Disciplinary Construction of Chinese Language and Literature Resources Integrating Fuzzy Mathematics

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The development of a country’s language and literature is the orientation of the country’s spiritual strength, and it is also the embodiment of the national literary quality. Chinese language and literature has a very long history of development, the content of which is broad and deep, and there are countless literary works. It is impossible for one person to fully understand these works after spending his entire life. As a result, these literary resources are optimized and constructed and classified into various disciplinary contents, so that students can systematically learn literary knowledge according to their own interests. Therefore, this paper conducts a disciplinary analysis of the construction of Chinese language and literature resources by integrating the method of fuzzy mathematics. Through the study of fuzzy mathematics, the method of fuzzy cluster analysis is proposed to classify Chinese language and literature resources, and the method of fuzzy comprehensive evaluation is used to evaluate the contents of various subjects. This paper selected the richness of subject content, faculty strength, talent demand, and subject difficulty as evaluation indicators. By comparing the scores of various discipline indicators before and after resource optimization, the results showed that using fuzzy cluster analysis, disciplines 1 and 2 were popular disciplines. Disciplines 4 and 5 were general disciplines, and disciplines 3 and 4 were unpopular disciplines. Using the fuzzy comprehensive average, the comprehensive scores of the six disciplines were 84, 79, 80, 82, 83, and 75, respectively. The quality of resource construction in these disciplines was high. In addition, the scores given by experts were all above 70 points, with an average score of about 83 points. It showed that the method of using fuzzy mathematics to construct Chinese language and literature resources has achieved good results, and the results obtained by using the method of disciplinary analysis were reliable and feasible.

1. Introduction

China’s education system is continuously optimized, and the construction of Chinese language and literature resources should also be accelerated. Because Chinese language and literature involve many historical works and the literary resources are complex and diverse, it is difficult to analyze them in detail. In the past, expert evaluation was used to classify these literary resources. These methods are inefficient, and the classification basis will vary from person to person, so there is controversy. Fuzzy mathematics is a method that can analyze fuzzy phenomena. The process of judgment, evaluation, reasoning, decision making, and control in fuzzy mathematics can also be described by fuzzy mathematics. It is a very novel and efficient method to use fuzzy mathematics to process a large number of resources. Therefore, this paper integrates fuzzy cluster analysis and fuzzy comprehensive evaluation method to conduct a disciplinary analysis of Chinese language and literature resources, so as to optimize Chinese language and literature resources, speeding up the process of resource construction, which can promote the development of Chinese language and literature.

In order to analyze the construction of language and literature resources, some scholars have conducted related research. Among them, Li [1] studied the resource construction of Vietnamese language and literature in Vietnam with multietnic and multilanguage like China [1]. Jin [2] reconstructed the historical formation and characteristic understanding of language and culture based on the
literature of Singapore and Malaysia [2]. Umar [3] analyzed the causal structure in Aceh in the language and literature. The causal structure is a very important syntactic and semantic category of human language. In Chinese, the causal structure is one of the most important sentence structures, which is often equal to active and passive sentences [3]. Tao [4] focused on the study of oral corpora in Chinese language and literature and its applications, outlined the current state of corpus construction in the field of Chinese linguistics, and described and evaluated various corpus resources [4]. However, most of these studies only considered a small angle of literature and lacked disciplinary and standardized analysis, so more advanced methods need to be explored.

In order to analyze Chinese language and literature resources in a disciplinary manner, some scholars have proposed the method of fuzzy mathematics. Among them, Jiang et al. [5] introduced an intelligent control scheme based on fuzzy sets to solve the adaptive problem of rough control rules [5]. In order to accurately study fault sealing, Dong [6] improved the comprehensive quantitative evaluation method of fuzzy mathematics on the basis of previous research [6]. Sun [7] effectively reduced the cost of software testing quality evaluation and improved the reliability of software testing quality evaluation methods by using fuzzy models [7]. Ruan and Li [8] used fuzzy mathematics as an analysis tool, combined with the actual characteristics of human adaptive sports equipment industrial design, and focused on the essence of industrial design under fuzzy theory [8]. The research of these scholars on fuzzy mathematics has promoted its development to a certain extent, but the application of these fuzzy mathematics is less involved in the construction of Chinese language and literature resources. Therefore, it is necessary to further explore the application of fuzzy mathematics for disciplinary analysis.

