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Optimization Strategy for Blended Teaching Resources of College English Reading Based on Network and New Media Technology

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Abstract. The blended learning model combining online and offline teaching has been widely promoted in universities due to its greater flexibility and richer course resources. The main research content of this article is to focus on online teaching content, fully utilize fragmented time of students, and recommend reasonable online English learning and reading resources for students. Firstly, the real needs of students for English reading resources were investigated and analyzed from the perspective of students. Through interviews or questionnaires with students from different majors, genders, and learning scenarios, the needs of students were analyzed in depth. Then, a personalized online English reading resource recommendation model based on multi-source fusion was established. The model is divided into four levels: data collection module, multi-source information fusion module, information aggregation module, and application layer module. Finally, in order to verify the effectiveness of the method proposed in this article, real school students were selected as the target audience for recommendation. A model was used to obtain the demand profile of English reading resources from students, and then targeted reading resources were provided. The recommendation results met the requirements of the strategy design in this article.

Keywords: online reading, intelligent algorithms, data analysis

1 Introduction

In the report of the 19th National Congress of the Communist Party of China, it was proposed that we should actively carry out the innovation of online smart education model based on “Internet plus”, introduce and utilize national excellent online courses, famous teacher courses, famous school courses, etc., and synchronously share high-quality teaching resources. We need to deepen the integration of network technology and educational content, enhance teachers’ ability to use network technology, and improve the quality of classroom teaching. Under the development concept of educational modernization, how to fully utilize modern educational technologies such as the internet and multimedia to develop innovative teaching models and better serve teaching is the main direction of current research [1].

The rapid development of network and new media technology enables people to access, process, and send information anytime and anywhere using handheld mobile devices such as mobile phones and handheld computers. Information acquisition is extremely convenient. Therefore, relying on handheld mobile devices and wireless networks to carry out educational activities, obtain educational information, and achieve lifelong learning has become a hardware foundation [2].

In the era where information is readily available, the learning habits and behaviors of college students are quietly changing, and blended learning has become one of the main learning methods for students, which is a combination of classroom learning and online learning. Online reading is increasingly favored by college students, while traditional paper-based reading methods are unable to meet the needs of young people. In the era of online media, college students can use new online reading methods on the basis of traditional reading methods to efficiently utilize fragmented time, allowing them to learn and accumulate English knowledge. This approach allows students to not be limited to the limited time and space of English classrooms. By utilizing fragmented learning methods, students can autonomously engage in online English learning according to their own needs and acceptance abilities, in order to improve their interest and learning effectiveness in English learning. The two fundamental characteristics of this learning method are the dispersion and fragmentation of learning time and learning

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space. Therefore, fragmented online learning is naturally suitable for small-scale learning, such as English vocabulary, English grammar, etc. [3].

Based on the above analysis, how to recommend the optimal English reading resources for college students during online learning time in a targeted manner, and how to better utilize computer algorithms to intelligently recommend reading resources based on online learning scenarios, are the research contents of this article. Therefore, the work done in this article is as follows:

1) Firstly, analyze the learning characteristics of college students, establish a scientific and accurate student demand model, and use it as the data basis for recommending resources;

2) Design an intelligent English reading resource recommendation strategy based on the established demand model. The recommendation strategy will automatically recommend content based on the student's situation, providing effective and adaptable English reading resources for students to read more efficiently.

3) We have built a framework for an intelligent recommendation system and preliminarily designed a recommendation algorithm. After experimental verification, our method can effectively recommend English reading resources.

2 Related Work

In recent years, many scholars have conducted corresponding research on the utilization of English reading resources. Firstly, in terms of utilizing online resources, Tang Ling sorted out and analyzed the current situation of digital teaching resources in universities, adopted representative cloud computing technology in English resource acquisition, and then established and improved resource storage, management, and access mechanisms. She constructed an English digital teaching resource management platform to achieve the integration of English reading resource acquisition and network technology [4].

Hua Shaofeng analyzed the problems in the integration and utilization of online resources and teaching practice of college English, and proposed improvement strategies for the utilization of English resources [5].

Sang Haiying proposed an artificial intelligence based comprehensive management plan for English teaching resource information to solve the problem of sharing English teaching resources between different campuses of the same school. The plan relies on the design of English teaching resource storage modules and system servers to implement the hardware design of the system, and then implements the software design of the system based on the operating environment of the system. The results indicate that this scheme is more suitable for sharing and utilizing English teaching resource information [6].

In terms of fragmented reading, Zhicong Chen believes that the tension between social acceleration and communication games has led to the fragmentation of mobile reading time, which in turn affects the reading content and behavior patterns of readers. After analyzing large-scale user behavior data of a mobile reading application for three months, the fragmentation of reading time and reading points was measured. Finally, it was emphasized to improve the efficiency of fragmented reading by reshaping social interaction and entertainment modes in digital media [7].

Minxian Chen, focusing on the fragmented reading scene of online Q&A communities, integrated the original research to form a set of influencing factors on user information encounter behavior in online Q&A communities. Then use the DEMATEL method to analyze the interrelationships between influencing factors and identify their key influencing factors. Finally, corresponding strategies and suggestions are proposed based on the research findings [8].

Yuchen Liu believes that behind the transition from traditional paper media to modern online media is a revolutionary change in people's ways of obtaining information and cognitive thinking. For contemporary college students who are deep users of online media, fragmented reading habits have profoundly changed their cognitive and behavioral patterns. In response to the impact of fragmented reading habits on contemporary college students, it is necessary to strengthen the cultivation of their reading ability, language ability, memory ability, and media literacy [9].

Shuyuan Yang, her research background is under the rapid development of Internet information interaction technology. Many online teaching resources and learning platforms are gradually replacing the traditional teaching methods. It is necessary to promote English teaching to personalized, intelligent and diversified development. Then she analyzes the actual teaching practice and believes that the traditional classroom teaching mode and online teaching mode have their own limitations and fixed drawbacks. Therefore, the article focuses on the teaching of applied English reading courses, relying on the Chaoxing Learning Platform for blended teaching practice of

applied English reading courses. The practical content covers pre class exploration, in class collaborative discussion, and post class expansion and consolidation, aiming to innovate teaching content and scenarios, thereby improving the efficiency and quality of applied English reading teaching. The article has achieved good results in guiding teaching [10].

