

## Research Article

# Effect of Blended Teaching Mode in Colleges and Universities Based on Automation Technology on College Students' English Performance

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In today's society, the rapid development of information technology has had a profound impact on human work and life as well as on education. In recent years, the rapid development of the Internet and information technology has laid a solid foundation for the digital transmission of information, which has changed the mode of information transmission and improved the efficiency of information dissemination. As an important part of network information dissemination, blended teaching is rapidly developing from an on-demand learning platform to an interactive learning platform and has now become a blended teaching platform in China. The main problem of the current blended teaching model is that the effect of improving performance is not good. In order to solve this problem, this paper introduces automation technology, which can significantly improve the extraction accuracy of information extraction methods in specific fields by using rich domain knowledge and features and complete the extraction tasks at multiple levels. The automation method based on automation technology has great advantages in this regard and effectively improves the English performance. Two groups of voluntary college students were randomly selected to conduct a one-semester blended teaching model designed in this paper to investigate the 'students' English scores. The average grades of students were 95.2, 96.7, 96.8, and 97.2, respectively, which is a big improvement over the existing system.

## 1. Introduction

With the rapid development of information technology, significant changes have taken place in the field of education. First of all, it is possible to get a large number of high quality teaching materials for free through the Internet and diversify the teaching materials available for teachers in addition to the textbooks. Teachers need to keep up with the time and progress of reform and development, consider integrating information technology and education, and create a model of hybrid learning that combines e-learning with traditional education to improve the quality of education. The contradiction between the traditional teaching mode and the needs of students is gradually revealed. Students are not interested in learning and their enthusiasm is not high, which makes it difficult to improve the effect of classroom teaching. The reform of English teaching is imminent.

Regarding the achievement of college students, relevant scientists have done the following research. Zhang proposed a study based on the web performance management system, using a network-style design framework, using good programming tools, and can support database applications. This system mainly realizes student achievement management, including managing student grades, entering grades, modifying, deleting, and querying statistics [1]. The goal of Aguirre-Mendez et al. is to determine the factors that predict essay writing in general chemistry courses for nonscientific disciplines. There is a remarkably positive correlation between the quality of argument writing and student learning performance. The remaining five aspects of the thesis are predictions of student success in the exam [2]. Because note-taking is important for student learning, Morehead et al. aimed to update the literature on student general behavior. And to assess the impact of these new technological

advances on notes, university students are looking for questions from previous researches and questions related to new technologies [3]. Jamal and Hanan applied quantitative methods for data storage and query design. Factors such as demographics, motivation, technology, and satisfaction are compared between people and students. These analytical data were analyzed for age and gender to see significant differences between the two groups. Women are happier than men. In online courses, men are happier than women [4]. Lake et al. proposes that 'students' perceptions of learning are important factors affecting academic performance and outcomes. He found that the grades students expect to achieve can vary widely from the grades they achieve, and the survey and concept of self-efficacy is now better understood as a tool to improve the learning experience and as a powerful driver of student success [5]. The purpose of Khanifam was to determine student engagement, student academic performance, and examine how strongly student engagement affects the academic performance of industrial engineering students. The analytical techniques used were descriptive analysis and simple linear regression. According to the research results, students have high participation and excellent academic performance [6]. The main problem of these studies is that they cannot effectively improve grades. For this reason, this paper introduces automation technology and blended teaching mode in colleges and universities.

The following studies are available on automation technology and integrated learning in colleges and universities. Pendleton et al. solved the problem of applying artificial intelligence to research materials that require large-scale experimental data collection and the ability of algorithms to propose new experiments, providing an abstract layer for humans and machines that can read a wide range of experimental scripts and download scalable data. Laboratory automation technology facilitates the initial process of data collection [7]. Duke Xi aimed to educate the community on strong ethical debates, regulations on automation in ethical billing situations, and beyond. In the context of systems that employ automation, there is a continuum between dealing with an ethically charged context and actually performing an automated ethical deliberation [8]. Gupta and Sharma conducted a Google Sheets survey among college students. Respondents identified themselves as a threat to cybercrime while studying online. It is suggested that in the future it will be possible to choose to integrate learning through online teaching and combine classes to overcome the weaknesses and threats of online teaching, but to make full and potential [9]. Tran et al. analyzed the results of university teachers in the implementation of a systematic multidisciplinary model. The results of the blended learning model provide evidence for the introduction and development of a systematic integrated learning model that is useful for improving the quality of teacher and higher education outcomes [10]. Ko et al. provided evidence-based insights into how teacher-initiated blended professional development courses can support teachers in addressing these challenges. Research informs how educators, researchers, and administrators can work together to overcome educational urgency. When the

results are generalized across different cultural contexts, it can support the flexible design and implementation of blended instruction in variable learning environments [11]. The above study provides a detailed analysis of the performance of university students in English and automation technology, as well as the implementation of mixed studies in high schools and universities. It is no wonder that these studies have had a significant impact on the development of similar fields. People can learn a lot from methods and data analysis. However, little research has been done on the English language application of university students in automation technology and mixed learning methods in colleges and universities, and this technology should be fully applied to research in this field.

