An Empirical Study of the Influence of Online Learning Behaviors on Learning Outcomes in Blended Teaching Mode—Taking *College English Listening* as an Example

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Abstract

Blended teaching, which integrates the advantages of online and offline teaching, has become the main direction of higher education teaching reform. In the era of education big data, research on the online learners' behavior based on data mining has attracted more and more attention from higher education researchers. However, in the field of foreign language teaching, research on the relationship between online learning behaviors and learning outcomes in the blended teaching mode is still at an early stage. Taking the course *College English Listening* in Zhejiang Yuexiu University (ZYU) as an example, this study conducted a comprehensive data analysis of online learning behaviors of 152 students of ZYU to explore the influence of online learning behaviors on learning outcomes in the blended teaching mode by utilizing Microsoft Excel and SPSS.20 statistic software. The result shows that the number of course login, the quantity and the quality of forum replies, the number of note submission, the quality of the notes, the average score of vocabulary tests, the number of the times of taking listening tests and the average score of listening tests are all significantly and positively correlated with students' learning outcomes, while the study does not find a correlation between students' learning outcomes and the number of the times of taking vocabulary tests, the total length of online learning and the length of video viewing. Based on the study results, implications are put forward to give reference for the teaching design and the management of the foreign language blended courses.

Keywords

Blended Teaching, Online Learning Behaviors, Learning Outcomes

1. Introduction

In recent years, the rapid development of the computer technology and the network communication technology has promoted the integration of conventional classroom teaching and online teaching. Blended teaching, which combines online and offline learning, has attracted more and more attention in the fields of training and education. Development and application of blended teaching in higher education are particularly noteworthy. More and more universities at home and abroad have recognized the importance of blended teaching and began to carry it out widely. China also attaches great importance to blended teaching in the higher education curriculum reform, and has successively introduced a series of policy documents. For example, The Chinese Ministry of Education, in 2015, issued "Opinions on Strengthening the Construction, the Application and the Management of Online Open Courses in Higher Education Institutions", in which it is explicitly stated that "universities are encouraged to apply online open courses in accordance with their talent training goals and needs through various methods such as online learning, combining online learning with classroom teaching, and to continuously innovate the course sharing and application models within and between universities" [1]. In October 2019, the Ministry of Education issued "Opinions of the Ministry of Education on the Construction of First Class Undergraduate Courses", which points out that "10,000 national and 10,000 provincial first-class undergraduate courses will have been constructed in three years, and among them, around 4000 national online first-class courses (national high-quality online open courses) and around 6000 national online and offline blended first-class courses will have been established" [2]. In November of the same year, "Notice of the General Office of the Ministry of Education on the Recognition of Offline, Online and Offline Blended and Social Practice National First Class Undergraduate Courses in 2019" was released, which as a result marked that the Online and Offline Blended Courses had become the main direction of higher education curriculum construction.

With the blended teaching becoming the new teaching norm, the effectiveness of blended teaching has drawn much attention from university front-line teachers and researchers. The blended teaching involves more influencing factors because it combines both online and offline teaching. Since the concept of learning engagement was introduced into the education field, many studies have shown that the higher level of student engagement in learning, the better the academic performance. Learning behavior, as the key indicator of students' learning input is the most direct factor causing changes in students' academic performance. Analysis on learners' learning behaviors based on data mining can help teachers better understand student engagement in learning and provide supporting strategies to improve teaching results. In light of this, taking *College English Listening* as an example, this paper, by means of data mining, explored the correlation between online learning behaviors and learning outcomes in blended teaching mode, aiming to provide some practical suggestions for the teaching

design and the management of foreign language blended courses.

2. Literature Review

2.1. Online Learning Behavior

Generally speaking, online learning refers to the learning activities conducted by learners via the Internet. During the process of online learning, learners interact directly or indirectly with various tools and resources in the learning system, aiming to achieve the learning objectives. Therefore, online learning behavior is manifested as the interaction between learners and the various elements such as learning content, the learning system, teachers and peers in the learning process. In a word, online learning behaviors are basically the learners' online interactive behaviors.

The online learning behavior that this study centers on is based on the various learning behavioral records left by the students on the teaching platform UMOOC during the blended teaching of *College English Listening*. In this study, the following behavioral data are collected and analyzed: the number of course login, the length of online learning, the length of video viewing, the number of note submission, the quality of the notes, the number of forum posts and replies in the forum discussion, the quality of the forum replies, the number of the times of taking vocabulary tests, the average score of the vocabulary tests, the number of the times of taking listening tests, the average score of the listening tests.