Shumin Yang analyzed the recent A-level reading test papers of college English, reflected on the current situation and problems of English reading teaching in vocational colleges, and utilized the iSmart foreign language intelligent learning platform to explore the application of blended learning mode in vocational English reading teaching through personalized self-directed learning before class, collaborative inquiry learning in classroom teaching, and post class expansion training, combined with process evaluation and summary evaluation. The teaching experiment shows that the blended English reading teaching model has shown initial effectiveness, and the English reading effect of vocational college students has been improved. The comprehensive application ability of English, as well as the passing rate and high score rate of College English A-level have been improved to varying degrees [11].

Based on the above research, this article analyzes the fragmented reading results led by the internet. Firstly, it is necessary to conduct a precise analysis of the English reading resource needs of vocational college students, and then make accurate information recommendations during the fragmented time according to the needs.

Therefore, the structure of this article is as follows: Chapter 1 and 2 mainly analyze and summarize the research background and direction of this article, Chapter 3 mainly explores the real needs of students for learning resources, constructs a scientific and reasonable resource demand model, Chapter 4 mainly discusses the intelligent recommendation strategy of English resources, builds the overall framework of the recommendation strategy, and completes the establishment of each module. Chapter 5 is the practical application verification of the method, and completes the application of the recommendation strategy through the analysis of real student needs. The last chapter is the conclusion section, which summarizes this article, analyzes the shortcomings of this article, and looks forward to the future application of network and new media technology in English teaching.

3 Construction of a Learning Resource Demand Model

Based on interviews with students of different grades and majors in some universities, 20 demand indicators for online learning resources were initially extracted, and the connotations of the indicators were explained and explained. Through two focus group discussions, a digital resource demand model based on Densydiam demand theory was preliminarily constructed, and its dimensions and indicator connotations were refined. This article combines the field of network resource research to clarify an important issue of model and research process fitting - feature insight. This method can run through the entire research process, which can be a supplementary means of capturing user features, a combination of determining elements and subjective ideas in the model construction process, and a basis for explaining phenomena in promotional practice. The specific process is shown in Fig. 1.

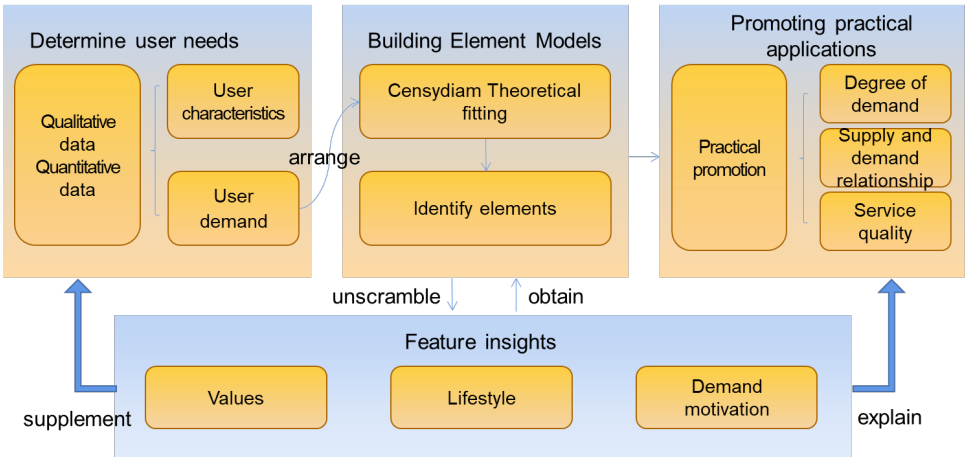

Fig. 1. Requirements model construction process

3.1 Establishment of Demand Indicators

The demand indicators should be able to accurately reflect the demand situation. The establishment of demand indicators requires a large amount of literature and research as the basis. Through searching and summarizing articles on online learning resource research in CSSCI journals of Wos and CNKI in the past five years, the key words used are digital education resources, multimedia education resources, electronic education resources, distance education resources, online education resources, open education resources, and online education resources. These problems can reflect the quality characteristics of English resource construction and indirectly express the demand for resource utilization. After summarizing and screening, there are many practical problems in the specific use of online learning resources within the past five years. Firstly, from the perspective of the resources themselves, they can be summarized as "low quality, limited quantity, poor support, and difficult access". Among them, poor resource quality, poor performance, and limited quantity of high-quality resources are the most mentioned issues. Secondly, in terms of support services for student learning and teacher teaching, the existing resources have poor support capabilities in teaching and lack high-quality access channels, which are also the core issues affecting the research and use of English reading online education resources.

Many vocational colleges have inadequate English reading teaching resources and facilities, and most engineering colleges list English as a public basic course. Compared to skill courses, English courses are not given enough attention. For vocational college students, having a certain level of English reading ability is helpful for them to enter the job market. Reading ability directly affects the overall English proficiency and development of students, but cannot achieve the goal of effective communication. English communication is also not the training goal of vocational college students.

From the perspective of teaching level, some vocational college teachers have problems with teaching patterns and dogmatism in English reading related courses. In most English reading classrooms, teachers pay too much attention to explaining English vocabulary and grammar knowledge, and cannot grasp the main idea of the article from a macro perspective. Although English vocabulary and grammar are beneficial for improving language proficiency, they are inseparable. Especially for English teaching of vocational college students, it is important to grasp the content of the article as a whole, and to stimulate students' enthusiasm for participating in reading from the perspective of reading interest. At the same time, in reading classes, teachers often overlook the guidance of reading skills and methods, leading to weak reading ability and comprehension ability of students.

