



Design and Application of Teaching Platform for Foreign Students' Characteristic Culture Course Based on Data Mining Technology

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Abstract. This course aims to introduce the characteristics and culture of Chinese students. This course will help foreign students understand their own culture, which is a good reference for their study in China. Data mining technology is used to collect data from three sources: (1) questionnaire; (2) Observation and analysis; (3) Interview teachers of foreign students. SPSS software is used to analyze the collected data, and then TF-IDF algorithm is used to establish the model. The platform utilizes data mining technology to analyze and mine the learning data of cultural courses for international students. By studying the learning characteristics and needs of international students, we provide them with personalized teaching services and learning resources. The platform not only digitizes traditional offline teaching resources, but also integrates interactive methods such as socializing, Q&A, and resource exchange into its course platform, achieving online and offline communication, comprehensively meeting the teaching needs of international students' characteristic cultural courses. Practice has proven that this platform can effectively enhance the learning initiative and enthusiasm of international students, and enhance their understanding and cognitive level of Chinese culture.

Keyword: Data mining · Overseas student · Characteristic culture courses · Teaching platform

1 Introduction

With the intensification of globalization and the trend of internationalization, the number of international students is constantly increasing, and the teaching of cultural courses for international students is also receiving increasing attention. However, due to the background and cultural differences of international students, traditional cultural curriculum teaching methods are difficult to fully meet their needs. Therefore, in the teaching of cultural courses for international students, how to innovate teaching methods and improve teaching quality has become an important research direction [1].

This article designs a teaching platform for characteristic cultural courses for international students based on data mining technology. Data mining is a computer science technology that can find patterns and patterns from a large amount of data. By analyzing

and mining students' learning data, we can better understand the learning characteristics and needs of international students, and provide them with personalized teaching services and learning resources [2]. Therefore, the application prospects of data mining technology in the teaching of cultural courses for international students are very broad.

Curriculum setup is the most fundamental part of curriculum development and training programs. Many scholars often take curriculum setup into account when researching courses, linking it to training goals and requirements. The content of relevant courses varies depending on the teaching object [3]. The specific setting of course content also determines the form of teaching organization to be adopted, the venues, and application of methods. Therefore, the significance of curriculum design is significant, which shows that the rationality of curriculum design can directly affect the entire process of training. Once the rationality of the curriculum cannot be achieved, the school's goal of cultivating cultural awareness cannot be achieved [4]. In this context, the main significance of conducting research on Chinese cultural experience courses as follows:

Theoretical significance: The Chinese cultural experience course is a relatively new attempt in the cultivation and at present. This type of course can the foreign China for Chinese culture. Starting from the curriculum setting, this article explores the and advantages of the curriculum setting of the Chinese Culture Experience Course in Guizhou universities, the curriculum structure of the Chinese Culture Experience Course, which has great significance for the cultivation of cultural awareness of foreign students from Guizhou universities in China, and can also supplement the current relevant content of the curriculum setting [5].

Practical significance: From a small perspective, the cultural experience curriculum is conducive to the scientific standardization of the Chinese culture curriculum for international students in China. In the general direction, it is conducive to improving the quality and level of training and education for foreign students from universities and colleges in China, and it is also conducive to the steady [6]. The cultivation of international students in China not only includes their professional learning abilities and work and life abilities in China, but also increases the corresponding cultural knowledge to enable them to understand China and its culture, and become an ambassador and bridge for China to communicate with countries around the world in the future [7]. The classification analysis of curriculum teaching disciplines in Fig. 1 below.

Nowadays, Chinese culture curriculum has become an indispensable part of the curriculum for middle and senior foreign students, and the teaching mode of culture curriculum has gradually changed from teaching textbook knowledge to "walking on the ground and seeing with your own eyes", and practicing by yourself. Based of Chinese culture courses offered by foreign students' teaching institutions, and the experience centered research paradigm, this paper summarizes two mainstream modes of Chinese culture teaching, analyzes their advantages and disadvantages, and puts forward an experiential culture teaching mode and specific operation mode with regional culture as the entry point and "practice guide book for foreign students' culture courses" as the blueprint [8]. Therefore, mining, this paper designs and applies the teaching platform of foreign students' characteristic culture courses.

