# Research on Hybrid Teaching Mode Based on Personalized Learning Resource Recommendation

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***Abstract:*** The traditional classroom teaching mode has the shortcomings of relatively single form and unable to carry out differentiated teaching for individual students. Under the background of education informatization 2.0 action plan, "Internet+ education" has been developing rapidly. "Online" plus "offline" hybrid teaching mode also emerged. In view of this background, this paper designs a hybrid teaching mode which can carry out personalized learning resource recommendation. Taking the teaching of algorithm design and analysis as an example, this paper constructs a student-centered, innovative and personalized learning mode. Through the data mining and analysis of students' individual learning behavior, the personalized learning approach is innovated. The teaching practice shows that this method can effectively enhance the teaching effect.

***Keywords:*** Personalized Learning; Resource Recommendation; Online Plus Offline, Hybrid Teaching

At present "Internet+ education" has been developing rapidly. The online learning platform provides a new way for information teaching in the new era. Hybrid teaching has set off an upsurge of teaching reform, which can combine the advantages of online teaching and traditional teaching. Many scholars have carried out a series of research on hybrid teaching mode by using different network teaching platforms [1], such as MOOC [2], Blackboard, Mosoink Cloud, etc. Online learning platform records a large number of students' learning process data. Through big data analysis, the online learning process and behavior [3] can be analyzed to mine students' learning problems and characteristics, and provide personalized guidance and learning resources recommendation.

This paper takes the course of algorithm design and analysis as an example to study the hybrid teaching mode of personalized learning resource recommendation [4]. Through the data mining analysis of individual learning behavior, the differentiated knowledge recommendation and personalized learning are carried out to improve the teaching effect and students' quality.

## 1. Advantages of hybrid teaching mode based on personalized resource recommendation

In this paper, through the research of hybrid teaching and personalized learning resource recommendation teaching mode, we explore new talent training and classroom teaching methods.

The proposed teaching mode has the following advantages:

(1) Form a student-centered teaching strategy, break the traditional teacher centered characteristics.

(2) Establish course learning group, pay attention to team cooperation and students' participation.

(3) Personalized resource recommendation and differentiated guidance, personalized knowledge recommendation and learning according to the differences of students' behavior and learning effect.

(4) Construct process evaluation criteria based on online learning records, improve students' learning literacy.

# 2. Design of hybrid teaching mode based on personalized resource recommendation

## 2.1 Design ideas

The online and offline hybrid teaching mode of "algorithm design and analysis" course is constructed by using online learning platforms such as MOOC, Blackboard, Mosoink Cloud. Online learning platform collects and records a large number of learning behavior data. It can carry out data analysis and mining, realize personalized learning resource recommendation and learning knowledge supplement, and help to improve students' learning effect.

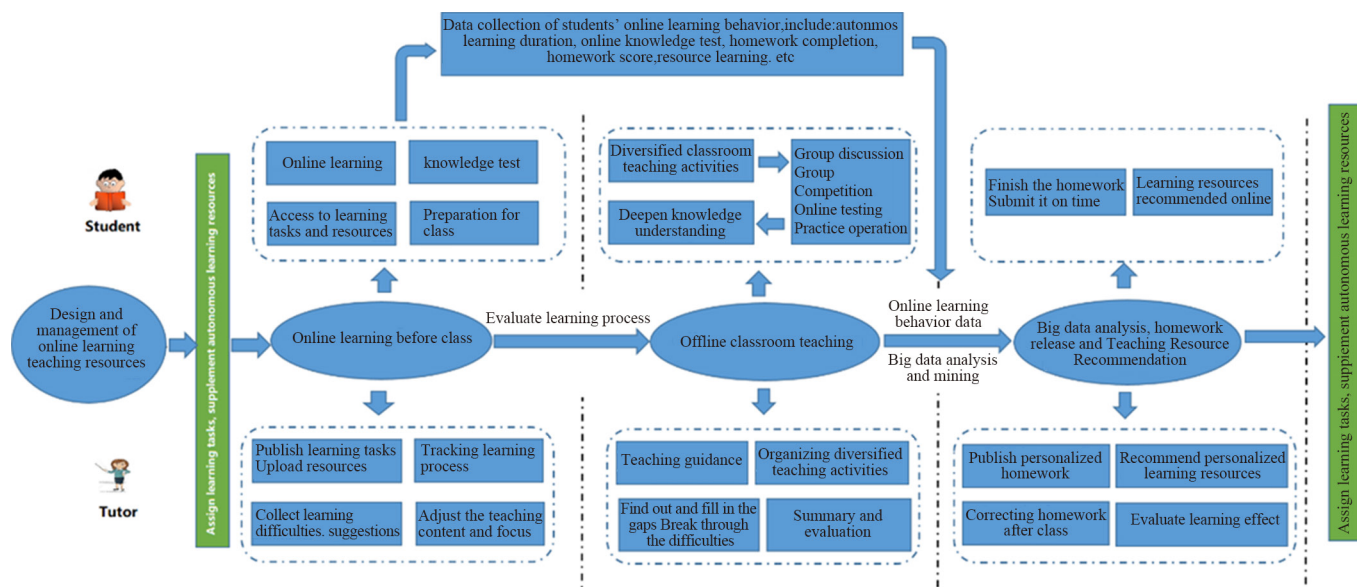The flow chart of this teaching mode is shown in Figure 1.



**Figure 1.** Flow chart of hybrid teaching mode based on personalized knowledge recommendation.

## 2.2 Teaching strategies

### 2.2.1 Design and collection of mixed teaching resources

Curriculum teaching resources is an important factor to determine the effect of curriculum teaching. Online digital teaching resources are mainly classified into two categories: instructional resources and supplementary content resources.