From this, it can be seen that in the current process of English learning and reading in vocational colleges, students pay too much attention to memorizing vocabulary and understanding grammar, neglecting their practical language application and comprehension abilities. They tend to learn English too exam oriented and dogmatic, and focus more on whether they can pass the CET-4 exam.

Therefore, how to guide vocational college students to learn English and how to maximize their overall understanding of English articles requires research and analysis from the perspective of students. Therefore, in order to establish a scientific and reasonable demand model, this article preliminarily establishes a demand model for English reading resources through interviews and auxiliary survey questionnaires. Some interview questions are set as shown in Table 1.

Table 1. Partial interview content list

Q: What is the basis for students to choose digital resources for use?
I usually read English when teachers have homework requirements, such as completing homework in class and submitting my reading experience. Secondly, for the final exam, the teacher outlines the key points, and finally, for exams such as specialized textbooks and English CET-4 and CET-6, it is necessary to maintain reading habits and vocabulary accumulation.
Q: Is English digital resources helpful for your learning
A1: Currently, based on the courses I have studied, the resources provided by the teacher are generally excellent, targeted, and diverse in form, including course videos, presentations, documents, or digital textbooks. **A2:** Sometimes you may encounter problems. For example, when looking for educational games, it is difficult to find ones that are of good quality and meet the requirements. **A3:** Sometimes there may be problems, and we occasionally search for digital courseware ourselves. We can find that some resources are too outdated, not updating the latest results in a timely manner, or there are errors in the content of resources, which can cause us to receive incorrect teaching information. The level of content on learning websites is uneven, and some content has low reference value. **A4:** There is a problem with this. Although there are many online resources, the quality is also uneven. For example, in learning programs like AMOS software, many digital resources are simply for selling courses or data analysis services, which can be frustrating and hinder the search for more effective resources.

A5: There are indeed some usage issues with online resources. Firstly, the quality of online resources varies, and sometimes the resources found have problems with unclear expression, difficult layout, and even errors. For example, when searching for programming related resources, some format codes may not be displayed clearly, and some codes may have missing characters such as parentheses. Secondly, the content of some online resources cannot keep up with the times, and sometimes the searched content is already outdated.
A6: For researchers, the use of online resources does not involve any mismatch between resources and courses, as well as poor quality of resources. There are two main reasons for the analysis. Firstly, searching for online resources is a crucial issue. As long as the corresponding keywords or keywords are found correctly, the accuracy is generally very high. Secondly, each teacher and their research department have relevant digital resource channels or methods. Therefore, there will be no issue with the use of online English reading resources.
A7: There are problems with poor resource quality and mismatch between resources and courses in online resources. For example, I want to find the latest version of materials in general biology, but most of the materials online are from the previous version, and the new version has too few materials, resulting in poor quality. Also, when searching for some inorganic chemistry materials, there may be issues with the content of some materials that do not match the course content of your school.
A8: Firstly, there is a price issue: most of them require VIP or super VIP services, and the prices offered are on the rise. Secondly, there is a quality issue: the quality of resources is uneven, and the screening time is sometimes too long.

Q: What is your opinion on online English reading resources?

A1: The online resources are now very abundant, and you can access most of them as long as you search for them. But there is a problem that sometimes the quality of resources is very low. There are many resources, but the quality of resources can be said to be slightly unsatisfactory. But overall, I am still quite satisfied, from the perspective of my personal needs.
A2: I hope to maintain existing digital resources and continuously enrich them, attract more people to participate in digital resource construction, and hope that more people can share good resources.
A3: With the development of the times, the available network resources are gradually becoming more abundant. Utilizing these digital resources can broaden people's horizons, increase knowledge, and greatly improve learning efficiency. I raise my hands in favor of the construction of online resources.
A4: In today's era, the use of the internet has become an essential part of almost every college student. The channel for obtaining learning has gradually shifted from the teacher's personal preaching and guidance to personal online learning. People are increasingly accepting this way of acquiring knowledge because it allows them to learn more and learn more about previously unknown knowledge. So I hope to strengthen the use of online resources for students from the first class, and establish relevant courses for learning. However, at the same time, it is necessary to supervise students to make reasonable use of the internet and not engage in activities unrelated to learning under the guise of using online learning. This goes against the original intention of increasing online learning content. To sum up, it is necessary to vigorously promote online learning while also supervising learning.
A5: Online English reading resources make learning methods, methods, and content more diverse, but too much learning content can also be difficult to choose from. The same direction of content can be obtained through multiple channels, and teaching ideas from multiple perspectives can be obtained. Although more is learned, the absorption is limited. If more is learned, it may also lead to imprecise situations. Because the duration of a course remains the same, more content is learned. Online resource learning should be used as an auxiliary means to assist classroom teaching, making learning more interesting and easier, and should not add more pressure to students; Whether to choose networked resources in teaching and what kind of network resources to choose should also be based on teaching objectives, teaching content, and student needs.
A6: I hope that network resources can be compatible with each other. When it comes to reading related papers, sometimes there may be issues where the literature you need is not available on this website, and then you may have to search for other websites, so I hope there can be more compatibility between websites. In addition, in terms of video tutorials, we hope to set metrics such as likes or adoptions, and screen the audience for these evaluations to avoid malicious likes. This approach can facilitate finding relevant content with a certain basis and quickly find high-quality and suitable videos for oneself.
A7: For theoretical researchers, the use of digital resources is very limited or narrow. Apart from basic theoretical research, it is important to observe the progress of experimental research, and there is no need for diversified digital resources. However, from an experimental perspective, having VR visual effects such as experimental instruments and processes should be a joyful thing. Therefore, the VR visual effects of digital resources can increase some sources of resources.
A8: I hope that the channels and ways of obtaining e-books can be more diversified, and there will be more electronic ancient classics. The visual effects resources of virtual simulations such as VR and AR are reflected in my professional assistance in visiting museums. Not only will I use the corresponding museum apps, but the refinement of introductions and guides will improve the efficiency of museum viewing. Moreover, the virtual simulation of certain ancient buildings or tools within the museum can also help me have a more intuitive experience and understanding when visiting.