In order to apply fuzzy mathematics to the construction of Chinese language and literature resources, this paper adopts fuzzy clustering analysis of fuzzy mathematics and fuzzy comprehensive evaluation method for research. Through the rating of each subject indicator, the C1 indicator of Chinese linguistics had the highest score of 82 points. The scores of C2 and C4 indicators did not exceed 50 points. The score of C3 indicator was 68 points. This showed that the knowledge richness of Chinese linguistics was relatively high, but the teachers were insufficient and the subject was difficult. The C2 indicator of Chinese international education was 67 points, and the C1 indicator was only 54 points. It was necessary to enrich the knowledge content of Chinese international education. The C2 indicator of minority language and literature was 77 points, and the other indicators were all at the medium level, indicating that there were sufficient teachers engaged in the education of this subject. The C3 indicator of classical literature was 80 points, and the other indicators were all at the lower level, indicating that there was a shortage of talents in this discipline. The C2 and C3 indicators of secretarial studies were both at the L1 level, indicating that there was a large demand for talents and a sufficient number of teachers. The C2 and C4 indicators of sign language interpretation were 74 and 67 points, respectively, and the remaining indicators were all below 50 points. It showed that the talent demand for sign language interpretation is relatively large. The subject difficulty is also relatively large, and the teachers and knowledge of sign language interpretation are insufficient. The C2 indicator of sign language translation after resource optimization was below 70 points, which was lower than the previous C2 indicator score. It may be that the content of each subject has changed after the optimization, and the requirements for teachers are stricter, resulting in a relative decline in the number of teachers. However, various indicators of other disciplines have improved to varying degrees, and most indicators have improved significantly.

2. Language and Literature Resources’ Construction

2.1. Chinese Language and Literature. Chinese language and literature has a long history, which is the first professional discipline established in the history of Chinese universities [9, 10]. Due to the diverse contents and forms of Chinese language and literature, the curriculum reform of education majors has always been a complex systematic project. It presents the characteristics of chaos, disorder, and even mutation of discontinuity and nonlinearity. Because of the changes of the times, more and more literary works, and literary resources have appeared, and its certainty is constantly decreasing and difficult to predict [11, 12]. As a result, the organization and arrangement of the compilation content of some textbooks of this major are mostly only considered from the logic and rigor of the subject’s own knowledge system, lacking flexibility, and interest [13, 14]. The deficiencies in the current Chinese language and literature education professional curriculum are an important factor for the lack of teacher quality of the current Chinese language and literature education graduates. Therefore, in order to truly play the role of the professional curriculum in cultivating new language teachers, the current Chinese language and literature education professional curriculum must be reformed and improved according to the actual needs of the new curriculum reform.

Therefore, in view of the shortcomings of traditional language and literature textbooks, this paper proposes a more comprehensive framework for the construction of Chinese language and literature resources, as shown in Figure 1. First of all, through research, the basic requirements of resource construction are understood, such as paying attention to the needs of students, understanding the needs of social development, improving the subject system, and being easy to teach. According to these requirements, resource construction can be carried out in the form of published books, literary videos, audios, etc. These constructed resources are then stored in libraries, related online platforms or literary forums. This can not only optimize the resources of Chinese language and literature but also disseminate cultural knowledge. The optimized resources are supervised by the public and can be further improved through public feedback [15, 16].
At present, most colleges and universities pay more attention to the examination of the mastery of subject knowledge and pay less attention to the students’ practical innovation ability, learning attitude, learning effort, and progress [17, 18]. Therefore, it is particularly important to change the traditional evaluation concept and improve the employment situation of students majoring in Chinese language and literature [19–22]. In this regard, this paper proposes a disciplinary analysis method integrating fuzzy mathematics, as shown in Figure 2. The method first classifies the subjects included in Chinese language and literature, and then conducts fuzzy cluster analysis according to the social development needs of each subject, the employment rate of the subject, the richness of the course content, and the enthusiasm of students to learn. Then this method improves each discipline and finally conducts a fuzzy comprehensive evaluation of the improved disciplines. The evaluation content includes the rationality of the resource construction of each discipline, the employment prospects of students in each discipline, and the overall satisfaction of experts. This method is expected to change the traditional evaluation concept and improve the employment rate of students, so as to carry forward the charm of Chinese language and literature, which will make the resource construction more perfect and reasonable [23, 24].

