Cooperative Foreign Language Teaching Model with Data Mining Algorithm

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Abstract. This paper constructs the practice teaching mode of curriculum cooperation mechanism, and expounds its application in the cooperative foreign language teaching practice teaching under the data mining algorithm. This teaching mode will quickly penetrate the latest development and the latest methods of artificial intelligence into the computer practice. Starting from the construction of artificial intelligence curriculum system and multi-disciplinary cooperation mechanism, it will cultivate students' practical ability and innovation ability.

Keywords: Data mining algorithm · Cooperative foreign language teaching mode · Ant colony algorithm

1 Introduction

With the rapid development of global information and industrialization, talents in the field of big data and artificial intelligence are in a state of shortage for a long time. It is particularly important for local colleges and universities to cultivate students with practical operation and innovation ability required by employers, This paper constructs a new teaching mode, curriculum collaborative mechanism practice teaching mode, and expounds its application in artificial intelligence practice teaching [1]. The curriculum collaborative mechanism practice teaching mode expounds the talent training methods to comprehensively improve the project practice ability and application innovation ability from the aspects of talent training objectives, computer project practice training, daily classroom teaching arrangement, teaching performance evaluation, etc., It is of great significance to broaden the learning vision of big data majors and exercise the ability of integrating theory with practice.

1.1 The Connotation of the Practice Teaching Mode of Curriculum Coordination Mechanism

The framework of the practical teaching mode of course collaboration mechanism is shown in Fig. 1. The practical operation of big data technology includes the establishment of Acer basic big data platform and the management of software and hardware environment, data storage and encryption processing, the setting of corresponding data

field mode, the adoption of batch processing algorithm, the Research on the application direction of results, etc., The purpose is to comprehensively improve the practical ability, guide students to seek programming and algorithm design independently, and understand the theory and method of artificial intelligence from the program through the actual Multi Programming and multi computer. The framework of practice teaching mode of curriculum cooperation mechanism is shown in Fig. 1.
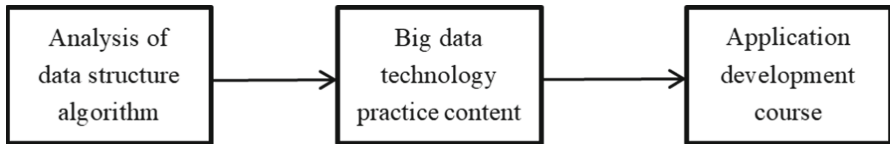

Fig. 1. The framework of the practice teaching mode of curriculum collaborative mechanism

1.2 Curriculum System Design

Big data mining and analysis are realized by means of computer programming, and basic programming courses should be set up in the course system. Practice one is to collect data, crawl experimental data, clean and encrypt data. Practice two is basic experiment, database design, construction of data cloud computing development platform and corresponding model modeling, The purpose is to make students learn to find the target data, combine with mathematical modeling cases, and solve the process of target task pertinently [2]. Practice 3, through data visualization technology, data analysis and batch processing technology, shows the mining results of the experimental project in a variety of ways, and improves the ability of analyzing and solving practical problems. Practice 4, cultivate students' comprehensive practice and business ability: Practice 5, practice 3, practice 3, practice 3, practice 3, practice 3, practice 4, practice 4, practice 4, practice 5, practice 4, practice 5, practice 5, practice 5, practice 5, practice 5, Set up a comprehensive experiment course, as the basis of follow-up teaching.

2 Introduction of Case Embedded Collaborative Teaching Mode

This teaching mode includes two aspects: one is the collaborative planning of course group, which integrates the knowledge of each course with cases as a link, so as to help students build a complete knowledge system and effectively enhance their overall grasp of knowledge; the other is the exploration of research-based teaching mode around cases, Taking engineering cases as the main line to cultivate students' ability to analyze and solve problems.

2.1 Collaborative Planning of Curriculum Group

The selection of engineering cases is not more important than refinement. It is mainly one or two cases. It does not need to cover all the knowledge points of all courses. It

is more about teaching students to understand engineering concepts through cases and master the methods to solve problems. There are several principles in the selection of Cheng cases.

① Engineering cases should be common in engineering practice, with real engineering background.

② The knowledge covered by the case should be able to run through the teaching of the course group.

③ The case can not be too complex, too complex case students understand difficult and difficult to implement.

④ The equipment suitable for the laboratory should be selected first for the case, and the final control scheme should be implemented on the actual experimental device. Integrating the above principles, the engineering case of this teaching mode firstly selects the liquid tank control system in the laboratory, and uses this case to run through the teaching of each course. Secondly, the evaporator simulation device is selected as an advanced case to carry out comprehensive training in the industrial network control system.