2.2. Previous Studies on Online Learning Behavior

Previous studies on online learners' behavior mainly focused on the three aspects: analysis model of online learning behaviors [3] [4], the characteristics of online learning behaviors [5] and the factors that affect learning outcomes, such as student engagement [6] [7] [8] [9], online interaction [10] [11] [12], support strategies from the teacher [13] [14]. With the wide application of data mining technology in educational research, data analysis of learners' online learning behavior has received mounting attention from higher education researchers. For example, by mining the behavioral data on the MOOC platform, Fu Gangshan and Wang Gaihua found that the number of forum posts and replies, the number and the quality of the learning logs, the length of online learning positively affected students' academic performance, while the average length of one login and the number of text messages students received had negative correlation with students' academic performance [15]. Jia Jiyou *et al.* analyzed the data from six MOOCs of Peking University and found that significant and positive correlation existed between the total length of online learning, the frequency of video viewing, web-page browsing and lecture note downloading, the number of the forum posts and replies, test scores and students' academic performance [16]. Using the Tsinghua Education Online (THEOL) platform as data source, Li Xiaojuan *et al.* conducted an empirical study and found that the number of course login, the

number of the times of reading resources, the number of times of participating in questionnaires, the number of assignment and note submission, the number of forum posts and replies positively impacted students' academic performance [17]. All in all, a host of previous studies have validated that in MOOC environment, learners' online learning behaviors significantly affected the learning outcomes.

2.3. Previous Studies on Online Learning Behaviors in Blended Teaching

Although a great quantity of researchers have explored the relationship between the MOOC learners' online learning behaviors and the learning outcomes, the study on the online learning behaviors in the blended teaching mode has not attracted enough attention, especially in the field of foreign language teaching. Lu Lifang and Zhen Rong conducted a study on the relationship between online learning behaviors and learning outcomes in online and offline blended teaching, which showed that there was a strong correlation between the number of assignment submission, the average score of assignments and students' academic performance and there was a week correlation between the number of course login, the number of forum posts and replies and students' academic performance [18]. Relying on the behavioral data on the teaching platform, Yang Wanxia examined the correlation between students' online learning behaviors and their final exam scores from four aspects: the number of visiting the online course, the number of participating in online discussions, the duration of online learning, and the number of the times of reading online resources, and found that except the participation in online discussions, there was a significant and positive correlation between the other three online learning behaviors and the final exam scores [19]. Zhang Jin *et al.* did a correlation analysis between students' online learning behaviors and their achievements of advanced mathematics in blended teaching mode, which revealed that the length of online learning, the online testing results, the number of reading and downloading online resources, the number of online discussions were all positively related with students' academic achievement [20].

The above studies have given us a glimpse of the characteristics of the online learning behavior in blended teaching mode, but the research data were all derived from the science and technology courses and far too little attention has been paid to the study of the online learning behaviors in the blended teaching of the foreign language courses.

2.4. Research Questions

Under this research background, this study, taking the course *College English Listening* as an example, conducted an analysis based on data mining of the online learning behaviors of 152 students of ZYU, attempting to figure out the following three questions: 1) What are the characteristics of online learning behaviors of the learners in the blended foreign language teaching? 2) What is the re-

lationship between students' online learning behaviors and their learning outcomes? 3) What suggestions could be given for the teaching design and the management of the blended foreign language courses?

3. Research Design

3.1. Subjects and Data Source

The present study focuses on the course *College English Listening*, which is a compulsory foreign language course in ZYU (a private university in the city of Shaoxing, China). The course began to be built on UMOOC platform in 2018 and was established as the high-quality online open course in 2019. Since the fall semester of 2019, the course has been taught in the online and offline blended teaching mode. In 2022, the course was designated as the provincial demonstration course of ideological and political education (online and offline blended course). The course evaluation consists of the evaluation of online learning and offline learning. Offline learning evaluation mainly focuses on students' class attendance, classroom interaction, mid-term exam result and final test result. Online learning evaluation is based on the massive behavioral data on the platform, such as the number of course login, the length of online learning, the quantity and quality of forum posts and replies and so on. Students are informed at the beginning of the semester of the evaluation weights for online learning, which are as follows: 5% for course login, 5% for the length of online learning, 10% for video viewing, 20% for forum discussions, 20% for learning notes, 20% for vocabulary test results and 20% for listening test results.

