Interaction frequency	Interactive effect
Interaction frequency	1	0.620
Interactive effect	0.620	1

Based on the above data analysis, the advantage of the education mode in colleges and universities is that the teaching method is simple and convenient and it does not have high requirements for the teaching environment and tools. Also, teachers have strong subjectivity (Pickering *et al.*, 2017); Students can communicate face-to-face with teachers. As the frequency of interaction increases, the class satisfaction will gradually increase. Finally, the combination of imparting and discussion will help establish a good interactive trust between teachers and students, producing better teaching results. The disadvantage of this kind of education mode is that it relies too much on teachers as the center and students can only passively receive the knowledge in the way of instilling; the teaching tools of teachers are mostly PPT and the teaching methods and tools are simple in structure so that there are relatively few changing elements in the classroom, which may easily result in boring classroom atmosphere; finally, the frequency of interaction between teachers and students is not sufficient, which is easy to lead to the idleness of students (Prabhakar, Spanakis & Zaiane, 2017).

Establishment of the PE Public Curriculum Teaching Mode in Colleges and Universities under the Environment of MOOC

Design Thoughts

The design of classroom teaching mode refers to the rational organization of the important factors such as the objectives, contents, methods and evaluation of classroom teaching under the guidance of scientific teaching thoughts and concept with the support of good environment and resource allocation so that the classroom teaching can operate smoothly.

The design thoughts of the research on the PE public curriculum teaching mode in colleges and universities under the thesis data mining is to make full use of the Internet data mining technology and communication technology based on the network resources and teaching resources of MOCC and to establish hybrid teaching mode from online and offline aspects (Prabhakar, Spanakis & Zaiane, 2017).

Teaching Mode Framework

In the design of the teaching mode framework of MOCC, it is necessary to follow the design thoughts as well as the basic direction of the design of the mode framework: the first is the interactive direction. Teachers and students can fully communicate in the classroom, resulting in better interaction effect and influence; the

second is the orderly direction. In the operation of the network resource teaching method, it is necessary to adhere to the orderly guidance of teachers and the teaching curriculum should be conducted according to the standard; the third is the direction of autonomy. Students can give full play to their subjective initiative and consciously complete the basic knowledge learning, establish autonomous learning groups and discussion forums; the fourth is the timeliness direction. When imparting the knowledge in the classroom, it is necessary to intentionally train the innovative ability, search ability and learning ability of students; the fifth is the openness direction. With the advantage of MOCC network platform resources, the teaching methods of teachers and students are not limited by teaching materials, time and space; the sixth is the operational ease direction. The whole teaching process is carried out on the network, so it is possible to be proficient in using online teaching resources based on the basic operation of the computer; the seventh is the personalized direction. Students can autonomously arrange the time and schedule of learning so that their self-management ability can be fully exerted.

Therefore, the basic framework of the MOCC teaching mode is designed as follows: with the support of computer information technology and multimedia network technology, students can make full use of network resources and traditional curriculum materials on the online network teaching platform to learn the basic knowledge of the curriculum; students can learn the teaching content with strong practicalness offline and establish a good practice process and activity guidance. The hybrid teaching mode can be established combined with the online and offline learning methods so as to promote and guide the student-oriented learning mode and form a dynamic and effective teaching mode for teachers and students. Figure 2 shows the framework of PE public curriculum teaching mode in colleges and universities under the environment of MOOC.

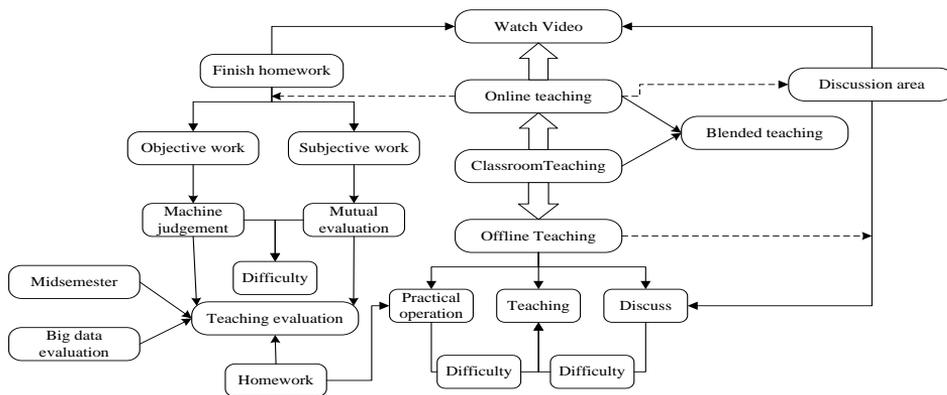


Figure 2. Framework of Teaching Mode of College Physical Education Public Course under MOCC Environment

Process Design of Hybrid Teaching Mode

The hybrid teaching mode fully combines the advantages of traditional learning methods with those of network learning. It can not only play the guiding and inspiring role of teachers, but also fully enhance the subjective learning enthusiasm of students. The essence of hybrid teaching is to absorb the quintessence of both to obtain the optimal learning results (Aksela, Wu & Halonen, 2016).