The corresponding experimental results are extracted for each evaluation method. The values of  $V_i$  are 70.7, 42.3, 53.02, and 45.2, and the values of  $W_r$  are 99.3, 66.8, 79.8, and 67.1, respectively. It can be seen that the prototype system cannot achieve good results on the data set, and the recall rate gradually increases with the increase of the number of templates used. Two groups of voluntary college students were randomly selected to conduct a one-semester blended teaching model designed in this paper to investigate the 'students' English scores. The average scores of this system were 96, 97.2, 96.4, and 97.5, respectively.

## 2. Effect of Blended Teaching Mode on College Students' English Achievement

The integrated learning approach not only combines the benefits of traditional face-to-face teaching and online instruction, but also places students in the position of teacher and maintains students' emotional transformation. Also, people should respect the diversity of students' personalities, be attentive, and strengthen students' abilities. In addition, it cultivates students "use of information technology" and focuses on students' internal growth processes.

Constructivist learning theory is the use of constructive ability to create a teaching environment. Constructivist learning theory believes that knowledge transmission needs to rely on certain situations, and it is actively obtained through meaning construction. This is consistent with the idea of making full use of online educational resources to achieve autonomous learning in the teaching process advocated by blended teaching. Blended teaching is a new learning environment created with the help of the internet platform. Students no longer only complete the entire learning process under the face-to-face guidance of teachers, but with the assistance of teachers, acquire knowledge through face-to-face learning and online learning in the classroom and complete the cognitive process of the entire knowledge [12].

Constructivist learning theory is based on teachers as the main body and pays attention to the teaching of students as the main body, which is in line with the idea of mixed education. Constructivist learning theory is an important theoretical basis for blended teaching. Constructivist learning theory holds that students are in the leading role of teaching, rather than being acquired directly from the

outside and passed to the brain. Students, on the other hand, apply what they have learned to external situations, and then construct meaning in an interactive way.

Cognitive learning theory states that learning is a process in which learners acquire new cognitions after thinking about problems in their brains. It designs instructional processes that focus on the individual and focus on developing students' self-study skills. At the same time, the theory of comprehension can increase students' interest in learning, increase students' enthusiasm and initiative, and fully encourage students to continue to develop ways to learn in the learning process and achieve learning goals. Cognitive learning theory informs students through the leadership role of the teacher. It is a new application and development of cognitive theory in the information age and is also an important function in integrated learning [13].

Teachers play a pivotal role in instructional design, curriculum arrangement, and interaction. Regardless of traditional teaching methods or online teaching methods, what teaching strategies teachers use will have a significant impact on students' enthusiasm for learning, students' recognition of teaching methods, and the cooperation between students and teachers.

Students are the main research subjects. How to effectively mobilize students' learning motivation and cultivate students' self-learning awareness is the key to the university network platform. In university network teaching, especially in the mixed teaching of university network teaching platform, if teachers can fully mobilize the enthusiasm of students, classroom teaching can achieve better results.

In modern pedagogy, educational technology theory refers to the teaching theory and practice that teachers use various technical means in the teaching process, and teachers use teaching materials rationally, carefully design curriculum content, earnestly carry out teaching implementation, and formulate teaching evaluation. Blended teaching is the integration of information technology, mobile interactive technology, and other technologies with traditional teaching. These technologies create the necessary conditions for the generation, dissemination, development, and use of educational knowledge throughout the implementation phase of blended teaching [14, 15].

It is a teaching method that emphasizes the student-centered teaching method to discover students' learning styles and learning characteristics through tracking records of the learning process and carry out personalized learning activities.

Humanistic learning theory believes that learning is a process of inner growth of learners. Paying attention to the inner feelings and psychological changes of learners is the basic point of humanistic learning theory. The ultimate purpose of education is to enable learners to maintain physical and mental health and promote all-round development while acquiring knowledge. In a blended teaching environment, the teaching process not only provides rich learning resources and information technology platforms but also learning resources are no longer limited to books. The use of online teaching video, audio, etc., will make the classroom atmosphere more active. The visual teaching mode can enhance the fun of learning. Students can choose

personalized online teaching resources for learning according to their knowledge needs, which can improve 'students' happiness, participation, and self-realization to a certain extent. From these aspects, the learners' enthusiasm, motivation, and enthusiasm for learning have been mobilized to realize a truly people-oriented education. Figure 1 shows the process model of blended teaching.

The blended teaching model gradually transforms the teacher-centered to the learner-centered and the way of knowledge transmission changes from explicit transmission to invisible transmission. Since blended learning involves both online and classroom learning, the design needs to take into account the interaction between online and classroom learning, the choice of teaching strategies, and the two main roles in the learning process, that is, the collaboration between teachers and students. The learning process is divided into three stages: before learning, during learning, and after learning. At each stage, students and teachers are involved in their own activities to implement the learning process and achieve learning goals. In the preview stage, teachers provide relevant learning resources through the learning platform and class WeChat group and give reading preparation tasks. Students log in to the learning platform and WeChat group, study independently, and complete the tasks assigned by teachers. In the multimedia classroom, the teacher first checks the students' prior knowledge. Then, according to the feedback and content of the students, different teaching strategies are used to teach. Students participate in a variety of classroom activities such as discussions, oral presentations, and cooperative learning and listening. In the extension stage after class, teachers perform extended tasks on WeChat groups or learning platforms, and students have to complete these tasks. Teachers and students can also use the network to deepen their learning, continue discussions and dialogues, and teachers answer questions and solve problems to help students consolidate the knowledge gained in the classroom. The process of blended teaching mode is shown in Figure 2.