This study collected and analyzed the behavioral data left on the UMOOC platform by 152 first-year students majoring in Chinese Language and Literature (9 males and 143 females) during the spring semester of 2022 with a total of 16 teaching weeks.

3.2. Data Collection

The data recorded on the UMOOC platform include student's names, student numbers, class groups, majors, the number of times they visited the online course, the number of times they watched the videos, the total hours students spent online, the duration of students' every single login, the number of times they read and downloaded the resources, the number of times they posted and replied in the forum discussion, the number of times they completed and submitted the online assignments, the scores of the assignments, the number of times they participated in the questionnaires, the number of times they read the notice announcements and so on.

In this study, the online learning behaviors of the learners are classified into four categories: course login behavior, resource learning behavior, online interaction behavior and test taking behavior. Course login behavior refers to students' visiting to the online course; resource learning behavior includes video viewing and note taking; online interaction behavior mainly refers to posting

and replying in the forum discussion; and test taking behavior consists of taking the vocabulary tests of each unit and taking the listening tests on the platform. Hence, as Table 1 shows, this study ultimately identified 11 measuring variables for online learning behaviors: 2 for course login behavior, 3 for resource learning behavior, 2 for forum interaction behavior, and 4 for test taking behavior. Another variable of this study is the learning outcomes, that is, students' final examination results.

3.3. Data Processing

First, the author utilized the Microsoft Excel to calculate the data of the four categories of the online learning behavior to make a comprehensive analysis of students' online learning behaviors. Then, the Pearson correlation analysis were conducted by using statistical Package for Social Sciences (SPSS20.) to reveal how the online learning behaviors of the learners affected the learning outcomes in the blended teaching mode.

3.4. Data Results and Analysis

3.4.1. Course Login Behavior

Two sets of behavioral data were collected to analyze students' course login behavior: the number of course login and the length of online learning.

1) The number of course login

As is shown in Table 2, 152 students visited the course 20,672 times altogether in 16 weeks, with about 8.5 visits per week per capita, which shows that students visited the online course frequently. High frequency of course visit is closely related with the learners' high level of enthusiasm and engagement in learning. According to Li Fengqing *et al.*, a higher level of student engagement in learning usually results in better learning outcomes [21].

2) The length of online learning

Students' total length of course login and the duration of each login, are displayed in Table 3. The maximum total length is 1701 minutes (about 28.3 hours); the minimum is 116 minutes (about 1.9 hours), and the total length of course login per capita is 632.5 minutes (about 10.5 hours), which means that students spent about 40 minutes on the platform per week per capita. The maximum duration of one login is 19.7 minutes, the minimum 2.8 minutes, and the average length of one login is 6.7 minutes, which indicates that students' online learning presents strikingly distinctive feature of fragmentation.

Table 1. Categories of online learning behavior and measuring variables.

Categories	Measuring Variables			
Course login behavior	the number of course login		the length of online learning	
Resource learning behavior	the length of video viewing	the number of the note submission		the quality of the notes
Online interaction behavior	the quantity of forum posts and replies		the quality of forum posts and replies	
Test taking behavior	the times of taking vocabulary tests	the average score of vocabulary tests	the times of taking listening tests	the average score of listening tests

Table 2. The number of course login (frequency).

Data Samples	Total visits	Maximum number	Minimum number	Weekly visits per capita
152	20,672	302	31	8.5

Table 3. The length of online learning (minute).

Maximum total length	Minimum total length	Total length per capita	Maximum length of one login	Minimum length of one login	Average length of one login
1701	116	632.5	19.7	2.8	6.7

3.4.2. Resource Learning Behavior

Three variables are investigated in this study to measure students' resource learning behavior: the length of video viewing, the number of note submission, and the quality of the notes.

1) Video-viewing

Lecture videos are regarded as the core part of online courses. In online learning, students usually spend most of their learning time watching teaching videos. There are 30 teaching videos in the online course, with a total duration of about 302 minutes. Students' video-viewing data are displayed in Table 4.