After conducting interviews with students and drawing on research findings from other literature, combined with existing teaching experience, the demand indicators for reading resources by students are shown in Table 2.

Table 2. List of demand indicators

Indicator connotation	Explanation of indicator connotation
Accurate content	The content is accurate, complete, and error free
Content Authority	Participation of renowned teachers and authoritative sources
Practical content	Valuable and can be used frequently
Professional related	Good match between teaching activities and textbooks
Beautiful interface	The interface layout is beautiful, elegant and exquisite, with a sense of design
Diverse forms	Featuring multi element interactive features such as gaming and VR
Privacy protection	Will not cause user information leakage
Individual needs	Resource based personalized recommendation mechanism
Added value	Honors such as certificates
Validity	The content is complete, accurate, and authoritative
Matching	Good compatibility with classrooms, textbooks, etc
Cost	Low cost or free
Supportive	Maintenance updates and learning support services
Feedback	There is a feedback mechanism for learning outcomes
Individuation	Personalizable services and recommendation mechanisms
Accessibility	Resource compatibility and openness, abundant resources

3.2 Scientific Evaluation of Demand Models

To evaluate the scientificity of a model, one should start with the necessity of each indicator in the model. The main methods are to send survey reports and interview topics to students at designated locations, as well as to communicate and exchange ideas with frontline teachers and relevant experts in the field. The evaluation process is shown in Fig. 2.

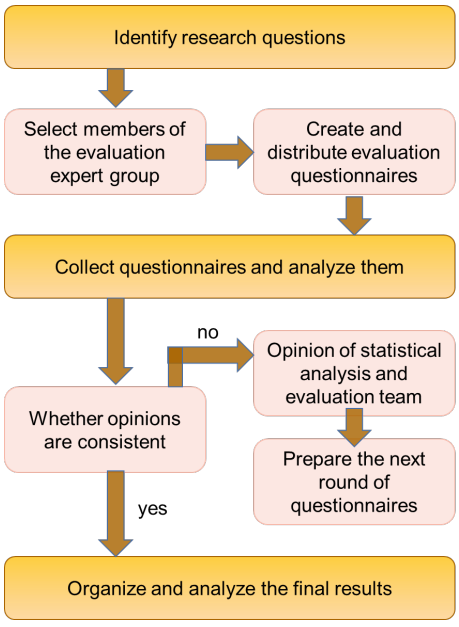

Fig. 2. Evaluation process diagram

After communication, feedback data from experts and frontline teachers were obtained. For each indicator in Table 1, the number of modes in the “necessity” score array determines the degree of consensus of the expert

group on the indicator. Taking "effectiveness" as an example for determining the "necessity" of the indicator, this indicator has 10 sets of expert feedback data, analyzed using the quartile difference method [12], and arranged as shown in Fig. 3.

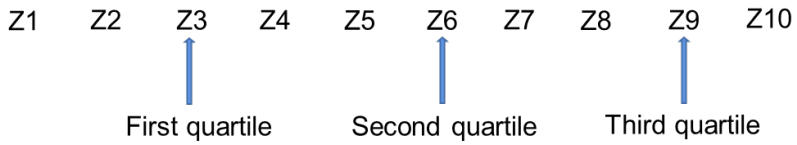

Fig. 3. Data arrangement diagram

Among them, A represents the value of "necessity", and the interquartile difference is represented as:

$$Q.D. = Q_3 - Q_1 = Z9 - Z3. \quad (1)$$

Q.D. is used to describe the degree of dispersion of the "necessity" evaluation data in this study, and to analyze the magnitude of differences in opinions among expert groups. For the "necessity" evaluation data of this study, the value interval of *Q.D.* is [0, 4]. According to formula 1, it can be inferred that:

$$Q.D. \geq 0. \quad (2)$$

$$Z_3, Z_9 \in [0,4]. \quad (3)$$

$$Q_1 = Z_3 \in [0,4]. \quad (4)$$

$$Q_3 = Z_9 \in [0,4]. \quad (5)$$

$$Q.D. = Q_3 - Q_1 \in [0,4]. \quad (6)$$

According to the above process, when *Q.D.* = 0 or *Q.D.* = 1, Believing that this indicator is effective, it has been evaluated by frontline teachers and experts as a necessary indicator. After analysis, the indicators in Table 2 were evaluated, and the evaluation results are shown in Table 3.

Table 3. List of demand indicators

Indicator connotation	Explanation of indicator connotation	Necessity determination
Accurate content	The content is accurate, complete, and error free	92.3%
Content authority	Participation of renowned teachers and authoritative sources	89.4%
Practical content	Valuable and can be used frequently	94.8%
Professional related	Good match between teaching activities and textbooks	100%
Beautiful interface	The interface layout is beautiful, elegant and exquisite, with a sense of design	100%
Diverse forms	Featuring multi element interactive features such as gaming and VR	96.3%
Privacy protection	Will not cause user information leakage	93.9%
Individual needs	Resource based personalized recommendation mechanism	96.4%
Added value	Honors such as certificates	100%
Validity	The content is complete, accurate, and authoritative	99.2%
Matching	Good compatibility with classrooms, textbooks, etc	97.7%
Cost	Low cost or free	100%
Supportive	Maintenance updates and learning support services	**19.1%**
Feedback	There is a feedback mechanism for learning outcomes	98.2%
individuation	Personalizable services and recommendation mechanisms	100%
Accessibility	Resource compatibility and openness, abundant resources	**30.3%**
Interesting	The level of interest in online English reading resources	98.4%

Remove the indicators that do not exceed 60% from the above indicators to obtain the final evaluation indicators. The interpretation of each indicator is as follows:

Accurate content: mainly refers to whether online resources have a complementary and auxiliary effect on the classroom and textbooks, and whether they can accurately match and meet the expectations of students.

Content Authority: Content authorization institutions mainly consider whether the institution is authoritative. Currently, there are many institutions that provide English reading resources. When determining whether the selection of institutions is reasonable, the first step should be to check the institution's level, such as whether it is national or provincial.