In blended teaching, part of the learning activities of learners is online self-study, so online resources play a supplementary role in self-study. The first principle in the design of learning resources is that they should be compatible with the content of the textbook. In other words, resources should be tailored to the needs of the learning organization. Different learning content in each chapter requires different resources to adapt to the teacher's learning organization to achieve learning goals. Resources should be designed with learners in mind because they are for learners. Therefore, the second principle takes into account the needs and interests of learners. If teachers do not provide guidance for autonomous learning, the teaching materials can only be targeted for learning if they can arouse the learners' interest in learning. Therefore, we first need to understand the learning interests and needs of learners and analyze their personality, knowledge, and other characteristics, which is necessary for the preliminary analysis before planning. It can be learned that most learners were born at the beginning of this century, the information technology has developed rapidly, they are exposed to a lot of information in their lives,

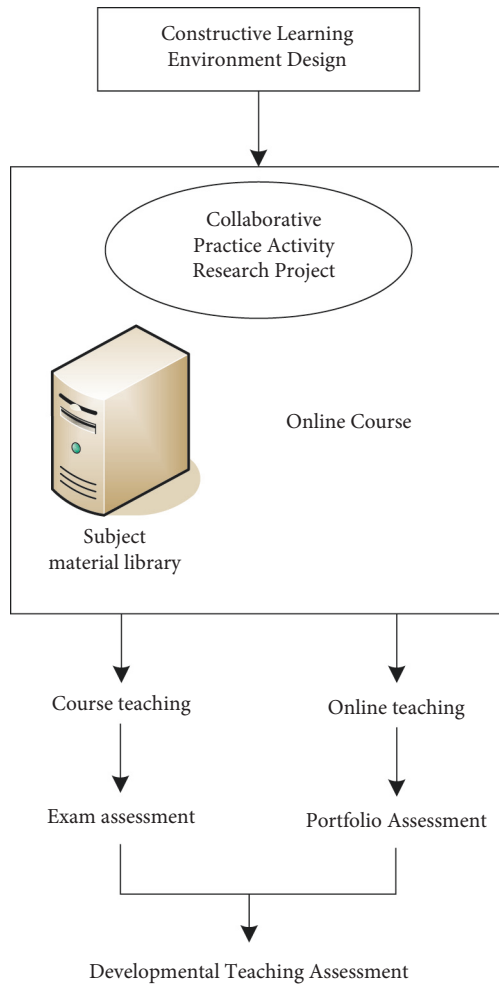


FIGURE 1: The process model of blended teaching.

they like new and exciting things, and they like personalized learning and lifestyle. It's clear that traditional books and resources have been unable to keep up with the pace of new-age education. Therefore, people need to choose interesting, popular, and flexible learning resources. The third principle is to consider how easily students can use resources. Common terminal devices for students to receive teaching resources include mobile phones, laptop computers, and desktop computers. The teaching resources can be pushed through the computer terminal or the mobile terminal. Some resources need to be downloaded before they can be viewed, or if they take up a lot of memory, people can choose the online teaching platform on the computer to push them. Some are web link type or real-time interactive resources, people can choose to push the mobile terminal through WeChat group or WeChat public account, and students can click to open it. The fourth principle is to develop learning tools in partnership with teachers and students. As learners, students need a sense of engagement and achievement in order to be motivated to continue learning. If they only get the material provided by the teacher, they will get bored after a while. Therefore, people encourage students to participate in the development of the tool. They can share their favorite resources, original projects, and lectures as supplementary

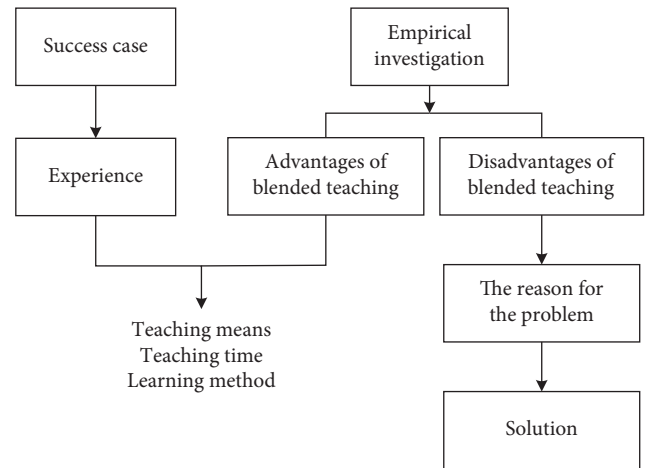


FIGURE 2: Blended teaching mode process.

materials on the learning platform or WeChat group, which can not only stimulate enthusiasm for learning but also increase satisfaction. Selecting or compiling resources for students is also a process of thorough reflection and learning, allowing students to internalize external knowledge into their own.

The main problem of the current blended teaching model is that the effect of improving grades is not obvious enough. For this reason, this paper introduces automation technology. Web information extraction means that the information on the web page is extracted by users according to their own needs and the irrelevant information is filtered. So as to achieve the purpose of extracting semistructured or unstructured information from web pages and expressing and storing them in a structured and semantically clear form. The traditional method is to write a special program for information extraction, that is, a wrapper, to convert the required complex data mapping into structured and semantically clear data. According to the degree of automation, web information extraction methods are generally divided into three types: manual, semiautomatic, and fully automated information extraction.