From Table 4, we can see that the longest time that students spent on viewing videos is 811 minutes, and the shortest time 103 minutes. The average time students spent on viewing videos exceeds the total length of videos only by 18 minutes, which indicates that very few students repeated viewing the videos. The average time students spent on video viewing (320 minutes) accounts for 51% of the average total length of online leaning (632.5 minutes). To have a better understanding of students' resource learning behavior, the student population distribution about the completion rate of the video viewing is displayed in Figure 1.

As is shown in Figure 1, only 52 students (34% of the students) viewed all videos and 30 students (19.7%) watched less than half of the videos, which indicates that students' video viewing situation is unsatisfactory.

Through self-reflection and the interviews with students, the author concluded three reasons for students' poor performance in watching videos. Firstly, video viewing accounts for a small percentage (10%) of the online evaluation. However, other tasks such as learning notes, forum discussions, vocabulary tests and listening tests account for 20% respectively. Students are inclined to pay more attention to the tasks with higher weight in assessment. Secondly, students' learning time is limited. With the integration of online and offline teaching in higher education institutions, more and more teachers in ZYU adopt blended teaching mode, which means students' online learning workload is getting increasingly heavy. Additionally, video viewing requires a large amount of time, which to some extent, intensifies students' focus on assignments with higher evaluation weight. Thirdly, the quality of the videos needs to be improved to stimulate students' learning interest. Above all, under the influence of the factors such as the orientation of the course evaluation, the insufficient learning time,

and the low video quality, students are inclined to adopt a more "economical" approach to obtain higher grades by focusing on the online tasks with higher evaluation weight.

2) Note taking

Taking notes plays an important role in foreign Language learning. The frequency of note submission and the note quality are significant indicators for students' engagement in language learning. In this course, students are required to submit the learning note once a week, and that is to say, there are 16 times of note submission in total. To further examine students' note quality, the teacher (also the author of this paper) divided the notes into 5 levels, with the highest level granted 5 points and the lowest 1 point. Table 5 shows the number of students' note submission and the note quality.

As is shown in Table 5, 2148 learning notes were submitted on the platform by 152 students in 16 weeks, and the average number of submission was 14, which indicates that students were highly motivated to submit the learning notes. Concerning the note quality, 82 students (54% of the students) scored above 4 on average in note quality, 44 students (29% of the students) scored between 3 - 4, and the average score of students' notes is 3.8, which reflects that the quality of the students' notes is relatively satisfying.
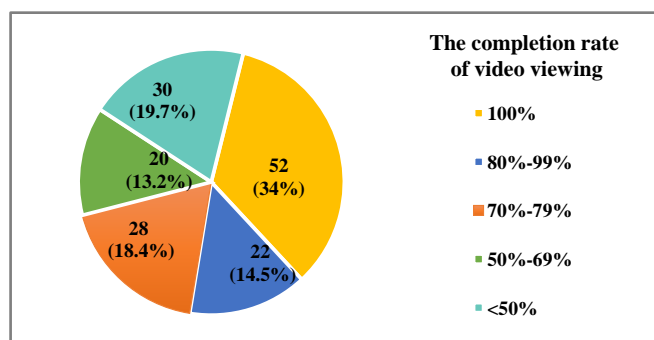
Figure 1. The student population distribution about the completion rate of video viewing.

Table 4. Video viewing (minute).

Total length of Videos	Maximum length of video viewing	Minimum length of video viewing	Average length of video viewing	Total length of course login per capita
302	811	103	320	632.5

Table 5. The number of note submission and the note quality.

	Total number	Maximum number	Minimum number	Average number
Frequency	2148	16	3	14
	Full score	Maximum score	Minimum score	Average score
quality	5	5	1	3.8

The fact that students were highly active and positive in taking notes is partly due to the high evaluation weight of the task and partly the teacher's incentive measure, that is, giving small prizes to the students who submit high-quality notes. However, when checking student's learning notes, the teacher found that most of the students took notes only during the process of offline learning, and very small proportion of the notes were taken during online learning, which accords with the above findings that students' online learning is featured by distinctive fragmentation and that students give insufficient attention to the teaching videos. To conclude, students' online resource learning is generally at a shallow level, and students' deep online learning needs to be enhanced.