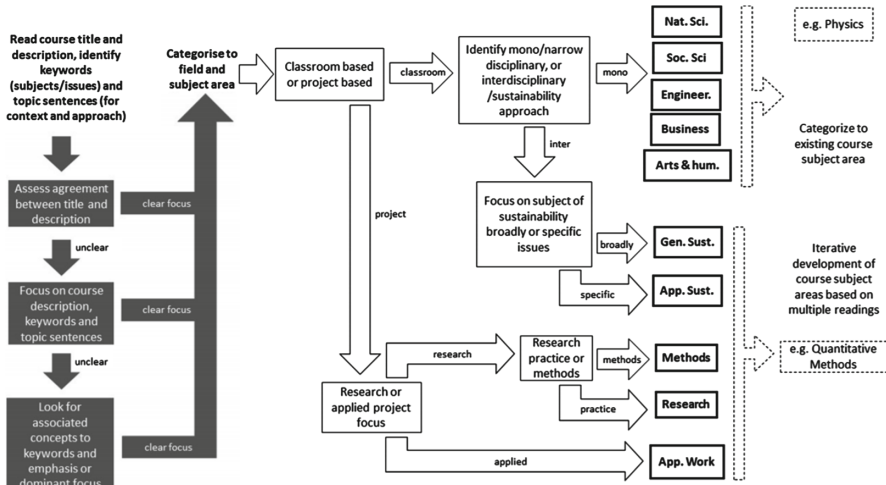


Fig. 1. Classification and Analysis of Curriculum Teaching Subjects

2 Related Work

2.1 Data Mining and Education Big Data

Data mining and education Big data analysis are popular research directions in modern education technology. Data mining is a technology to discover knowledge, information and patterns from a large amount of data, and education Big data analysis is to apply data mining to the education field, so as to realize the comprehensive mining, in-depth analysis and fine application of education data resources.

Education Big data analysis plays an increasingly important role in Education reform and Educational assessment. By analyzing, mining, and applying a large amount of data, comprehensive monitoring and analysis of students' learning behavior can be achieved, insight into students' learning trends and patterns can be provided, more accurate feedback and evaluation can be provided for teachers, and the improvement of educational fairness and quality can be promoted [9].

At the same time, education Big data analysis also helps to promote the realization of personalized teaching. By analyzing detailed data on student learning, personalized teaching plans can be developed based on different student characteristics and needs, achieving precise matching, and thereby enhancing students' interest and effectiveness in learning. In addition, education Big data analysis can also find existing education problems and improvement space, providing support for education decision-making and policies.

In 2000, the began to cooperate with its computer development center to out primary big data related on the U.S. education industry [10]. After 12 years, the released the Research Report on the promotion of education and analysis in 2012, which covers the research results of U.S. educators and big data researchers on American advanced, intermediate The cases of the combined and education in primary institutions, and summed up the relevant laws, have made a guiding and instructive role for the application worldwide.

China’s research and attention, mainly because in recent decades, the stage of transformation and development, and various new technologies and new ideas can not play a good the process of development of education. However, through the relevant research results published by many private teaching institutions or big data research institutions, we can find that, Big data has also achieved good results [11]. The knowledge structure of course selection is shown in Fig. 2 below.