At present, although there have been some changes in the curriculum evaluation methods of the Chinese language and literature education major, in the actual operation process, the curriculum evaluation of this major has not yet achieved a fundamental change in function [25]. Therefore, colleges and universities must take various measures, especially to implement incentive mechanisms, in order to stimulate the enthusiasm of teachers to participate in curriculum reform [26]. Second, on the basis of inheriting and carrying forward the essence of traditional Chinese educational thought, it is necessary to criticize and absorb foreign educational ideas that are full of vitality, integrating, innovating, and creating new educational ideas suitable for China’s national conditions, which can replace the backward traditional educational ideas with them [27].

2.2. Disciplinarization of Fuzzy Mathematics. Fuzzy mathematics is a method of describing a phenomenon or its degree by using human abstract language. There are many specific fuzzy methods. In this paper, the fuzzy cluster analysis is used to classify various disciplines, and the fuzzy comprehensive evaluation method is used to evaluate the quality of resource construction.

Fuzzy Clustering: assuming that Chinese language and literature is represented by $C$, the subjects included are divided into popular, general, and unpopular subjects. If

![Figure 1: Framework for the construction of Chinese language and literature resources.](image-url)
The degree of similarity is represented by $B$. Then for any subject, the degree of similarity is given as formula (2):

$$B_{ij} = \frac{1}{\sum_{k=1}^{c}((c_j - o_j)(c_j - o_{kj}))^{1/m}}.$$  

(2)

The center points of the clusters are as given in formula (3):

$$a_i = \frac{\sum_{j=1}^{n} c_{ij}b_{ij}}{\sum_{j=1}^{n} c_{ij}}.$$  

(3)

In formula (3), $b$ represents the similarity.

Fuzzy Comprehensive Evaluation: if there are $m$ factors that affect the quality of resource construction of various disciplines in Chinese language and literature, and the factor is represented by $F$, then there is formula (4):

$$F = \{f_1, \ldots, f_m\}.$$  

(4)

The quality evaluation result of resource construction is represented by $L$. If there are $n$ results, then formula (5) can be obtained:

$$L = \{l_1, \ldots, l_n\}.$$  

(5)

From this, the evaluation matrix is established as formula (6):

$$A = \begin{bmatrix} l_1f_1 & \cdots & l_1f_m \\ \vdots & \ddots & \vdots \\ l_nf_1 & \cdots & l_nf_m \end{bmatrix}.$$  

(6)

If the weight of each matrix element is represented by $w$, then the corresponding evaluation index score is given as formula (7):

$$s_{ij} = l_if_j \times w_{ij}.$$  

(7)

This results in a comprehensive evaluation score are given as formula (8):

$$S = \{l_1f_1, \ldots, l_1f_m, \ldots, l_nf_1, \ldots, l_nf_m\} \times \{w_{11}, \ldots, w_{ij}, \ldots, w_{nm}\} = A \times W.$$  

(8)

Finally, the resource construction quality of each discipline is judged according to the comprehensive evaluation score. In order to facilitate the calculation, the weights in this paper are all assigned 1.

3. Language and Literature Experiment Design and Data Sources

The experimental data in this paper are obtained through network surveys, and Python software is used for data processing because Python syntax is simple and easy to use. The information of each subject is obtained from the official website of the university with the relevant subject, or obtained through public information. This paper first obtains the relevant professional disciplines of Chinese language and literature, as shown in Table 1, so that the disciplinary analysis can be easily carried out according to these contents. Among them, the subject codes in Table 1 are derived from the codes stipulated by the education majors in Chinese colleges and universities. The T in the secretarial and sign language translation code represents the postgraduate professional code.