3.4.3. Online Interaction Behavior

Students' discussions in the forum are the major manifestation of student-teacher and student-student online interaction. Discussions mainly consist of posts and replies in the forum. Much of previous studies have found that students' participation in forum discussions exert influence on their learning outcomes. For example, the empirical study conducted by Luo Heng *et al.* revealed that the total number of words posted by students in the forum had a relationship with their learning outcomes [22]. To master students' online interaction behavior, the author analyzed two groups of data: the number of posts and replies in the forum discussion and the quality of the forum replies.

1) The number of forum posts and replies

In the online course, 40 discussion topics were released in the forum by the teacher. Students' participation in the forum discussion is revealed in Table 6.

Table 6 shows a great disparity between the quantity of forum posts and that of forum replies. By reviewing the content of the replies, the author found that students mainly replied to the topics released by the teacher and seldom posted in the forum. As can be seen in Table 6, the maximum number of replies is 39, which means that the student replied nearly all the topics posted by the teacher in the forum, while the minimum number is 1, indicating that the student seldom participated in the forum discussion. The small number of the posts shows that there was little student-student interaction in the forum.

2) The quality of forum replies

Referring to the quality analysis framework of online discussion constructed by Yan Hanbing *et al.* [23], the author divided students' replies into four levels, with the highest level granted 4 points, and the lowest 1 point. The quality of students' forum replies is demonstrated in Table 7.

Detailed data statistics show that 39% of students score higher than 3 points on average, and 31% of students between 2 - 3 points on average and 30% of students lower than 2 points. The average score of students' replies is 2.2, indicating that students' discussions are at a medium level in quality.

Based on the quantity and the quality of students' forum posts and replies, it can be concluded that students were prone to interacting with teachers rather than peers. Most students just gave simple responses to the topic discussions

Table 6. Forum posts and replies (frequency).

Total number of posts	Total number of replies	Maximum replies	Minimum replies	Per capita posts	Per capita replies
8	3508	39	1	0.05	23.1

Table 7. The quality of forum replies.

Full score	Maximum score	Minimum score	Average score
4	3.8	1	2.2

initiated by the teacher and rarely took initiative to start communication with their learning peers. Three reasons are probably accountable for this. first, in blended teaching, students tend to ask questions in the classroom by face-to-face communication rather than on the platform. Next, most students regard forum discussing as a task rather than an avenue to exchanging ideas with teachers and peers. Thirdly, students are not confident in their English. They are too afraid of making mistakes to initiate the communication and share their ideas with their peers.

3.4.4. Test Taking Behavior

In this study, four variables of test-taking behavior are investigated: the times of taking vocabulary tests, the average score of vocabulary tests, the times of taking listening tests, and the average score of listening tests.

1) Taking vocabulary tests

There were 6 vocabulary tests on the platform which were released every two weeks to check students' mastery of the key words and phrases in the textbook. To ensure that all students take the vocabulary tests, the teacher asked the students to complete the task in 10 minutes during the classroom teaching. The number of the times of taking vocabulary tests and the average score of the test results are shown in Table 8.

As we can see in Table 8, the average number of the times of taking vocabulary tests is 5.8, with the completion rate arriving 97%, which means that the vast majority of the students (132 in 152 students) have finished all the 6 vocabulary quizzes. It clearly shows that the teacher's guidance and supervision in the classroom contribute to a high rate of the test taking. To further master students' engagement in vocabulary learning, the test results should also be considered. As is shown in Table 8, the mean value of students' average scores is 78.6, which indicates that students' mastery in vocabulary learning is generally satisfactory.

2) Taking listening tests

Except for vocabulary tests, 8 listening tests were also released on the platform. The number of the times of taking listening tests and the average score of the listening tests are shown in Table 9.

As can be seen in Table 9, the average number of the times of taking listening tests is 6.9 with the completion rate 86%, which reflects that students were fairly active to take the listening tests. The average score of the students' listening test

Table 8. The number of taking vocabulary tests and the test results.

	Maximum number	Minimum number	Average number
The number of taking vocabulary test	6	3	5.8
	Maximum average score	Minimum average score	The mean of all average scores
Vocabulary test results	95	27	78.6

Table 9. The number of taking listening tests and the test results.

	Maximum number	Minimum number	Average number
The number of taking listening test	8	2	6.9
	Maximum average score	Minimum average score	The mean of all average scores
Listening test results	92	20	68

results is 68. The mean value of the average vocabulary test scores is 10.6 higher than that of the average listening test scores. That's because students who spend more time on preparing the vocabulary tests could get a higher score more easily. However, students' listening test results are more closely related with their English listening competence rather than how much time they prepare for the test. It turns out that the mean value of students' average listening test scores is very close to the average score of the final listening test which is 67.7. From this we can see that, listening test results can better predict students' final exam grade.