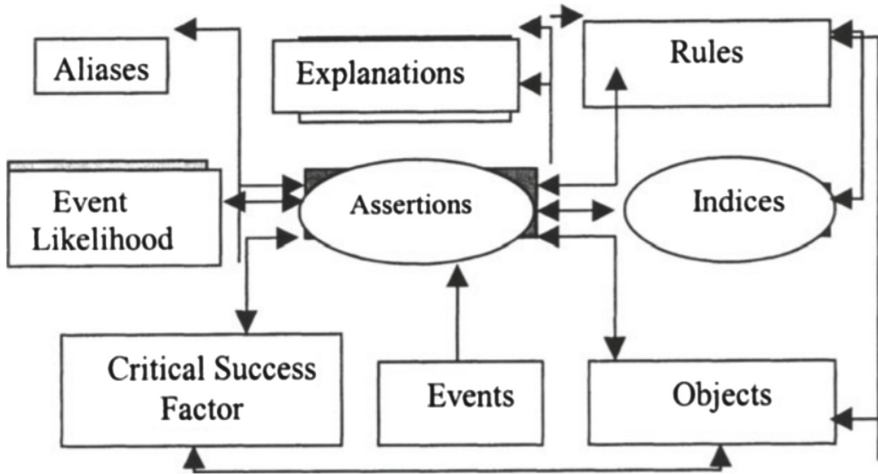


Fig. 2. Course selection knowledge structure

However, through the research on the of big data, this paper finds that the in China’s and marketing industry has been in the forefront of the world. Taking Alibaba as an example, Taobao under the group is the leading brand of China’s and marketing big data application, including, supercomputer and other technologies in the marketing industry, which has injected a strong shot into the education industry, China can integrate and transplant the particularity of the education industry with the advanced big data application experience of other industries in the form of industry transplantation to form China’s education big data platform [12].

2.2 Teaching Status of Characteristic Culture Courses for Foreign Students

Teaching characteristic cultural courses for international students has always been one of the key tasks of domestic universities. After arriving in China, international students not only need to learn professional knowledge, but also need to understand China’s traditional and folk culture in order to better integrate into Chinese society.

Most colleges and universities have cultural courses for foreign students, including language, culture, art, history and other courses [13]. With the increasing demand for international students in universities and the diversification of their needs, the content and form of characteristic cultural courses for international students are also constantly being updated and improved.

Firstly, the content of characteristic cultural courses for international students is mainly reflected in the following two aspects: firstly, it emphasizes the basic knowledge of traditional Chinese culture. Traditional Chinese studies, classic works, literature and art are key areas that international students need to focus on, helping them better understand the cultural background and history of China, and thus better understand and integrate into local society [14]. The second is to emphasize modern Chinese trend culture. For example, Chinese sports, movies, music, etc., allow international students to understand the development and trends of contemporary China, and feel the vitality and modernity of Chinese culture.

Secondly, the teaching forms and methods of characteristic cultural courses for international students are constantly being updated and improved, if a combination of online and offline teaching is adopted. Online teaching utilizes advanced means of digital technology, such as educational videos, online cultural courses, online reading, online quizzes, etc. It extensively utilizes the Internet and information technology to facilitate the learning of international students. Offline teaching includes various forms such as cultural relics inspection, cultural tours, literary and artistic activities, and on-site experiences, which can help international students better access and understand Chinese culture and society [15].

According to the survey, at present, Chinese culture courses are mainly offered to middle and senior foreign students. Although there are many kinds of textbooks, there are not many high-quality textbooks, and they mainly focus on theoretical introduction, and the design of practical links is less. There is no unified standard for the length and grade of Chinese culture courses in each school. In addition, the course content is mainly the introduction of Chinese mainstream traditional culture, while the regional cultural characteristics are less 3. Through the investigation of Chinese culture courses offered by foreign student teaching institutions in Shanghai, Beijing, Tianjin, Jiangsu, Anhui and so on.

It mainly introduces the theoretical knowledge of textbooks, with simple practical activities. This mode mainly focuses on the explanation of traditional cultural knowledge in textbooks, and students' activity space is centered on the classroom. Teachers intersperse one or two practical activities in the whole teaching activities. The classroom emphasizes the teachers. Students passively accept knowledge [8]. Its advantage is that teachers can and teach basic theoretical knowledge systematically and completely in unit time; Students can get and master more theoretical knowledge. However, this teaching mode overemphasizes the dominant position of teachers, which is suitable for the knowledge structure with strong theory, and is not suitable for the cultural knowledge that requires a lot of operation and participation. In the cultural courses taught in this teaching mode, foreign students generally do not have any cognitive experience after learning, which is prone to the problem of generalizing, making them think they know Chinese culture very well, and are prone to "cultural shock" in the process of practice.