Based on natural language understanding technology, it is generally suitable for extracting information of text structure. Firstly, the text is segmented, and then some semantics are given to the words, and finally the extraction rules are extracted according to the relationship of the natural language itself. Some of the rules here are generated after analysis by language experts, and some can be automatically generated from learning materials in a preexisting database. The advantage of this method is that it can effectively process the information of texts stored in a large number of natural languages, especially the information itself conforms to the characteristics of natural languages. The extraction process is shown in Figure 3.

### 3. Modern Automation Technology

Modern automation technology has developed step by step with human society. In order to meet the needs of human

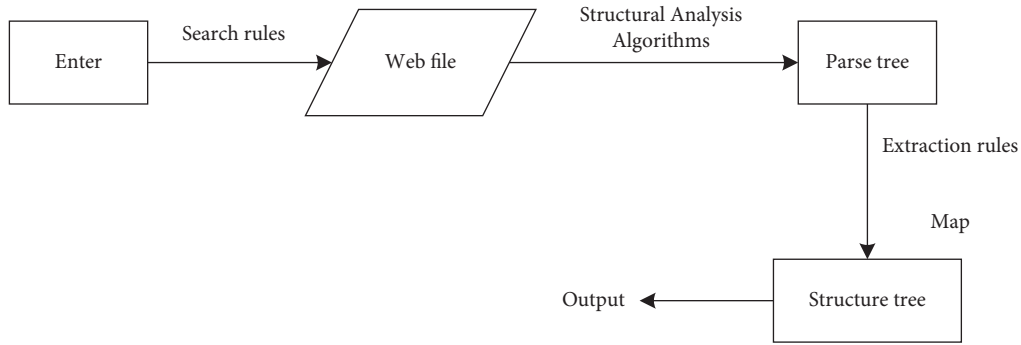


FIGURE 3: Extraction process display.

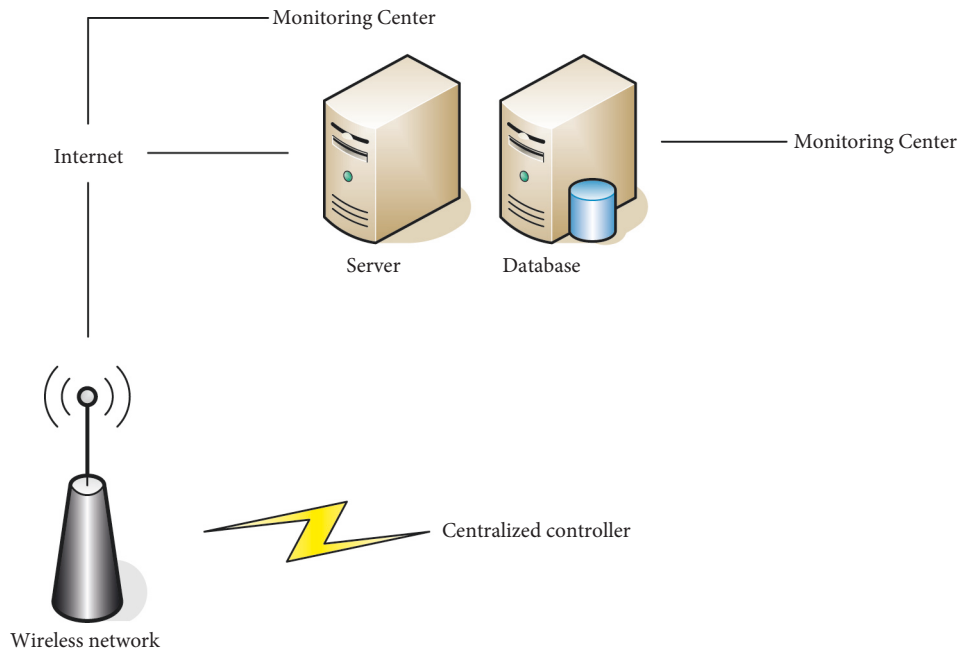


FIGURE 4: Information transmission architecture.

beings to understand and transform the world, it has developed step by step, greatly expanding the functions of human organs. It is the crystallization of science and technology and the crystallization of human wisdom. However, no matter what field automation technology is used in, it has some distinctive features. It mainly has the characteristics of multidisciplinary technology interleaving and strong expansibility. Every automation technology is a system with automatic control as the core technology. It liberates human beings from the complex, dangerous, and cumbersome labor environment and greatly improves production efficiency and facilitates control of production costs. Figure 4 shows the information transmission architecture.

Automation refers to the automatic detection, information processing, analysis and judgment, manipulation and control of machinery, equipment, systems, or processes (production and management process) without the direct participation of people or less people, according to the requirements of the people, to achieve the expected goals.

The following is the relevant formula for the automatic and efficient extraction of network information, which is used to automatically and efficiently extract the learning resources required by students in the blended teaching mode on the network.

$$\text{Tree}(R_1, R_2) = \frac{|A|}{((|R_1| + |R_2|)/2)}, \quad (1)$$

where  $A$  represents tree matching results and  $|T|$  represents the number of nodes.

$$\text{Tree}(R_1, R_2) = \frac{|A \cap (f(R_1) \times f(R_2))|}{((|f(R_1)| + |f(R_2)|)/2)}, \quad (2)$$

where  $f$  represents selection function.

$$\text{Sc}(E^{(m)}) = \sum_{1 < u \leq a} V(t_{i_u+m+v}, t_{i_{u-1}+m+v}), \quad (3)$$

where  $\text{Sc}$  represents structural similarity.