Practical content: The practicality of the content is a concern for teachers and schools. Teachers hope to provide teaching resources that are suitable for the corresponding course content or have a small deviation from the course content.

Professional related: At this level, the professionalism of resource content is examined. The courses offered in vocational colleges are all professional, and the content of resources should be as relevant as possible to the major of the course content, in line with the professional direction, and can involve some vocabulary in the professional training plan.

Beautiful interface: The level of interface aesthetics refers to the quality characteristics of the interface of matched English resources that have a certain degree of aesthetics and design sense, and can attract learners' first impression.

Diverse forms: Diversity refers to the diverse forms of exponential learning resources, which, compared to synthesis, include animation, games, VR, audio and video, etc. It can meet the learning needs of different types of learners, enrich their sensory experiences, and provide learners with novelty and pleasure.

Privacy protection refers to learners not wanting to disclose information about their learning content and behavior related to resource use, which is less quantifiable in actual research. Therefore, based on specific manifestations, it can be described as no advertising, no promotion, and no personal contact information of users.

Individual needs mainly refer to the personalization of resources, namely the personalized customization of resources and resource recommendation services. This includes learners hoping to have a more independent resource experience, or to receive unique customized services and resource recommendation services, in order to better obtain resources that meet their own needs.

Added value: The dimension of added value is difficult to quantify and generally refers to the sense of gain beyond providing the necessary resource incentives for the course.

Validity: refers to the completeness, accuracy, and authority of the content of a resource, which is the first element of content requirements in the quality characteristics, representing the evaluation of the quality of the resource.

Matching mainly refers to the subjective supplementary description of online English resources that have a complementary and auxiliary effect on classrooms and textbooks, relative to mandatory use.

Cost: Cost is the most concerning issue for users and also the most fundamental issue in the control dimension. Under the same quality conditions, low-priced resources are often more attractive to learners (pirated resources are among them). For vocational college students, good English reading resources should be made free.

Supportive: refers to resources that have strong support and can be maintained, supplemented, and updated in a timely manner.

Feedback: can be understood as whether the internal learning needs of students are met, and the needs of English learning can be summarized as feedback, including the desire to receive feedback on grades to promote personal progress; I hope to obtain a certificate of completion or proof of study in order to improve at a certain stage of life; I hope to choose more challenging and challenging resources in order to challenge myself and gain a sense of inner achievement.

Individualization: refers to the personalized customization of resources and resource recommendation services. This includes learners hoping to have a more independent resource experience, or to receive unique customized services and resource recommendation services, in order to better obtain resources that meet their own needs.

Accessibility: From the perspective of learners, accessibility refers to the degree of openness of resources. Learners hope that the platform has good compatibility and can easily obtain various resources they need;

Interested: It is mainly related to the psychological factors of students, that is, whether students are more willing to accept or feel more happy to accept when resources are matched.

In summary, a demand model for students has been obtained, which quantifies emotional needs and facilitates the effective design of subsequent resource matching strategies.

4 Recommended Strategies for English Reading Resources

After the analysis in the previous chapter, in the mixed reform process of English reading courses, search and allocation of online reading resources were carried out [13]. This section drew a personalized English reading online recommendation model based on multi-source fusion [14], which is divided into four levels: data collection, multi-source information fusion, information aggregation, and application [15]. The personalized information recommendation model for micro reading based on multi-source fusion is constructed in this paper, and the recommendation strategy model is shown in Fig. 4.

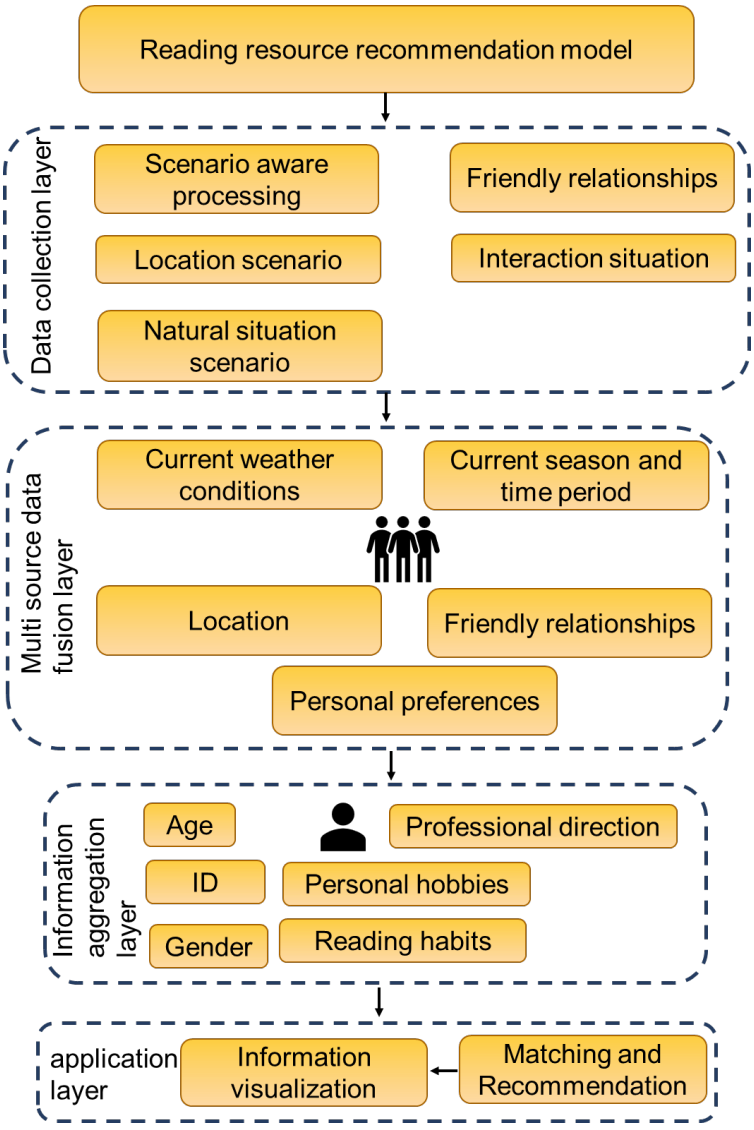

Fig. 4. Schematic diagram of intelligent recommendation strategy model

4.1 Description of Each Functional Module

1) In terms of data collection, the data foundation comes from the perception and processing of student situational information, the extraction and processing of student social network data, and the collection and processing of student emotional experience data. The recommendation for reading should be targeted. The situational