3 Teaching Platform of Foreign Students' Characteristic Culture Courses Based on Data Mining

3.1 Design of Teaching Platform for Foreign Students' Characteristic Culture Courses

Since the characteristic culture digital teaching platform is to carry forward and inherit the characteristic culture, the teaching platform constructed should have teaching characteristics, and the most important thing is to reflect the teaching design. Teaching design is the teaching strategies, other elements in an orderly and optimized manner, and forming a teaching plan, as in Fig. 3.

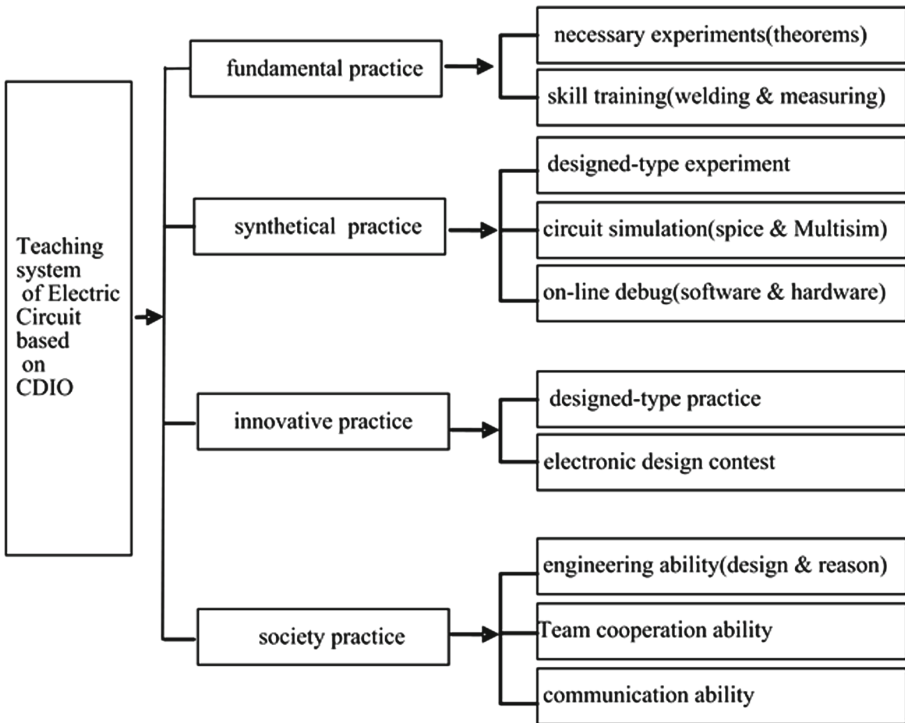


Fig. 3. Structure of course teaching system based on Data Mining

The courses generally offered can be divided into:

- (1) Special cultural general courses. It mainly introduces the relevant local characteristic culture in the form of words, pictures and videos, such as national characteristics, distribution, use of words, music and dance characteristics, so as to broaden the knowledge of characteristic culture, open it to all professional students, and focus on the education of humanistic spirit and scientific spirit for students.
- (2) Practical teaching courses of characteristic culture. It mainly focuses on skill learning, and uses video and teacher demonstration to learn some skills and culture

in the characteristic culture, such as the writing method of words, music singing, dance movements, national handicraft production and other practical operations. It is opened for students of specific majors, focusing on the inheritance and education of characteristic culture for students.

Therefore, the digital teaching platform of foreign students' characteristic culture must be developed and designed in combination with general education and practical teaching courses to meet the teaching needs.

The curriculum is the core and concrete embodiment of the overall planning for cultivating talents in a school. The curriculum is divided and constructed according to the type of school, school functions, teaching objectives, learning methods, and requirements, as well as the organization and arrangement of school courses, as well as the division of labor and cooperation between courses. It mainly reflects the overall planning for the training objectives of the school, covering teaching objectives and disciplines, scope, content, progress, tasks, and activities. In addition, curriculum design is a dynamic fine-tuning process, and its changes are also affected by political, economic, cultural, and other aspects. Therefore, the author believes that curriculum setting refers to the setting and arrangement of various courses selected by schools according to market needs the goal of talent cultivation. In summary, this study believes that it is more reasonable to divide the curriculum content.