Online teaching is mainly composed of teaching videos, discussion forums and homework. The offline teaching situation is more complicated and the role of teachers is more important. Then, in the process design of the hybrid teaching mode, the difficult points are learnt offline and the basic knowledge and communication and discussion are performed online. In the process of learning, the online and offline teaching are integrated in a timely manner, which can not only learn the basic knowledge, but also enhance the frequency and effect of the interaction between teachers and students.

The process design of the hybrid teaching mode in the MOCC environment follows the way of “online teaching + offline teaching”, with teachers and students playing different roles and doing different tasks. Teachers create a learning environment and students perform online learning; teachers organize discussion and learning methods for students and assign learning tasks and practical operations. Students ask questions and collect information to solve problems to form the ability to solve problems independently. In the meantime, special discussion forums are established on the network platform and students can actively discuss the problems to fully absorb the learned knowledge and skills; teachers and students must make objective feedback on the classroom teaching results in a timely manner and finally complete the teaching objectives. They can communicate the learning results on the network platform to achieve the win-win objective. The process design of the hybrid teaching mode in the MOCC environment is shown in Figure 4.

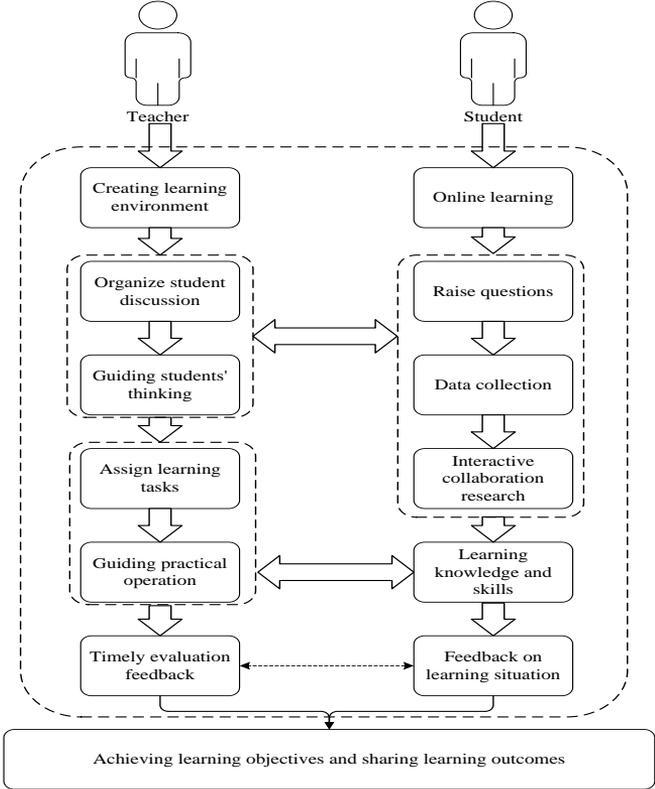


Figure 4. Flow chart of Hybrid Teaching Mode in MOCC environment

Implementation of the Teaching Mode of MOOC

The first is the configuration of software and hardware facilities. The teaching mode based on the MOCC environment must be equipped with the necessary conditions for network operation. The configuration of computer hardware, the installation of operating system and the purchase of network resources are all necessary conditions for realizing the hybrid teaching mode of MOCC.

The second is the acquisition of educational and teaching resources. In the specific implementation of the teaching mode under the MOCC environment, the selection, application and development of educational teaching resources are very important links. Whether it is offline teaching or online teaching, the acquisition of network resources and the selection of teacher resources are very crucial.

The third is the improvement of teaching concepts. In teaching, students should be regarded as the main body and the role and influence of teachers should be placed in the auxiliary position. In the process of imparting and cultivating knowledge, it is necessary to strengthen the learning cooperation and exchange among students and attach importance to the cultivation of students' competence and innovation ability (Ferguson & Clow, 2016).

Conclusion

This paper takes the Internet data mining technology and MOOC as the research background and conducts the objective statistical analysis of the traditional education mode in colleges and universities by questionnaire. Also, this paper designs the framework of PE public curriculum in colleges and universities under the MOOC environment and establishes a hybrid teaching mode under the MOCC environment combined with the advantages of online and offline education. This paper also carries out a detailed process design for this teaching mode. Finally, the precautions for the specific implementation of the MOOC teaching mode are given. The hybrid teaching mode of PE public curriculum in colleges and universities under the environment of MOOC based on the data mining technology is scientific, objective and practical, which is expected to provide new thinking for college educators and active students.

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