(1) Instructive curriculum resources including: according to the requirements of blended teaching, the syllabus, teaching plan, teaching plan, new teaching materials, PPT courseware, analysis of key and difficult points, etc.

(2) Supplementary and recommended content resources including: scientific research papers, web reference materials, algorithm running animation; exercise and test database, experimental reference code and operation video, micro class, etc.

### 2.2.2 Online activities on e-learning learning platform

(1) Teacher activity: design teaching activities before class and assign learning tasks. Collect and track students' questions, timely feedback and adjust classroom teaching activities. Online release of announcements, resources, assignments and evaluations; supervise the completion of tasks, etc.

(2) Student activities: understand the learning objectives and task requirements at the front of class; carry out problem analysis and scheme discussion in the learning group divided by teachers; complete exercises and expand knowledge online after class.

### 2.2.3 Offline classroom teaching activities

Offline classroom teaching strategy has been changed from teacher centered to student centered. Classroom activities are mainly carried out in the form of teachers' guidance and diversified activities. Diversified teaching activities can be carried out in the form of group competition, group discussion, expanding practice, practical operation, students' explanation, clearance practice and so on, so as to mobilize students' initiative to think and participate in the classroom. In view of the insufficiency of students' discussion and explanation, teachers make targeted supplement. Taking 0/1 knapsack problem teaching as an example, teachers should guide

students to learn dynamic programming to solve the problem of thinking path and code implementation process.

**2.2.4 Intelligent recommendation of personalized learning resources on online platform**

According to the data of students' learning behavior, learning process and teachers' evaluation recorded on the online learning platform, we use big data analysis and intelligent recommendation algorithm to recommend personalized learning resources, arrange homework after class.

According to the weak knowledge area of the individual, the corresponding learning resources and homework test are supplemented.

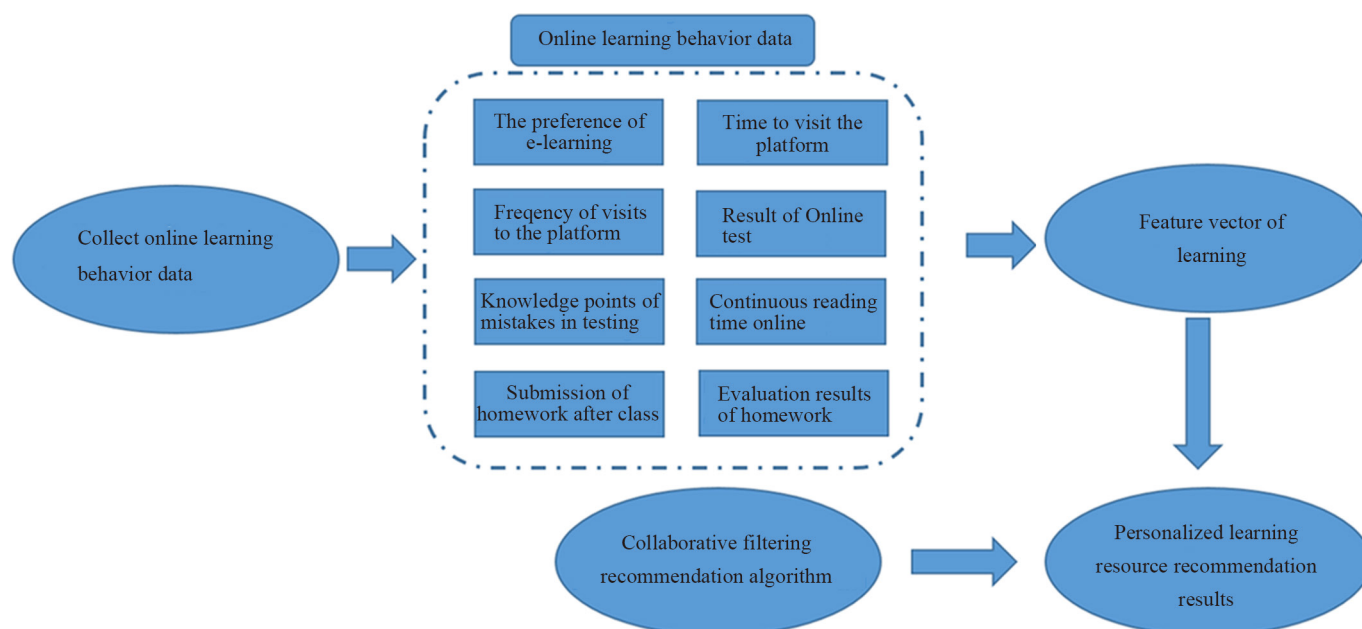The flow chart of personalized resource recommendation is shown in Figure 2.



**Figure 2.** Flow chart of personalized teaching resource recommendation based on learning behavior data.

**2.2.5 Evaluation of learning effect of blended teaching**

In the course performance evaluation, online learning data and classroom participation are taken into account. The students' learning diagnostic evaluation, process evaluation and summative evaluation run through the whole teaching process. In addition, collect feedback data of students' learning effect and learning experience; revise and improve the design of blended teaching mode, evaluate and reflect the effect of teaching mode reform.

## 3. Conclusion

Algorithm design and analysis is a course with strong theoretical and practical requirements. In the traditional classroom teaching, students do not understand the formation of the algorithm deeply enough, and the individual learning effect is quite different. Under the background of the rapid development of education informatization, online learning platform provides a good support for the hybrid teaching of algorithm design and analysis. This course group began to implement the reform of hybrid teaching model based on personalized knowledge recommendation from 2018. Teaching practice shows that: through the whole teaching process of publishing learning tasks, recommending personalized resources, explaining targeted learning offline in class, online testing and evaluation after class, it is helpful to improve students' autonomous learning and personalized learning ability, and greatly improves the teaching effect.

## References

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