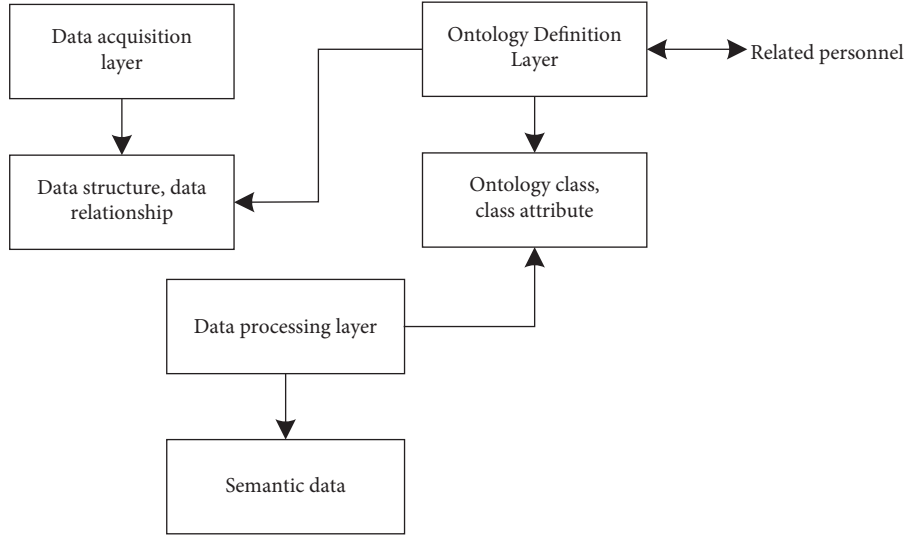


FIGURE 5: System hierarchy.

$$V(t_1, t_2) = \frac{|S_1 \cap S_2|}{|S_1 \cup S_2|}, \quad (4)$$

where  $V$  represents similarity.

$$L_u = \frac{TL_u}{TL_u + \alpha L_u},$$

$$E_u = \frac{TL_u}{TL_u + \alpha B_u}, \text{ and} \quad (5)$$

$$\alpha_u = \frac{2 \cdot L_u \cdot E_u}{L_u + E_u},$$

where  $L_u$  represents page accuracy and  $E_u$  represents recall rate.

The microaverage score is obtained by averaging the extraction results of all data records from the overall statistics.

$$L_{au} = \frac{\sum_u^A TL_u}{\sum_u^A TL_u + \alpha L_u},$$

$$E_{au} = \frac{\sum_u^A TL_u}{\sum_u^A TL_u + \alpha B_u}, \text{ and} \quad (6)$$

$$\alpha_{au} = \frac{2 \cdot L_{au} \cdot E_{au}}{L_{au} + E_{au}},$$

where  $A$  represents the total number of pages in the test set.

The macroaverage score, obtained by averaging the extraction results of each page separately,

$$L_{ai} = \frac{\sum_u^A L_u}{A},$$

$$E_{ai} = \frac{\sum_u^A E_u}{A}, \text{ and} \quad (7)$$

$$\alpha_{ai} = \frac{\sum_u^A \alpha_u}{A}.$$

Microaverage results are suitable for evaluating the accuracy of data record extraction work from an overall perspective.

$$D(\Theta) = \sum_{(x, \text{path}) \in \Theta} |\Theta[(x, \text{path})]| \text{ and} \quad (8)$$

$$f = \arg \min_{f \in G_k} \sum_{u=1}^b \varepsilon(f(m_u), n_u),$$

where  $D(\Theta)$  represents the number of anchor nodes.

$$D(\Delta) = \sum_{(i_1, \dots, i_a)} |i_1 \dots i_a| \text{ and} \quad (9)$$

$$A_G(L_d, L_t) = \sum_{u,v=1}^{b+a} (f(m_u) - f(m_v))^2 Q_{uv},$$

where  $b$  represents the number of nodes.

Microaverage results, describing the accuracy of tree matching results over the entire dataset.

$$L_{au} = \frac{\sum_u^A |A_u^{(t)} \cap A_u^{(g)}|}{\sum_u^A |A_u^{(t)}|},$$

$$L_{au} = \frac{\sum_u^A |A_u^{(t)} \cap A_u^{(g)}|}{\sum_u^A |A_u^{(h)}|} \text{ and} \quad (10)$$

$$\alpha_{au} = \frac{2 \cdot L_{au} \cdot E_{au}}{L_{au} + E_{au}},$$

where  $A$  represents match all test runs.

#### 4. Experiment on the Effect of Blended Teaching Mode on College Students' English Achievement

The data query block uses a framework that supports querying data in the form of triples. This article uses the

TABLE 1: Extracted experimental results.

	$L_{au}$	$E_{au}$	$\alpha_{au}$	$L_{ai}$
Vi	70.7	42.3	53.02	45.2
	70.8	56.4	62.8	61.2
Wr	99.3	66.8	79.8	67.1
	97.5	66.4	79.5	67.3

TABLE 2: Extracted experimental results.