2.2 Each Course is Based on Case Study

Research teaching is a "student-centered" teaching mode, which can arouse students' thinking through problems or projects, realize deep learning of knowledge, stimulate students' interest and potential in learning, and improve classroom atmosphere and teacher-student relationship, which is also the trend of teaching development in the future [3]. Different courses have different emphasis on foundation and application, and different research teaching modes and methods are adopted. This teaching mode adopts research-based teaching method based on problem, task and project. "There are many basic knowledge of sensors and detection, and the problem-based discussion classroom teaching mode is mainly used in the teaching process." the process control instrument and device course has basic knowledge and engineering application, and the problem + "task" teaching mode is adopted in the teaching process. "Industrial network control system" is a project-based teaching mode in the application teaching process. An improved data mining structure is shown in Fig. 2.

2.3 Similarity Model

The basis of classical rough set model is indistinguishable relation. When there are missing attribute values in the data (which is very common in database), the inseparable relation or equivalent relation can not cope with this situation. In order to improve the ability of rough set, many authors have proposed using similarity relation instead of indistinguishable relation as the basis of rough set. Practice shows that the similar model has better performance than the classical rough set model in practice. When solving the problem of missing values in database, a simple similarity relation can be defined as (where "origin" represents not knowing or not caring):

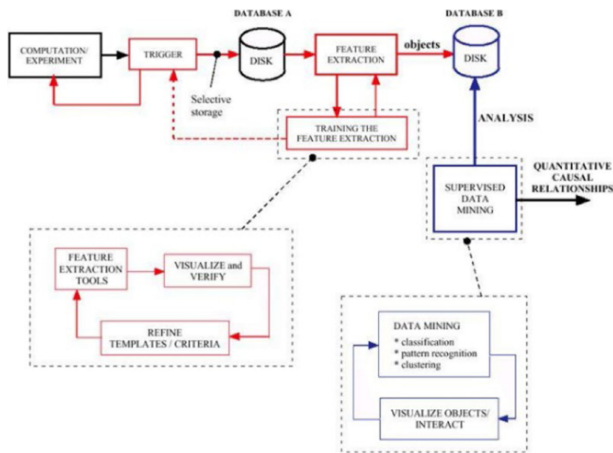$$\tau_c(x, y) = \{x \in \cup, y \in \cup\} \tag{1}$$

Fig. 2. Improved structure for data mining

The principle class of genetic algorithm provided in this paper is different from other kinds of genetic algorithms in other fields, mainly in the representation and fitness function. The representation method defined by the author is that each bit string represents one item of the discernibility matrix, that is, the discernibility attribute set of two objects. When a bit is 1, the attribute exists, otherwise it does not exist. Thus, each bit string is a candidate for reduction. The fitness function is defined as follows:

$$F(v) = (N - Lv)/n + 2Cv/(m^2 - m) \tag{2}$$

3   Practical Effect Simulation

3.1   The Teaching Effect is Widely Recognized by Students

The case embedded collaborative teaching mode has been applied in 2013–2015 automation class of our university, and achieved good results, More than 360 students in 15 classes benefited. In July 2018, through the statistical analysis of 124 valid questionnaires collected from the two courses, 955% of the students said that they like the discussion based classroom teaching, 982% of the students thought that the given thinking questions can help students understand the course content, and 853% of the students thought that the discussion based classroom teaching is conducive to students' concentration and improvement of learning effect. 100% of the students agree that the project-based teaching method is adopted in the course of industrial network control system. The simulation of teaching effect is shown in Fig. 3.

We have carried on the simulation analysis from five dimensions, from Fig. 3, we know that in the algorithm proposed in this paper, our proposed teaching effect is the best.
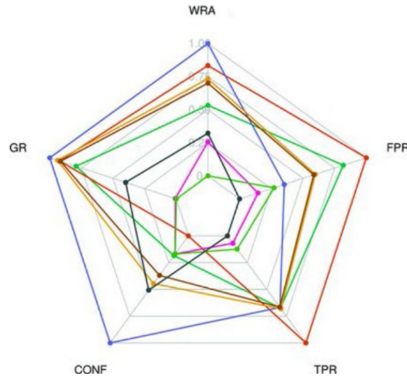
Fig. 3. Teaching effect simulation

3.2 The Students' Comprehensive Ability to Use Knowledge has Been Improved

In the 2016–2018 "Siemens Automation challenge", the degree of undergraduate students' participation has increased year by year. Because bisai is an undergraduate and research subject, the subject of bisai is to investigate the design and implementation of control scheme for complex production process, such as heating furnace, boiler, reactor and other production devices [4]. In previous years, the undergraduate students of bisai middle school were subordinate to di Ren, who really participated in the design and debugging of the project. In the past two years, 80% of the participating teams are undergraduate students, who undertake the main design and debugging work, and even many teams of undergraduate students form teams to participate in the project.