3.4.5. The Correlation between Online Learning Behaviors and Learning Outcomes

This study used Pearson correlation coefficient to examine the correlation between online learning behaviors and the learning outcomes (students' final test results). The correlation coefficient matrix obtained is shown in Table 10.

As is shown in Table 10, students' learning outcomes are positively correlated with the number of course login, the number of note submission, the note quality, the average score of vocabulary tests, the number of the times of taking listening tests and the average score of listening test results. It is noteworthy that the correlation coefficients between the number of forum replies, the two average scores of the vocabulary tests results and the listening test results and the learning outcomes are above 0.4, which indicates that students mainly focus on completing forum tasks like replying to topic discussions initiated by the teacher in the form and completing the vocabulary tests and listening tests.

There is no correlation between the number of the times of taking vocabulary tests and the learning outcomes. That's because in this study, taking vocabulary tests is a compulsory task for students to finish in the classroom, and most students took all the 6 vocabulary tests. Therefore, the number of the times of taking vocabulary tests exerted no influence on the learning outcomes.

Table 10. Correlation between online learning behaviors and learning outcomes.

Course login behavior	The number of course login		Total time spent online	
	0.359**		0.193	
Resource learning behavior	The length of video viewing	The number of note submission	The quality of the notes	
	0.183	0.310**	0.320**	
Online interaction behavior	The quantity of forum replies		The quality of forum replies	
	0.416**		0.347**	
Test taking behavior	The number of taking vocabulary tests	The average score of vocabulary tests	The number of taking listening tests	The average score of listening tests
	0.199	0.427**	0.353**	0.446**

(Note: ** indicates a significant correlation at the 0.01 level, and * indicates a significant correlation at the 0.05 level).

From Table 10, we can see that there is no correlation between the length of online learning, the length of video watching and the learning outcomes. However, previous researches have shown that the two variables are correlated with students' learning outcomes [15] [16]. The main reason for the different conclusions lies in the different learning environment (or teaching mode). Most of the existing studies are based on MOOC learning or Flipped classroom mode, so students spend most of their online learning time on watching teaching videos and browsing learning resources. However, in this study, the course was taught in the blended teaching mode, and students could master most of the learning content in the classroom teaching. Therefore, students were inclined to focus on completing online assignments. Another reason could possibly be the different characteristics of the subjects. Previous studies on learners' online learning behavior are mainly based on the science and engineering courses, while this study focuses on a foreign language course which is an arts course.

4. Conclusions and Implications

4.1. Conclusions

From the data analysis of the four categories of students' online learning behaviors in the blended teaching of *College English Listening*, we can conclude that: first, the high number of course login indicates that students are highly motivated and enthusiastic in learning, while the short average duration of one login indicates that students' online learning presents a distinctive feature of fragmentation; second, students' resource learning is at a shallow level, which can be shown in the low completion rate of the video viewing and the lack of note taking during the online learning; third, students tend to reply to the topics posted by the teacher with simple responses, and the student-student interaction is rare in the forum. So, there is a lack of in-depth communication and exchange of ideas in the forum discussion; lastly, students are positive in taking the vocabulary tests and listening tests, which are the tasks with high weight in online learning evaluation. Vocabulary test results can better reflect students' process

learning while the listening test results can better predict students' learning outcomes. What's more, the correlation analysis of the learning behavior and the learning outcome shows that students' learning outcomes are positively correlated with the number of course login, the number of note submission, the note quality, the vocabulary test results, the number of the times of taking listening tests and the listening test results. There is no correlation between the total length of online learning, the length of video viewing, the number of the times of taking vocabulary tests and the learning outcome.