MD	69.3	77.8	73.5	68.5	71.3	69.2
MD'	66.2	79.8	72.1	66.9	73.4	69
T3MD	86.3	82.9	84.6	82.3	79.6	79.8
T3MD'	78.6	86.8	82.5	70.6	82.5	81.1

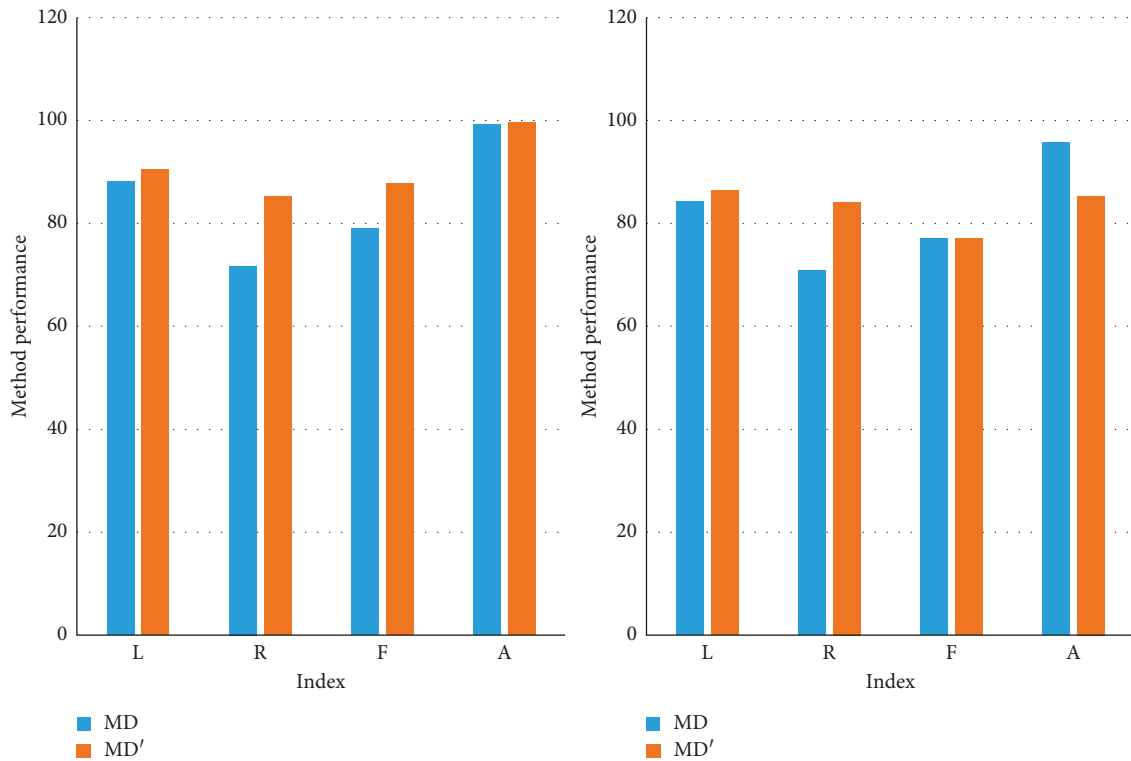


FIGURE 6: Method comparison results.

query interface that provides complete data query. Figure 5 shows a system hierarchy diagram.

As shown in Tables 1 and 2, the experimental results of each evaluation method are extracted. It can be seen that the prototype system cannot achieve better results on the data set. The recall rate increases gradually with the increase of the number of templates used. It can be seen that a larger number of templates are required to obtain a relatively high recall rate.

The method in this paper is compared with a semiautomatic method based on supervised learning. The comparison results are shown in Figure 6. It can be seen that all the evaluation indicators in this paper are better than the existing methods.

The accuracy of the two methods is summarized as shown in Figure 7 to compare the test results. It can be seen

that the accuracy of the method in this article has been greatly improved compared to the accuracy of the current system.

The teaching method based on blended learning should be different than before. The leadership of teachers and the dominance of students must be fully respected in the teaching process. Figure 8 shows the design scheme of the learning system for the mixed learning mode.

The variance analysis was used to investigate the differences in the above four dimensions among different types of schools. The statistical results are shown in Table 3.

An independent sample test was used to investigate the differences in the application of the mixed teaching model based on the college English teaching platform between different genders. Figure 9 shows the survey results. It can be seen that the boys are higher than the girls in the dimensions