information of students mainly includes time context, location context, natural situation context, and other information. This type of information can often be obtained through the user end, that is, through the mobile phone used by students. For example, time context can be provided by the system time of the student's mobile phone; The location context can be obtained through the student's mobile location service; The natural situation situation can be obtained through manual selection by users or analysis based on time and location [16].

User emotional experience information mainly includes information such as user personal preferences, user comment mood words, and keywords. User personal preference information is usually judged by the user's selection of the field of personal interest and historical behavior analysis when logging in for the first time, and can also be reflected by the user's rating of the information resources they have read. The tone and other keyword information in user comments are obtained by crawling user comment data. The user comment mood particles and keywords are mainly extracted from the user comment mood particles and keywords, and compared and classified using an emotion dictionary to reflect the user's emotional experience attitudes such as likes, dislikes, and anger [17], the above data collection methods can all be achieved through professional means, and this article only discusses the methods.

2) Data aggregation is a personalized information recommendation model for micro reading based on multi-source fusion. The multi-source data fusion layer is mainly responsible for classifying and statistically analyzing the collected and processed massive data according to the three user dimensions of user context, social network, and emotional experience proposed earlier, forming user context sub portraits, user social network sub portraits, and user emotional experience sub portraits, respectively [18], the above data aggregation methods can all be achieved through professional means. Due to my professional limitations, this article only discusses the methods, the above information aggregation methods can all be achieved through professional means. Due to my professional limitations, this article only discusses the methods.

3) The information aggregation layer is mainly responsible for the fusion and visualization of user profiles in the personalized information recommendation model for micro reading based on multi-source fusion. The fusion process of user comprehensive profiles is essentially the process of associating multiple sub profiles of users through their own attributes, such as user ID, gender, age, etc. It is also the process of attaching multiple user tags to corresponding users. The above information aggregation methods can be achieved through professional means. Due to my professional limitations, this article only discusses the methods.

4.2 Recommended Methods for English Reading Resources

The measurement of user context similarity mainly includes user time context, location context, and natural situation context. This type of data can be obtained from the process of model construction. Based on the characteristics of time and location data, cosine similarity is suitable for calculating similarity under a certain situational factor [19].

4.3 Measurement of Emotional Experience Similarity

The calculation of emotional experience similarity is similar to context, mainly by extracting modal particles from user comments for analysis, and quantifying the user's emotional experience based on an emotional dictionary [20], The specific calculation formula for the similarity of emotional experiences between user m and user n is as follows:

$$S = \frac{O_m \cdot O_n}{T(m) \cdot T(n)}. \tag{7}$$

$T(m)$ represents a set of topics where user m has left comments with emotional views, $T(n)$ represents a set of topics where user n has left comments with emotional views, O_m represents the emotional feature values contained in the comments left by user m on a certain topic, and O_n represents the emotional feature values contained in the comments left by user n on a certain topic.

4.4 Resource Recommendation Methods

The recommendation of English reading resources is divided into two steps, the first step attempts to find the core members of the target user in multiple relationship circles. The exploration of user's direct friend circle, situational similarity circle, and emotional experience similarity circle is similar to this, all of which form the maximum group structure by obtaining multi-source data to search for other users directly related to the target user [21]. The second step is to compare and expand the largest group structure formed by core users. For a user t who is not in the group structure, if there is an interaction relationship between user t and all users in the group structure, it can be included and formed into a new group structure. The group structure is a constraint relationship that requires any two node users in the group to have an interaction relationship. After comparing and expanding each group structure, the final recommendation loop is formed. By recommending the resources that a user is most interested in to others in the loop, the likelihood of the recommended information resources being adopted by others can be increased. The schematic diagram of the recommended method is shown in Fig. 5.