In order to conduct cluster analysis and comprehensive evaluation of various disciplines, this paper selects a number of evaluation indicators shown in Table 2, including the richness of discipline knowledge, discipline teachers, talent needs, and discipline difficulty. Corresponding vague comments are also given.
Table 1: Classification of Chinese language and literature disciplines.

<table>
<thead>
<tr>
<th>Subject code</th>
<th>Subject name</th>
<th>Meaning of discipline</th>
<th>Code for this article</th>
</tr>
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<tbody>
<tr>
<td>050101</td>
<td>Chinese language and literature</td>
<td>It focuses on the evolution law, structural features, and current state of the Chinese spoken language system and writing system from antiquity to the present</td>
<td>1</td>
</tr>
<tr>
<td>050103</td>
<td>Chinese international education</td>
<td>Specifically, it can promote Chinese international education’s core reading and abilities, as well as bilingual knowledge and practical application ability in Chinese and English</td>
<td>2</td>
</tr>
<tr>
<td>050104</td>
<td>Chinese minority language and literature</td>
<td>Students with a basic understanding of Chinese minority language and literature, as well as professional-related expertise, are sought</td>
<td>3</td>
</tr>
<tr>
<td>050105</td>
<td>Classical philology</td>
<td>Students study ancient Chinese writings before delving into the rules governing their creation and communication</td>
<td>4</td>
</tr>
<tr>
<td>050107T</td>
<td>Secretarial studies</td>
<td>Specifically, students study the fundamental theory and knowledge of secretarial job generation</td>
<td>5</td>
</tr>
<tr>
<td>050109T</td>
<td>Sign language interpretation</td>
<td>It cultivates high-quality applied sign language interpreters with a sense of humanism and ethnic communication</td>
<td>6</td>
</tr>
</tbody>
</table>

In this paper, the score of each indicator is expressed as a full score of 100 points, and the score is divided into three levels: L1, L2, and L3. The indicator comments corresponding to each level are shown in Table 3, where the total score S represents the quality of resource construction.

4. Results

4.1. Ratings for Each Subject Indicator. This paper first summarizes the scores of various indicators of various disciplines in colleges and universities with Chinese language and literature majors, as shown in Figure 3.

As can be seen from Figure 3, Chinese linguistics with subject code 1 had the highest C1 indicator score of 82 points, indicating that the knowledge richness of Chinese linguistics is relatively high. The C2 and C4 indicators were relatively low, not exceeding 50 points, indicating that the teachers are insufficient and the subject is difficult. The C3 indicator was 68 points, which belonged to the upper-middle level, indicating that there is a large demand for talents. Therefore, it is necessary for the country to strengthen the teaching staff and cultivate more talents in this discipline. Chinese international education with subject code 2 had the C2 indicator score of 67 points, which was above the average level, indicating that the teachers engaged in Chinese international education are OK. However, the C1 indicator was only 54 points, which was at the lower middle level, so it is necessary to enrich the knowledge content of Chinese international education. The minority language and literature code numbered 3 had a C2 indicator of 77 points, indicating that there are sufficient teachers engaged in the education of the subject, and other indicators were at an intermediate level. The C3 indicator of classical literature, code-named 4, was significantly higher than other indicators, with a score of 80, indicating that the talents in this discipline are scarce. But the other indicators were all at the low-middle level, so it is necessary to supplement teacher resources, student resources, and enrich the content of the subject, so as to cultivate more talents in the subject. The secretarial science with the code number 5 had the C2 and C3 indicators both at the L1 level, indicating that the demand for talents is large and the teachers are more abundant. But its C1 and C4 indicators were moderately low. The sign language interpreter code-named 6 had higher C2 and C4 indicators, with scores of 74 and 67 points, respectively, indicating that there is a greater demand for sign language interpreters and the difficulty of the subject is also greater. But the remaining indicators were all below 50 points, indicating that the current sign language interpretation teachers and knowledge are insufficient. Therefore, it is necessary to strengthen the construction of sign language interpreter teachers and improve the content of subject knowledge in order to cultivate more sign language interpreters. On this basis, the state needs to strengthen teacher management, improve teacher entry standards, and strictly implement the teacher qualification certification system to promote the curriculum reform of Chinese language and literature education. Meanwhile, the Chinese language and literature education major should also continuously enhance the consciousness of teachers’ professionalization. Taking teacher specialization as the direction of curriculum reform, cultivating new teachers as its own responsibility, and taking the achievement of teachers’ professional quality as the basis, the existing curriculum system should be reformed and improved, and the professionalism of curriculum settings needs to be enhanced, in order to adapt to the needs of the times for the training of new teachers.