3.2 Application of Teaching Platform for Foreign Students' Characteristic Culture Courses

The teaching of foreign students' characteristic culture course based on data mining is a new experiential teaching method gradually accepted by everyone at present. It requires to first collect the representative cultural elements in the local area, and then compile the "guide book for the practice of foreign students' Cultural Courses" (hereinafter referred to as the "guide book") according to these factors to guide practice with theory. The curriculum can be divided into two parts: Theory and practice, which can be carried out alternately. At ordinary times, classes teach the cultural elements of the region, and then let foreign students choose a certain point to carry out practical activities, and use practice to test the theory. This teaching mode allows foreign students to participate in practice from the place where they study. Starting from the familiar places around them, on the one hand, it can eliminate their sense of strangeness and timidity, on the other hand, it is also easy to perceive cultural elements and feedback practical information. The general procedure of this experiential teaching mode characterized by regional culture is: teachers select regional culture practice projects (no more than 4 per semester) k. Before each project, foreign students preview book. In class, teachers explain relevant cultural projects and assign practical tasks. Foreign students carry out practical activities in groups, Then report the project results in the form of a written report or presentation, and the teachers and other team members will comment and give feedback together.

After the implementation of the characteristic culture course teaching for foreign students based on data mining, two obvious results will be produced. First, foreign students' understanding of regional cultural factors is no longer fragmented and unsystematic, but will put the fragmented individual cultural representation into a whole cultural

background to observe and understand, forming a comprehensive and correct understanding. In turn, these theoretical understandings will better guide practical activities and form a virtuous circle [14]. The practice link various the school, including venues and personnel, to achieve resource integration and optimization, and open up a variety of experience ways for foreign students, so that foreign students can feel the regional cultural characteristics of the region in a close and all-round way.

4 Big Data Course Selection Algorithm

The offering of Chinese cultural experience courses in a certain university is at the forefront of universities. Although there are many categories, it cannot be ignored that they are closely linked to Chinese cultural courses in the implementation of specific courses, although these courses are actually featured as Chinese cultural experience courses. From the perspective of the methods and teaching models offered, the teaching model of most Chinese cultural experience courses is very single, even breaking away from the four basic words of “cultural experience” in the textbook of cultural experience. The main reason is that there are limitations in teaching venues and class hour arrangements, and specific issues are reflected in the interview feedback from the teaching director.

Cluster analysis refers to grouping based on the information involved in the characteristic cultural curriculum data that describes objects or their relationships. There are various clustering algorithms, but not all of them are suitable for this experiment. Considering the efficiency of the algorithm, we give priority to selecting efficient clustering algorithms. One of the greatest advantages of clustering methods based on definition partitioning is their fast convergence rate and speed, and they are also simple, efficient, and low in time and complexity for some large characteristic cultural curriculum datasets. K-means algorithm is a typical clustering algorithm based on the distance between targets, using the distance between targets as an evaluation indicator of the similarity between targets, that is, the closer the distance between two targets is, the greater the likelihood that they will be clustered together.

Firstly, we need to determine the size n of a known selected sample featured cultural curriculum dataset, and the characteristic dimension of each selected sample featured cultural curriculum dataset is m . Recorded as:

$$D = (X_{1i}, X_{2i}, \dots, X_{mi}), i = 1, 2, 3, \dots, n \quad (1)$$

Then we need to set the required number of clusters, K . And we need to randomly select the final clustering center point that is the same as the set clustering number k in a characteristic culture curriculum dataset.

$$C = (C_{1j}, C_{2j}, \dots, C_{mj}), j = 1, 2, 3, \dots, k \quad (2)$$

Calculate the Euclidean distance between each centroid and each point in the data set of the characteristic cultural curriculum. According to the criterion of the closest distance, they are divided into corresponding classes that are closest to the cluster center (most similar). The calculation formula is as follows:

$$D(i, j) = \sqrt{(x_{1i} - c_{1j})^2 + (x_{2i} - c_{2j})^2 + \dots + (x_{mi} - c_{mj})^2} \quad (3)$$