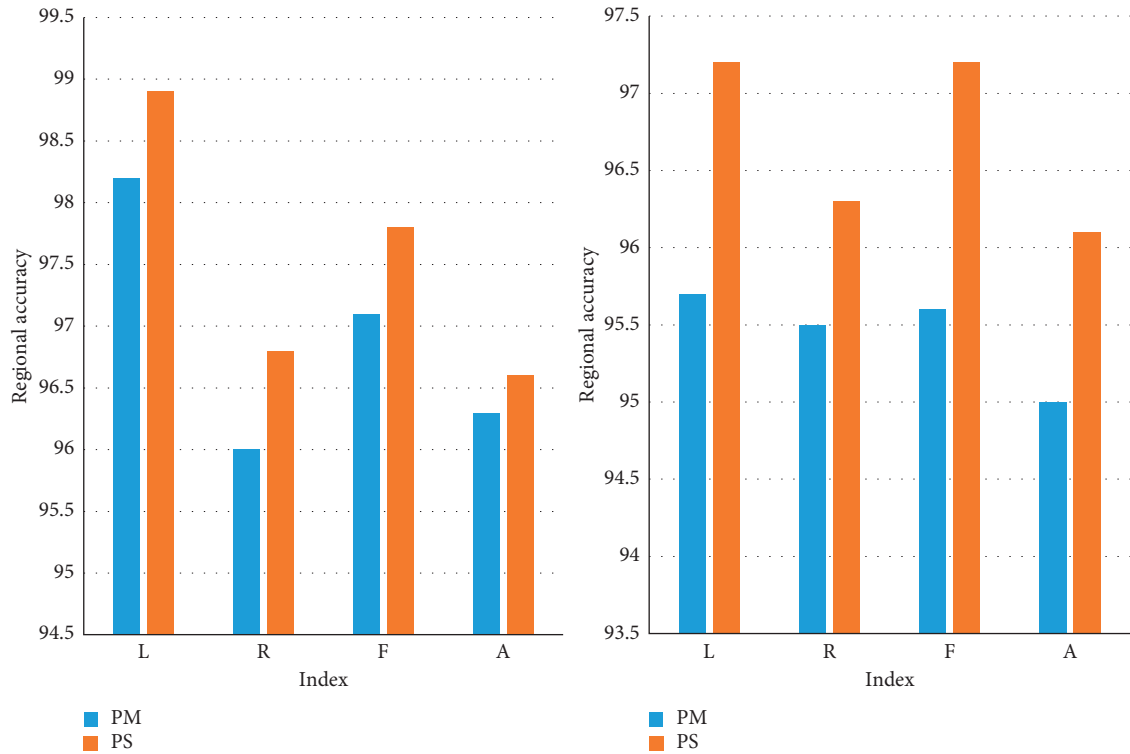


FIGURE 7: Comparison of experimental results.

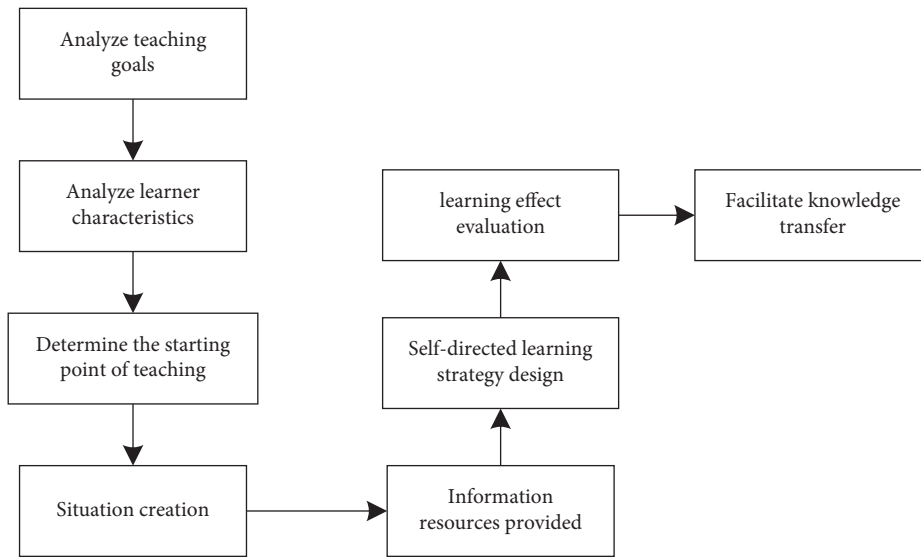


FIGURE 8: Teaching system design diagram of mixed teaching mode.

TABLE 3: Data statistics.

Project	Teacher-student interaction strategy	Student motivation	Student learning effectiveness	Platform resource utilization
A	M	2.61	2.35	2.58
	SD	0.52	0.58	0.65
B	M	2.78	2.17	2.39
	SD	0.37	0.37	0.36