4.2. Fuzzy Clustering of Various Disciplines. Then, according to the various subjects included in Chinese language and literature, this paper divides it into three categories, namely
popular, general, and unpopular, and then counts the similarity of the same category of subjects, as shown in Figure 4.

As can be seen from Figure 4, Chinese linguistics and Chinese international education with codes 1 and 2 were both popular subjects, with a similarity of over 80% in talent demand and over 75% in course content. The disciplines with codes 3 and 4 were unpopular disciplines, and the similarity of talent needs and course content would be lower, but both exceeded 65%. The disciplines of code 3 and code 4 were general disciplines. The similarity of talent needs was about 80%, and the similarity of courses was about 60%. Therefore, the state should ensure that there are sufficient teachers and students in Chinese linguistics and international Chinese education and can cultivate enough talents to meet the needs of the society. Meanwhile, the country also needs to pay attention to the employment of talents in unpopular disciplines and general disciplines and tap applied talents. In addition, Chinese language and literature education must change the status quo that it only focuses on knowledge goals. It is necessary to improve the target requirements of mastering "process and methods," requiring students to further master the methods of language learning, language education, and language education research on the basis of general

Table 3: Score rating for each indicator.

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<tbody>
<tr>
<td>s₁</td>
<td>Abundant</td>
<td>Generally</td>
<td>Scarcity</td>
</tr>
<tr>
<td>s₂</td>
<td>Adequate</td>
<td>Barely</td>
<td>Insufficient</td>
</tr>
<tr>
<td>s₃</td>
<td>Huge</td>
<td>Generally</td>
<td>Little</td>
</tr>
<tr>
<td>s₄</td>
<td>Difficulty</td>
<td>Generally</td>
<td>Simple</td>
</tr>
<tr>
<td>S</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>

Figure 3: Scores of each subject indicator.
methods such as learning, teaching, and scientific research, with the goal of improving "emotional attitudes and values." Teachers of language and literature are role models for students’ attitudes and values because the attitudes and behaviors that teachers show in the process of teaching and interacting with others will affect students subtly, some even for life.

4.3. Scores of Each Subject Indicator after Resource Optimization. According to the previous fuzzy cluster analysis, this paper makes the content of the disciplines richer and more diverse by comparing and optimizing the resources of different disciplines, for example, optimizing the resources of unpopular subjects and popular subjects, so that unpopular subjects can learn popular knowledge and more comprehensive talents can be cultivated. Based on this, this paper counted the scores of each indicator after the optimization of the resources of each discipline, as shown in Figure 5. Through changing the phenomenon that textbooks are used instead of courses and that courses are solidified, the setting of basic courses is improved according to the actual situation of students and the system of course content. At the same time, for courses that are not closely related to Chinese language and literature education, how to delete them and how to improve them comprehensively should be considered. The curriculum also should be set up in an optimized way.