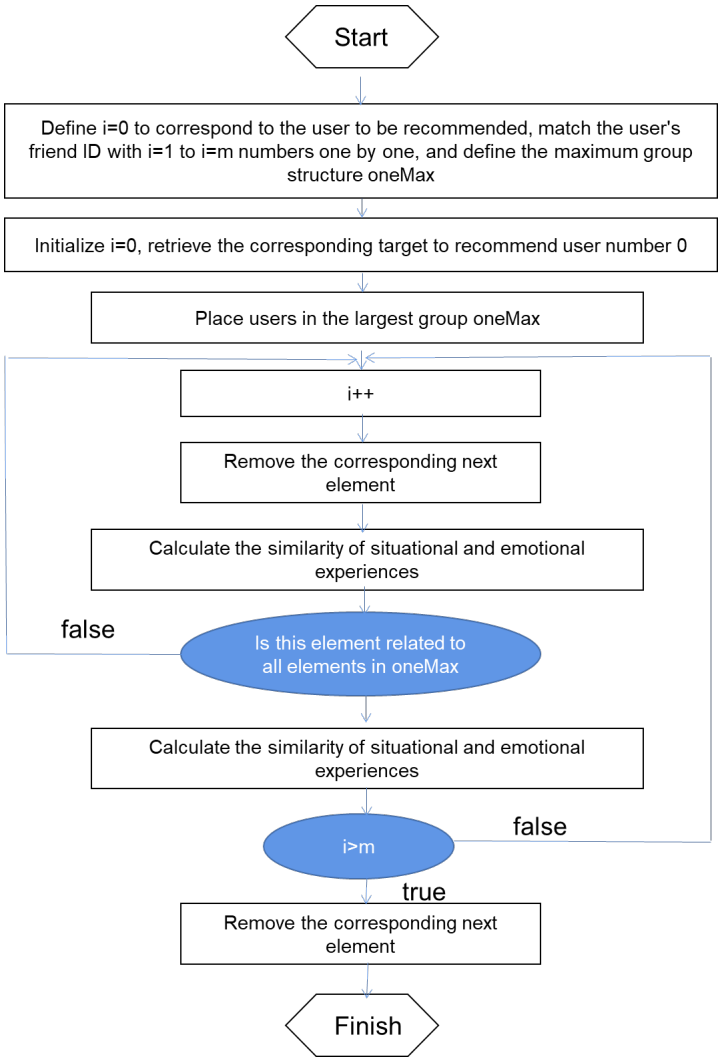

Fig. 5. Recommended method diagram

In summary, a recommendation method for English reading resources has been established, which is demand oriented and quantitatively analyzes emotional elements. The quantitative analysis model can be run using tools such as computers.

5 Demonstration of Practical Application Effects of Recommended Methods

This article obtains a basic profile of a student on campus based on their registration data on the English reading website and their usage habits of the English reading app [22]. The student's information data is as follows: {"id": "tghaha19108014628", "sex": "man", "age": 20, "area": "College", "city": "Zhangjiakou City", "time": "Morning break", "weather": "Sunny weather", "emotion": "Positive and optimistic", "Samefriends": "Tangshan's first handsome, netizen 59048383, lcat555, Divine sniper, why Mirror flowers and water moon", "love": "Love, news"}. Use word cloud mapping software to form a user profile as shown in Fig. 6.

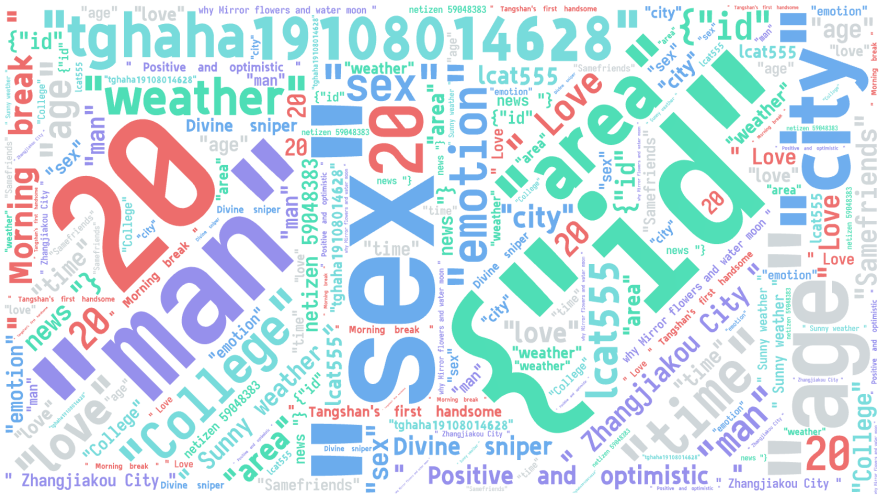

Fig. 6. Word cloud image

The comparison of personalized information recommendation effectiveness is usually evaluated based on three indicators: recommendation accuracy, recall, and comprehensive evaluation indicators. The calculation formula for these three indicators is shown in the formula.

The accuracy expression formula is:

$$\text{Precision}=\frac{\text{Rec}\cap\text{Req}}{\text{Rec}}. \tag{8}$$

The formula for expressing recall rate is:

$$\text{Recall}=\frac{\text{Rec}\cap\text{Req}}{\text{Req}}. \tag{9}$$

Comprehensive evaluation indicators:

$$\text{F-measure}=\frac{2\times\text{Precision}\times\text{Recall}}{\text{Precision}+\text{Recall}}. \tag{10}$$

The experimental process is as follows: first, set the number of resources in the recommendation list to 15, 20, 25, and 30, and recommend the target user 19108014628 in two ways. The traditional method of recommendation refers to recommending based solely on their reading history behavior. The total number of resources required by the user is determined as 30 based on the top 30 list of user needs. After recommending the user, the recommended resources and the number of resources that meet their needs and are recommended are determined. In order to compare the accuracy, recall, and comprehensive evaluation indicators of our method with traditional methods, the comparison results are shown in Fig. 7, Fig. 8, and Fig. 9.