After putting all the characteristic cultural curriculum data together. Then solve each set again, we can be certain not achieve the classification, it will change, and the above steps must be repeated again [18]. Then put the test dataset into model validation. In this experiment, test dataset. Because the training method using the random gradient descent method ensures the rationality of parameter selection, we use the multiple times to find the optimal learning rate. In order to ensure that the optimal learning rate can be obtained, we will compare the results of multiple experiments. Each experiment will take a different learning rate for experiments. Due to the characteristics of the random gradient descent method, the selection of the learning rate is particularly important. The learning rate is equivalent to determining the speed of gradient descent. If the learning rate is too large, it the decline speed being too fast and missing the optimal value. If the selected learning rate is too small, “It is possible to obtain a local minimum instead of a global minimum. We can determine whether the selected learning rate is appropriate based on the corresponding model prediction accuracy when selecting the learning rate.”. We conducted comparative experiments with learning rates of 0.1, 0.5, and 0.8 by constructing models multiple times, and the results in Fig. 4 below:

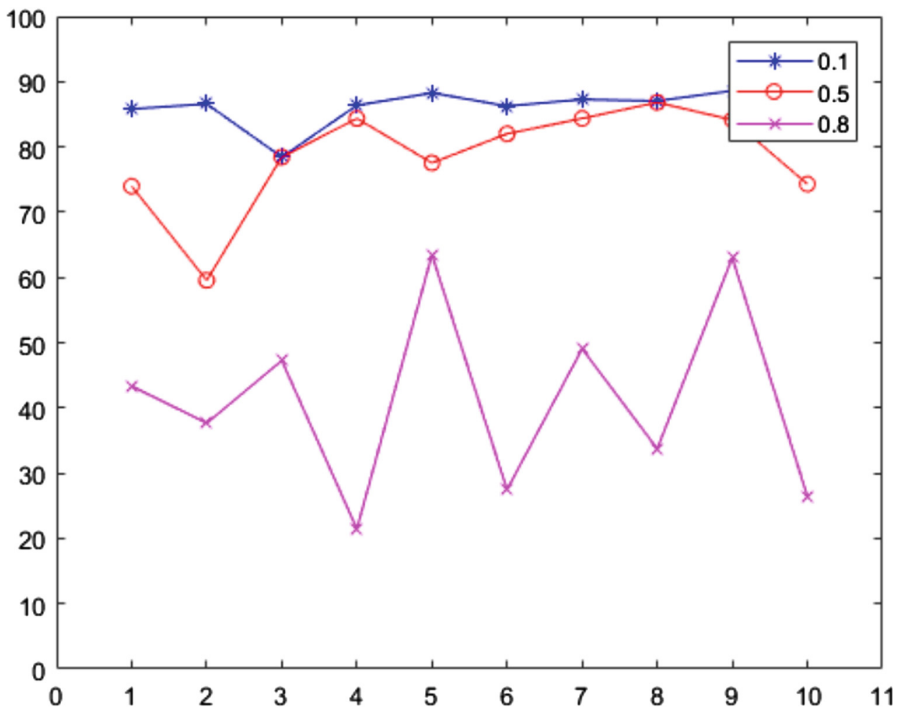


Fig. 4. Course selection accuracy

In the above Fig. 4, it mining studied in this article has the highest accuracy rate for setting up characteristic cultural courses. Because the results of mining using association rules have a certain degree of complexity, which is reflected in the diversity of mining

results, which requires the presentation of diverse information content. Therefore, we can choose to use the knowledge atlas method to analyze and present it. The knowledge atlas is to convert complex information into an information structure that can be structured for display through calculation and processing, The knowledge content that needs to be represented can also be presented through graphical rendering, providing a valuable basis for readers and observers.

5 Conclusion

The teaching platform of characteristic culture courses for foreign students based on data mining no longer takes Book assignments as the evaluation method. It is hoped that foreign students can truly enter the local social life, experience the local cultural characteristics, and reduce the sense of conflict caused by cultural differences. Through participation and cooperation to complete practical tasks, international students can also enhance their interpersonal skills and awareness of collaboration, and guide them to look at, analyze and solve problems from a cross-cultural perspective; Help them build a global vision and improve their ability to deal with conflicts and uncertainties; Encourage them to dare to challenge and innovate, so that all overseas students can spread Chinese culture with a more positive attitude and become messengers of friendship between the Han nation and other nations.

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