4   Research Design

Based on the investigation of the development of College English Teaching under the computer network environment in China, the essential task of this paper is to explore the ecological teaching mode. In this chapter, we will focus on the overall design process of this empirical study. The specific structural arrangement is as follows: firstly, establish research problems, select research subjects and variables, and clarify research methods and means, then list research design and process steps in detail, finally collect research data and text information, and carry out classified discussion and ecological analysis [5].

4.1   Research Questions and Hypotheses

Based on the current situation of College English Teaching in the computer network environment, this paper summarizes the maladjustment in the integration of traditional English teaching and modern education methods from the micro perspective, analyzes the maladjustment by using the principles and laws of educational ecology, and tries to explore the strategies and suggestions for reasonable optimization of teaching, It aims to promote the healthy development of College English Teaching in China towards the ecological direction of "compatibility, dynamic and benign". The author intends to

focus on the following four aspects of research issues, to make a detailed investigation of College English Teaching under the computer network environment, and to clarify whether there is imbalance in the process of integration of computer network and College English Teaching in the University [6]. 2. Summarize the performance and influence of imbalance objectively and in detail. 3. Use the principles and mechanisms of educational ecology, From the perspective of individual ecology, group ecology and system ecology, this paper analyzes the maladjustment and its causes; 4. According to the ecological education concept of harmony, connection and development, starting from the objective reality of micro niche (teachers, students and teaching environment), we have the courage to innovate and look for Countermeasures to alleviate the maladjustment, In order to build and optimize the ecological foreign language teaching mode of "teacher led student-centered" under the computer network environment [7].

4.2 The Maladjustment of the Combination of College English Teaching Elements and Computer Network Environment

From the perspective of educational ecology, any healthy development of subject teaching has its own relatively unique teaching elements. These elements run in and coordinate with each other in the long-term teaching practice, and gradually form an external balanced and stable language teaching environment and an internal coordinated development of teaching ecosystem. Traditional foreign language teaching is no exception [8]. However, when the computer network technology enters the foreign language curriculum, the traditional teaching elements are impacted by new teaching elements (such as multi-media, network content, technical methods, etc.), which will lead to the reorganization of teaching structure and the change of teaching arrangement (such as the design of teaching activities, the positioning of teachers and students' roles, the choice of teaching mode, etc.) [9]. The running in of the new and old elements requires a long-term process of compatibility and imbalance. The imbalance will inevitably break the original ecological balance of traditional foreign language teaching, and the unbalanced teaching system will immediately lead to more new imbalances. From a macro point of view, the maladjustment of curriculum integration at this stage mainly includes: the maladjustment of teaching concept and teaching practice, the maladjustment of national education policy and school specific situation, the maladjustment of technology and application, the maladjustment of new teaching mode and traditional teaching system, the maladjustment of teaching process and teaching management, etc. With the development of curriculum integration in depth, various new forms of maladjustment will emerge one after another and exist for a long time in the macro and micro fields of teaching, which directly affects the normal operation of the whole foreign language teaching system and seriously restricts the healthy and orderly development of modern foreign language teaching in China. The author believes that it is necessary for us to carry out all kinds of research to effectively intervene and actively regulate these disorders in time [10].

4.3 The Construction of College English Ecological Teaching Mode Under the Computer Network Environment

If we want to analyze the causes of maladjustment and explore the countermeasures to solve the maladjustment, it is difficult to achieve only relying on the traditional teaching theory [11]. Although traditional teaching theories can well explain the essence of human learning activities, the imbalance in teaching has posed a challenge to these traditional theories, mainly because the elements of the integrated teaching system have changed. The existing teaching system involves not only teaching and learning, but also more elements such as technology and resources. Therefore, in order to find the causes and Countermeasures of the imbalance and restore the dynamic harmony of the teaching system, we should re-examine our foreign language teaching from the perspective of ecology on the basis of the advantages of traditional theories, that is, to investigate the relationship between the internal elements of the foreign language teaching system and the external development environment according to the principles of ecology and the theory of educational ecology, This paper discusses the characteristics and functions of foreign language teaching ecology, analyzes the basic laws of its evolution and development, and explores the teaching mode of students, such as the setting of curriculum objectives, the design of teaching activities, and the construction of teaching mode. The domestic research on Ecological foreign language teaching mode has made some achievements in both macro and micro fields. In this paper, the author aims to put forward some specific strategies for mode optimization based on the empirical research results, hoping to contribute to the domestic micro research in this field [12].