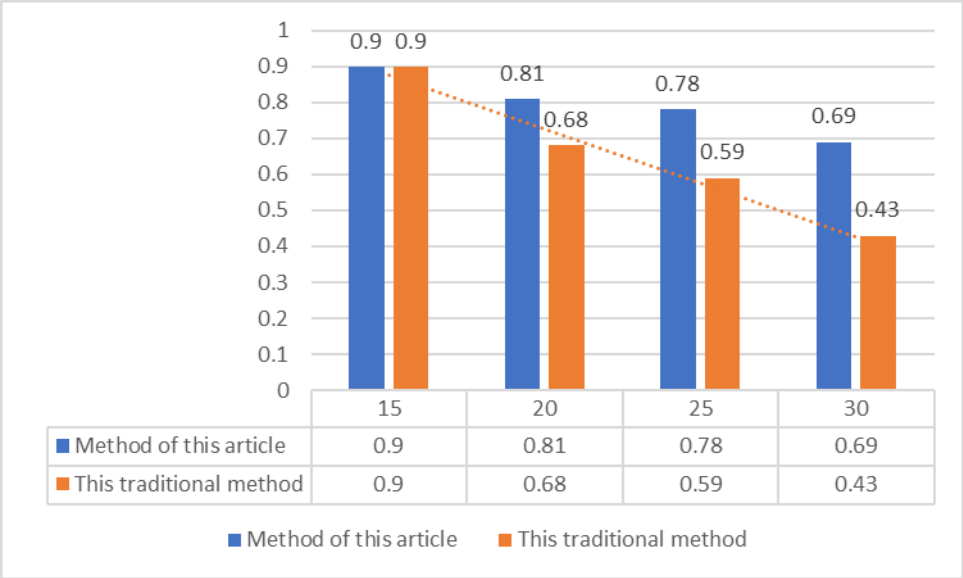

Fig. 7. Accuracy comparison

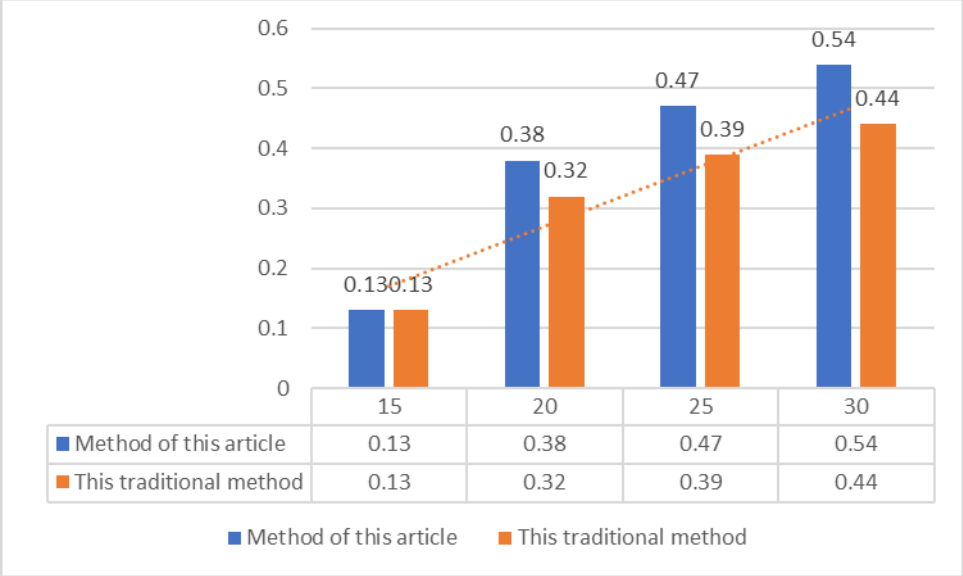

Fig. 8. Comparison of recall rates

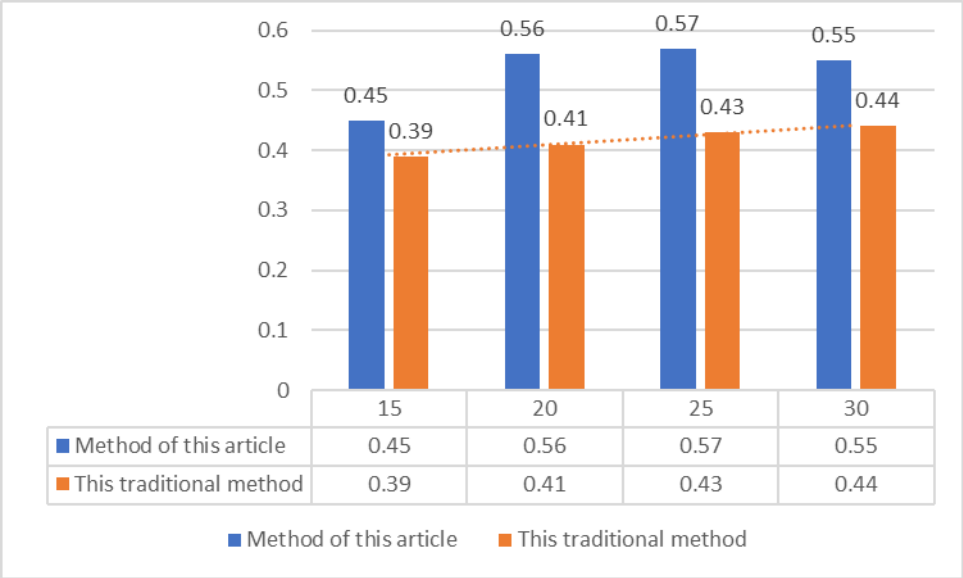

Fig. 9. Comparison of comprehensive evaluation indicators

According to the line chart of accuracy, recall, and comprehensive evaluation indicators, it can be seen that when the number of recommended resources is low, the difference between traditional methods and methods based on multi-source fusion for recommendation is small. However, as the number of recommended resources increases, the accuracy of each recommendation method decreases, the recall rate improves, and the value of comprehensive evaluation indicators increases. However, regardless of the number of recommended resources, the various indicators of the recommendation method based on multi-source fusion are higher than those of traditional methods. This verifies that the use of the personalized recommendation model based on multi-source fusion in this paper is conducive to improving recommendation accuracy, and also verifies the rationality and effectiveness of the improved hybrid recommendation algorithm based on multi-source fusion in this paper.

6 Demonstration of Practical Application Effects of Recommended Methods

This article implements the method design of recommending reasonable online English reading resources for students, explores their needs for English reading resources, and analyzes the needs of different majors, genders, and scenarios. Then, a personalized online English reading recommendation model based on multi-source fusion is established, which is divided into four levels: data collection, multi-source information fusion, information aggregation, and application layer. Finally, real school students are selected as the object to obtain student portraits, and targeted reading resources are provided. The recommendation results meet the requirements of the strategy design in this article. At the same time, there are the following thoughts on the integration and utilization of resources:

1) The smoothness of reading, considering the impact of network smoothness on the services of the micro reading platform, can consider caching the content that is about to be read when the network is relatively smooth, to ensure that users are not affected by network fluctuations when using the micro reading platform to read information, providing users with a more comfortable reading experience. For example, setting an offline mode.

2) Improve the readability of resources, and avoid abstract and difficult to understand words, phrases, and formats in the dissemination of text. Try to choose text resources that highlight the theme, are close to life, and express themselves clearly. These all affect the reading experience of readers, and titles are also a very important part. Studies have shown that the proportion of users who only read titles exceeds 65%, far exceeding the proportion of users who read the main text by 27%.

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