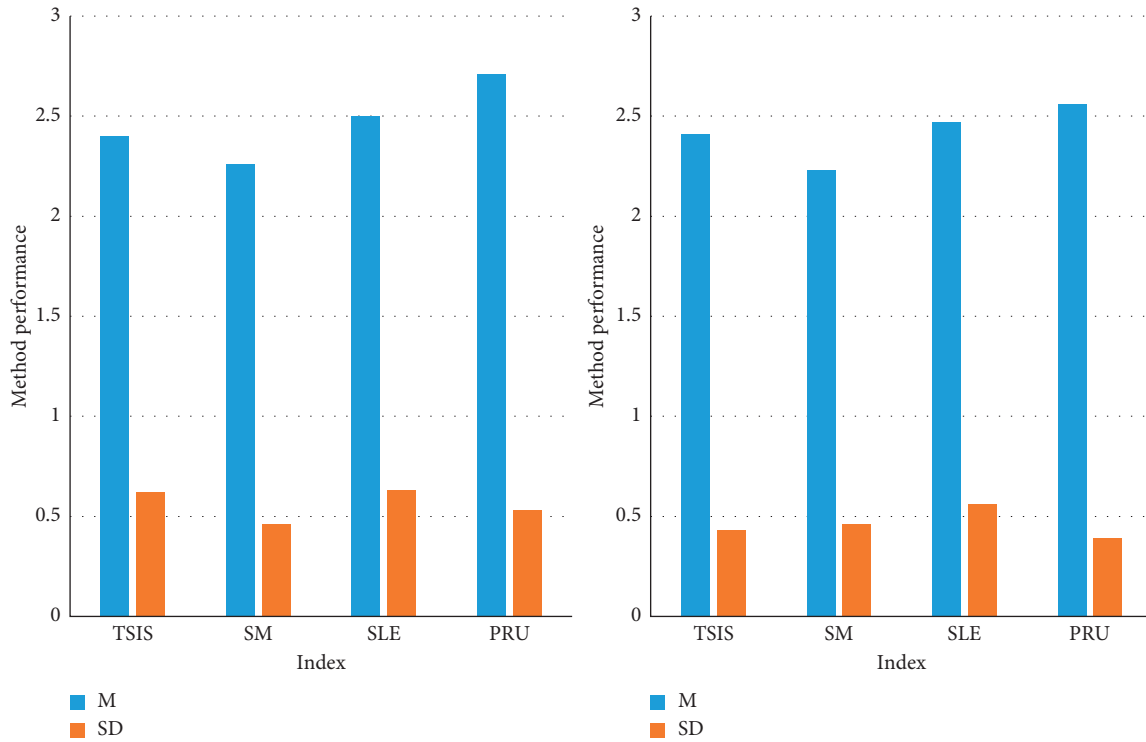


FIGURE 9: Blended teaching model survey results.

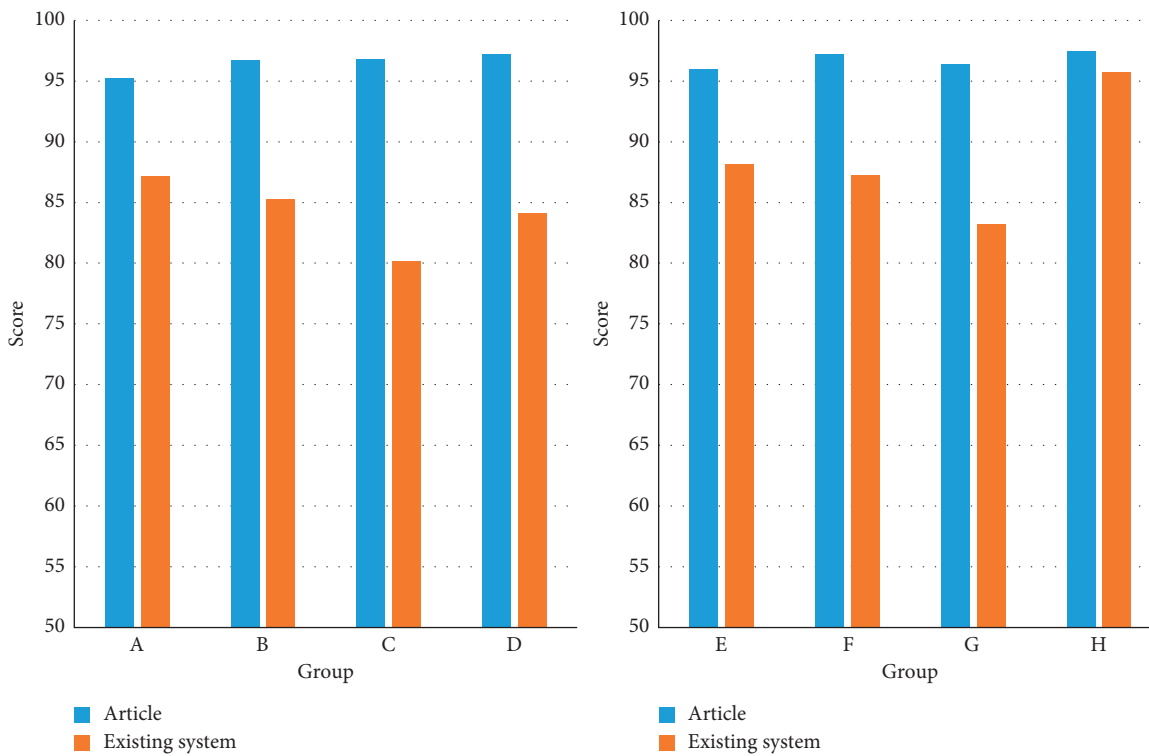


FIGURE 10: Achievement survey results.

of teacher-student interaction strategy, learning effectiveness, and platform resource utilization.

Two groups of voluntary college students were randomly selected, each group was divided into 8 groups with 100

students in each group, and the average score was taken. In another semester, the blended teaching model designed in this paper was conducted to investigate the students' English achievement. As shown in Figure 10, the results of the score

survey show that the system in this paper can greatly improve the English scores of college students, which is more effective than the existing system.

## 5. Conclusions

From the perspective of students, the current college students have certain information literacy. A large number of mobile electronic products have entered the campus, and students like to use the Internet and mobile devices to study and access materials. The way of communication between students is no longer limited to face-to-face communication, and some students prefer to communicate with others through the Internet. There is a certain foundation for blended teaching in higher vocational students. In addition, it is basically difficult to achieve personalized teaching in traditional classrooms. Vocational college students have great differences in the basics of admission, with English scores ranging from a dozen to more than 100. Some students give up listening because they cannot keep up with the teacher's rhythm. To address these issues, this thesis introduces automation technologies that really improve students' performance, automatically collect the English resources that the students need from the Internet. In terms of teaching evaluation methods, students have loopholes in online learning behavior, such as just hanging up without studying and using Baidu to search for answers in online tests. In future research, it is necessary to find ways to adopt more reasonable evaluation standards and improve evaluation methods.

## Data Availability

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

## Conflicts of Interest

The author declares no conflicts of interest.

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