Design of Online Teaching Platform for Multi-mode Learning with Dual-course System

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ABSTRACT

College teaching platforms have begun to realize the importance of teaching management, but the teaching effect of the dual-course education system has not been greatly improved. What is needed is the construction of online and offline teaching mode platforms based on the selection of a two-course education scheme. Based on the simple analysis of the research progress of dual-course education and teaching-related intelligent algorithms, this study constructed a platform with an improved algorithm using clustering analysis and a priori association rules, and a new recommendation algorithm is proposed, which realizes the personalized recommendation of dual-course education resources. The coverage and accuracy of the learning resource recommendation shorten the running time, and the newly proposed algorithm has excellent performance.

KEYWORDS

Online and Offline Teaching Platforms, Cluster Analysis, Recommendation Algorithm, Apriori Algorithm

INTRODUCTION

In the landscape of modern education, the digital transformation has significantly influenced teaching and learning processes. For two-course education, which is crucial for shaping students' ideological and political qualities, leveraging digital resources is of great significance. As Li and Zhang (2024) pointed out, the supporting digital resources of online courses can be utilized to create micro-courses for key and difficult problems. Teachers responsible for dual-course education theory teaching, in collaboration with the student affairs office, regularly develop these micro-courses and upload them to the WeChat exhibition module of the website . Once these micro-courses are made available on the platform, they bring about new changes to the teaching of two-course education. These micro-classes, characterized by high-quality animation effects, rich cases, and detailed theories, can effectively stimulate students' learning interest and enrich the teaching methods of dual-course education classes. Consequently, the time and space constraints of two-course education teaching are extended. It breaks free from the fixed-place limitation, reaching into infinite space and evolves from one-way transmission to multi-dimensional interaction.

However, despite these advancements, there are still challenges in two-course education. One of the key issues is the lack of personalized resource recommendation. Current teaching often struggles to meet the diverse learning needs of students precisely. The existing research on intelligent algorithms

related to curriculum teaching rarely focuses on personalized resource recommendation in the context of two-course education, and most applications are not specifically tailored to this unique curriculum.

This paper has three main research objectives. First, it aims to comprehensively analyze the online training content of two-course education, with a particular emphasis on the daily class mode. Second, we strive to construct a teaching-mode platform based on the selection of two-course education schemes. This platform is designed to solve the problem of personalized resource recommendation in two-course education by clustering log data, analyzing students' interests, and providing targeted resources. Third, we simulate and analyze the personalized resource-recommendation algorithm of the online-offline teaching platform constructed in this paper. By comparing and analyzing indicators such as running time, resource-recommendation accuracy, and resource-recommendation coverage, we aim to optimize the algorithm, shorten the running time, and improve the quality of personalized resource recommendation.

The research is structured into four main parts. The first chapter briefly introduces the teaching background of two-course education and the chapter arrangement of this study. Chapter 2 presents the design status of the teaching platform and the application of various intelligent algorithms in current teaching, and it summarizes the deficiencies in the current research. Chapter 3 constructs a teaching-mode platform based on the selection of two-course education schemes. Chapter 4 simulates and analyzes the personalized resource-recommendation algorithm of the online-offline teaching platform, aiming to enhance its performance. Through this research, we hope to contribute to the improvement of dual-course education and provide a more effective teaching model and resource-recommendation method.

STATE OF THE ART

Two-course education teaching generally adopts the standard teaching mode relying on teaching materials. However, college teaching also needs to utilize modern technology to carry out personalized teaching. Regarding curriculum teaching, most research is theoretical. For example, Bhaskaran et al.(2021) mainly summarized the institutionalized development of two-course education in their research . The research perspectives are diverse. For instance, Li et al.(2024) employed cluster analysis in their research, which is beneficial for teachers. Zhang (2025) proposed a projection-pursuit clustering evaluation model in their research . The model's weight was determined by the entropy method, where the interval number was converted into a real number through Monte Carlo, simplifying the evaluation of the interval-number index and objectively assigning weights to each index.

Classroom teaching evaluation can promote the renewal of teaching content (teaching plans), the continuous reform of teaching methods, and the exploration of effective examination methods. It enables teachers to continuously gain teaching experience and improve their teaching levels (Wu & Liu, 2023). Through classroom teaching evaluation, teaching management decision makers and teachers can understand the evaluation subjects, especially students' understanding and evaluation of teachers' classroom teaching performance (Chen et al., 2025). They can accurately grasp and comprehensively understand the actual classroom-teaching operational state and take effective measures to improve teaching, thus steadily enhancing the teaching quality (Madhavi et al., 2022).

The bold exploration of micro-classrooms has overcome the time and space limitations of students' education (Narimani & Barberà, 2024). The new class form helps students enhance their self-cultivation and improve their quality. In addition, school websites have established a link channel for students and plan to set up online two-course education live-broadcasts to solve students' problems in a popular and accessible way (Gao & Chen, 2024).

Data can be efficiently analyzed through prediction. After user analysis, valuable data can be extracted. The Hadoop system has addressed the issue of enterprise big-data storage and processing capacity (Ma et al., 2023). Nevertheless, it lacks the ability to analyze and understand the data. Therefore, the research focus of data-mining technology lies in extracting useful knowledge from

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