5 Theoretical Framework

The theoretical research of computer network technology applied to foreign language teaching is the result of the continuous optimization of combination and integration based on the theoretical research of various disciplines. With the development of College English teaching reform, the research of educational ecology has attracted close attention of the educational circles. It provides a new way of thinking for foreign language teaching research and enriches the theory of foreign language teaching. The integration of computer network and College English curriculum by using educational ecology is helpful to analyze and solve the system imbalance and ecological imbalance in College English teaching. The construction and optimization of ecological teaching mode and the realization of the ecological teaching of College English are the development and perfection of the theory in practice, and also a new perspective and experience of the reform of College English teaching. In this chapter, the author will introduce the theory of educational ecology and its basic principles and ecological laws, analyze the relationship between ecological theory and foreign language teaching in the computer network environment, and try to define the ecological teaching mode under the consideration of this theory [13].

5.1 The Theory of Educational Ecology

It is generally accepted that the term "educational ecology" was formally put forward by American scholar Lawrence Cremin (LA.) in his book "public education" in 1976.

The research on Educational Ecology in China started later than that in the west, and the research in Taiwan was earlier than that in the mainland. Since the beginning of the 21st century, due to the rapidly changing natural and social environment, economic globalization and other factors, people pay more and more attention to ecological problems, and the expectation of high-quality and efficient ecological education is gradually increasing, which promotes the research of educational ecology to be prosperous. For many years, the basic theory of educational ecology has been widely discussed by scholars at home and abroad. Many influential research results have been obtained by applying the theory to the practice of micro education [14].

Educational ecology is an interdisciplinary subject, which sprang up in the mid-1970s and spans the two fields of pedagogy and ecology. It is the product of the penetration and application of ecological principles and research methods in pedagogy. Specifically, ecology studies the law and mechanism of interaction between life system and environmental system; pedagogy studies the law of educational development, the influence of society on education, and the status and role of education in social development; while educational ecology takes pedagogy and ecology as the theoretical basis, draws on the research methods of these two disciplines and develops, According to the basic principles of ecology, especially the principles and mechanisms of ecosystem, ecological balance and coevolution, this paper studies various educational phenomena and their causes, and then grasps the law of educational development [15].

5.2   Basic Concepts of Ecology

The understanding of the basic concepts of ecology will help us to clarify the research objectives and standardize the research contents. There are many kinds of concepts in the subject. Here, the author mainly introduces the related projects of educational ecology involved in this study, and illustrates with examples of foreign language teaching in the computer network environment. 1. Species, key species, population and community species refer to the biological groups with certain morphological and physiological characteristics and existing in a certain natural distribution area. In different levels of ecosystem, due to the different basic units, the species in the ecosystem will be different. In the foreign language teaching under the computer network environment, we can regard students, teachers, teaching materials, computer hardware and software facilities, teaching environment, teaching methods, learning methods, school management and other teaching elements as the basic species in the ecosystem. Key species refer to the species whose disappearance or weakening will cause fundamental changes in the whole community and ecosystem. The number of individuals of key species may be large or rare, and their functions may be single or diverse. In the foreign language teaching ecosystem under the computer network environment, students, teachers and teaching methods are relatively important. These key species may also change with the development of teaching process. For example, in the multimedia classroom teaching dominated by teacher explanation, the leading role of teacher is more important, while in the process of student-centered network autonomous learning, the dominant position of student will be highlighted. Moreover, only teachers and students teaching groups without appropriate teaching methods can not form a healthy education ecosystem. Population refers to the collection of individuals of the same species living in a certain

space, which is composed of multiple individuals of the same species in the space. There are differences among individuals. In the foreign language teaching ecosystem under the computer network environment, as a large fixed population, students' individual thinking and activities often have an effect on the development of the population. At the same time, students are also affected by the activities among the populations, It is an important issue to explore the interest cultivation and ability development of individual students and student groups in order to improve the teaching quality in this teaching environment. Community refers to the aggregation of all biological populations gathered in a certain area or ecological environment at a specific time. As mentioned above, students, teachers, teaching materials, computer hardware and software facilities, teaching environment, teaching methods, learning methods, school management and other teaching elements interact and correlate with each other in the foreign language teaching under the computer network environment, forming a teaching ecosystem community.

6   Conclusions

In the teaching of the course group, the embedded engineering cases are used to plan the teaching tasks of each course in the course group, and then the research teaching is carried out around the cases in the teaching of each course. The embedded engineering cases connect the knowledge points of each course, help students build a complete knowledge system, strengthen the concept of engineering application, and cultivate students' ability to analyze and solve problems through research teaching. The combination of the two parts improves students' ability to use comprehensive knowledge to solve complex problems.

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