As can be seen from Figure 5, after the optimization of Chinese literature and Chinese language education, the C3 indicators of these two popular subjects increased to about 90 points, and the other indicators were all above 70 points. It showed that the richness of subject content, talent demand, and assignable teachers have been improved after optimization. But at the same time, the difficulty of subject has also been improved. For the optimized general subjects, although there is a big difference in the scores of the two indicators, they have both improved. Except for the minority language teachers who scored about 66 points, the rest of the indicators exceeded 70 points and were at the L1 level. The optimized unpopular subjects, in which the scores of each indicator of secretarial science were 90, 75, 77, and 88, were greatly improved compared with the previous overall indicators. The C1 and C3 indicators of sign language interpretation were both above 80 points, while the C2 and C4 indicators were both below 70 points, which were lower than the previous C2 indicators. This may be because the optimized teachers may have stricter requirements, and the number of teachers has declined relatively. Other indicators have been greatly improved, indicating that the
effect of resource construction has been improved after optimization.

Comprehensive Score: finally, this paper conducts fuzzy comprehensive scoring according to various disciplines optimized for Chinese language and literature resources and compares it with the scores of experts in the education department. The results are shown in Figure 6.

It can be seen from Figure 6 that after the optimization of subject resources in Chinese language and literature, it can be obtained through subject-based analysis that the fuzzy comprehensive score of Chinese language and literature was 84 points, while the comprehensive scores of other subjects were about 79 points, 80 points, 82 points, 83 points, and 75 points, respectively. The quality of resource construction in these disciplines is of high quality. In addition, the scores given by the experts were 82 points, 86 points, 70 points, 94 points, 78 points, and 87 points, which were all above 70, showing that the method of using fuzzy mathematics to construct Chinese language and literature resources has been recognized by the experts. The results obtained by the method of disciplinary analysis in this paper are reliable and feasible.

Although this paper can achieve certain results from the method of index rating, the research on the actual resource improvement measures is not deep enough. To promote the reform and improvement of the professional curriculum, the state, local governments, and colleges and universities should increase investment in the education of the major and further expand the educational resources of the major. The state, local finance, and schools should increase their investment in Chinese language and literature education on the original basis. The cooperation of Chinese language and literature education majors among colleges and universities need to be strengthened, giving full play to the characteristics of this major. The educational resources of this major should be shared. Scientific curriculum theory should be used to solve the complexity of curriculum reform. Meanwhile, the state should also improve the requirements for the mastery of modern educational theoretical knowledge and the cultivation of teaching practice and research capabilities. Students majoring in Chinese language and literature education should strengthen the study of modern education and teaching theories. They should also establish a modern education concept, teaching concept, student concept, evaluation concept, etc., enhance the awareness of the new curriculum reform, and pay attention to the latest developments of the new curriculum reform. They should also strengthen the training of teaching skills such as teaching design and organization, communication, and writing, so that students can not only have the ability of self-reflection and practice innovation but also have the ability of teaching and educating people.
5. Conclusion

The content of Chinese language and literature is rich and diverse. It includes a variety of disciplines, and it is difficult to construct its resources. Influenced by lecture style teaching, the traditional teaching method cannot be transformed well. Now facing the continuous reform and innovation of the education system, people have begun to understand that fuzzy mathematics is a good method for the construction and analysis of literary resources. This paper introduces the relevant content of Chinese language and literature and realizes that the traditional resource construction method of Chinese language and literature is pure, disordered, with a lack of interest and flexibility. Then it analyzes the characteristics of fuzzy mathematics. It is found that the use of fuzzy cluster analysis and fuzzy comprehensive evaluation methods can optimize resources and conduct disciplinary analysis. Therefore, this paper classifies the related disciplines of Chinese language and literature, selects the relevant evaluation indicators, and determines the evaluation criteria. By comparing the indicator scores before and after the optimization of resource construction of various disciplines, the subject-based analysis of fuzzy cluster analysis and fuzzy comprehensive evaluation is used. The results show that the comprehensive scores of each subject indicator of Chinese language and literature are all above 70 points, which have been significantly improved. The quality of resource construction in various disciplines is at a high level and has been recognized by experts with high scores. It shows that the resource construction method integrating fuzzy mathematics in this paper can achieve good results through disciplinary analysis. Nevertheless, there are still some imperfections in this paper. The research on fusion mathematics is not deep enough. The selection of indicators needs to be more comprehensive, and the design of experiments needs to be improved. Therefore, further study and exploration will be carried out in depth in the future to ensure better completion in the next work.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References