Admittedly, this study has some limitations. One of the main limitations is that the data collected are relatively based upon a very limited number of students from merely one major and from one university; therefore, in order to broaden the extent the findings can be generalized, large-scale research can be undertaken in the future studies. Another limitation of this study is that it mainly adopts the quantitative method to analyze students' online learning behaviors. To provide a panoramic view of students' online learning, the qualitative method should also be used by adopting the research instruments such as questionnaires, interviews in the future research. Thirdly, the behavioral data analyzed in this study are still not comprehensive enough. For example, the number of the times of resource reading and downloading, the number of the times of reading notice announcement and the number of participating in the questionnaires are not collected in this study due to the limited data size on the platform. Lastly, the research only touches upon the online learning behaviors in the blended teaching of *College English Listening*, so it is beyond the scope of the study to probe into the online learning behaviors in the blended teaching of other foreign language courses or the influence of both online and offline learning behaviors on the learning outcomes. Therefore, it is advisable to expand the research in greater scope and depth in future studies.

4.2. Implications

Based on the above conclusions, this study provides the following insights for the teaching design and management of the blended foreign language course.

4.2.1. Providing Guidance and Intervention in Learners' Learning Process

Teachers should conduct data analysis of learners' online learning behaviors in a timely manner to grasp learners' learning status, learning effectiveness and then provide intervention and guidance in the learning process [24]. Teachers are supposed to inform students of their learning performance in private or on the platform information bulletin regularly, because teachers' feedback would be beneficial for students to conduct self-evaluation and self-diagnosis, which would help them changing their cognitive style, adjusting their online learning behaviors, and promoting their learning effectiveness.

4.2.2. Promoting Learners' Deep Online Learning

Strengthening the construction of online learning resources is of great signific-

ance to the promotion of learners' deep online learning. First, the quality of the teaching videos should be improved. Videos are the important component and the main learning resource of the network learning, and the quality of teaching videos is crucial for the effectiveness of the online learning. Whether the videos can spur learners' interest and passion in learning determines the level of the learners' persistence and participation in online learning. To produce the high-quality teaching videos that accord with the characteristics of the subject, teachers should take various aspects into consideration during the process of video designing, such as the video content, the video duration, students' need for ubiquitous learning and so on. Furthermore, resources in varied forms (videos, audios, texts, images, and so on) should be developed and utilized to improve the learners' initiative and motivation in learning.

4.2.3. Enhancing Learners' Online Interaction

Online discussion is the most commonly-used method of online interaction. Online discussion is not only conducive to the cultivation of learners' critical thinking, but also beneficial for the promotion of learners' in-depth learning and knowledge construction [22]. Online discussions could promote thinking collisions and information sharing between students and teachers, which can help stimulate students' initiative in learning [24]. To improve the quality of learners' online discussion, teachers need to design and organize discussions elaborately, provide timely feedback on students' responses, and consider student's current level of knowledge and experience. To enhance students' online interaction in the forum discussion, several issues should be noted. Firstly, teachers should participate in online discussion. Topics initiated by teachers can mostly attract students' attention, and the quality and quantity of replies to the teacher's posts are significantly higher than other posts, which fully reflects teachers' leading role in online discussion. Secondly, teachers should also attach importance to the classroom interaction and help learners clear obstacles in cultivating deep interpersonal interaction. Classroom interaction can continue and supplement students' online learning. The classroom communication such as face-to-face emotional exchange, the cooperative learning and the group discussions can narrow the psychological distance between students, make up for the shortcomings of online interaction, and cultivate better online learning partnerships for students' online interaction.

4.2.4. Establishing a Diversified Evaluation System

In this study, diversified evaluation methods are adopted, which include formative evaluation, summative evaluation and diagnostic evaluation. The number of course login, the length of online learning, the quantity and quality of the notes, the length of video viewing, the quantity and quality of the forum posts and replies, the classroom interaction, the classroom attendance are used as the reference data for the formative evaluation. The final exam result is the main indicator for the summative evaluation, with appropriate reference to students' online

test results. The results of the vocabulary tests, the listening tests and the mid-term exam provide the basis for the diagnostic evaluation. The establishment of a diverse evaluation system can stimulate learners' intrinsic motivation in learning, emphasizing both the outcome evaluation and the process evaluation.

The blended teaching combines online learning and offline learning and enables the in-class learning and out-of-class learning to complement each other. Blended teaching does not only emphasize the leading role of the teacher in guiding, enlightening and monitoring students' learning, but also highlight the initiative, enthusiasm and creativity of the students as the main body of learning. Through exploring learners' key learning behaviors, teachers can adjust the course content and teaching resources, optimize the course evaluation system, enhance students' online interaction, so as to stimulate learners' learning enthusiasm, enhance their learning engagement, and improve their learning effectiveness.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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