



Factors Influencing Students' Willingness to Choose Blended Learning in Higher Education

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Abstract. Students' willingness to participate blended leaning has been an interesting topic in the higher education context. This paper aims to examine students' willingness to choose blended learning and identify the influencing factors related to their willingness. A large-scale questionnaire survey was conducted with a collection of 1903 valid responses. Meanwhile, nine students were interviewed. The findings indicated that blended learning have not been widely offered in Chinese universities. Students' participation and understanding of blended learning are relatively limited, but most students have a positive attitude to blended learning and are willing to choose it in the future. Such factors as students' demographic features, curriculum cognition, curriculum design, learning demands will affect their willingness to choose blended learning.

Keywords: Blended learning · Choosing willingness · Curriculum cognition · Students' demands

1 Introduction

Blended learning originated from online education. As a subversive innovation to the traditional education model, online education has gained extraordinary influence due to its features of prestigious schools, famous teachers, excellent courses, openness, free of charge and mobility [1]. However, the low completion rate of online education courses has aroused widespread concern. A large number of students cannot complete their studies without supervision or face-to-face instruction. As a result, the value of traditional school education has been re-examined. In recent years, colleges and universities around the world have explored the integration of online education into various face-to-face instructions and researched the effect of blended learning on students' learning performance [2]. Because blended learning combines the advantages of traditional face-to-face learning and online learning, the education community generally regards blended learning as an ideal model for realizing personalized learning, increasing learning opportunities, and reducing school operating costs [3]. Although faced with plenty of problems in learning and teaching practice, blended learning has become an important components of the higher education in the world.

In recent years, blended learning has become a hot topic in China's higher education reform. The Chinese government and higher education institutions have been offering increasingly more strategic and policy to encourage the development of blended learning. For example, the Ministry of Education of the People's Republic of China has issued a series of policies to promote the implementation of blended learning in colleges and universities. At present, the blended learning practice in China is thriving, while the research on blended learning obviously lags behind the pace of practice. In order to ensure the effective implementation of blended learning, it is urgent to understand the attitude and capacity of colleges and universities in blended learning [4]. However, in the majority of current research, the voice of students is ignored. There is few research focusing on students' attitude towards the introduction of blended learning in colleges or universities; their willingness to take blended courses offered by the colleges or universities, and what factors may influence their participation in blended learning. Based on these problems, this paper will analyze the cognition of college students on blended learning from their perspective, grasp their willingness to choose blended learning mode and the influencing factors, to provide suggestions for better implementation of blended learning in colleges and universities and promote colleges and universities to construct blended learning model to meet the demands of students.

2 Literature Review

2.1 Definition

Scholars have not reached an agreement on the concept of "blended learning". They have either defined the blended learning too broadly to cover all educational techniques used in classrooms, or regarded it too narrowly as their favorite type mode [5]. Some scholars have also tried to define the concept of blended learning rigorously. Among them, blended learning means that students complete the learning process by combining online learning with learning in entity organizations such as schools. In online learning, students can autonomously control the time, place, path, and pace of learning. In offline learning, students are supervised and instructed by teachers. During the learning process, the online component and offline component form an integrated curriculum system together rather than being separated. Which one meets these conditions is blended learning [3]. However, in the actual practical process, the diversity of blended learning may be far beyond imagination. Most people are confused about the concept and mode of blended learning. The definition of blended learning varies from person to person. However, most researchers believe that blended learning is a mode that organically combines traditional face-to-face learning with online learning [6, 7].

2.2 Effectiveness

With the emergence of blended learning, people urgently need to know which type of learning mode is more effective. In recent years, scholars have carried out comparative studies on the effects of blended learning, online learning and face-to-face learning. Three categories of findings were drawn: (1) some studies support the hypothesis that

blended learning is more effective than pure online learning and face-to-face learning. According to a meta-analysis of 47 experimental and quasi-experimental studies on the impact of blended learning and online learning on students' learning performance, the blended learning is more conducive to improving students' learning performance than pure online learning and face-to-face learning [8]. An experiment that applies blended learning to students' foreign language learning shows that blended learning significantly improves students' learning achievement [9]. (2) Only a small amount of experiments have reached the opposite conclusion. An evaluation of the implementation effect of the "Virtual School" project in West Virginia in the United States found that the academic performance of students adopting the blended learning model was significantly lower than that of those students receiving traditional face-to-face instruction [10]. (3) Some experiments also show that there is no significant difference between blended learning and pure online learning, as well as face-to-face learning. For example, some scholars have found that there is no difference in the learning performance of students under the three learning modes, and students have the same satisfaction with their learning experiences [11]. A teaching experiment conducted in a university in Shandong province, China, which compared the effects of traditional learning mode and blended learning model and found that whether blended learning model is adopted or not has no effect on students' performance [12].

2.3 Perception

Although students have different understandings and experience of blended learning, they generally hold a positive attitude towards it, especially those who have participated in blended learning. Students believe that the blended learning model is featured by flexible learning methods and good learning effects, but it encounters problems in time management and technology use [13]. Students are satisfied with blended learning because they generally believe that the learning effect is better than traditional face-to-face learning or online learning [14]. A survey conducted in Malaysia shows that students are satisfied with blended learning regardless of their achievements, and they are willing to continue taking blended courses if given the opportunity. Among the students majoring in accounting and financial management at the University of Winchester in the UK, a study on blended learning cognition was carried out. The results indicate that the students think highly of the courses with good organizational structure and rich resources. These students also hold a positive attitude towards the development of their knowledge and ability in the blended learning environment [15]. According to a survey conducted in Chinese colleges and universities, 72.58% of the students believe that blended learning is helpful to their own development, and most students are highly interested and confident in blended learning [16]. On the whole, students think that blended learning has advantages over traditional education modes and are willing to adopt blended learning mode in the learning process.

3 Methodology

3.1 Research Design

In this paper, “blended learning” refers to a learning model that combines both traditional face-to-face classroom learning and online learning using information technology. This study adopts a progressive research design combined with qualitative interviews and quantitative surveys. At the beginning, nine university students were interviewed to establish a fundamental understanding of the issues. Then, a large-scale quantitative survey questionnaire - Questionnaire on the Present Situation of Blended Learning in Colleges and Universities was well developed to collect quantitative data. After the questionnaire was collected, the data were further cleaned, and the reliability and validity of the questionnaire were tested. Through descriptive statistics of data, this paper analyzes the blended learning’s setting in colleges and universities, students’ cognition and willingness to participate in blended learning. Logistic regression was used to analyze the influencing factors of students’ choice of blended learning. Subsequently, the second cycle interview were conducted after quantitative data collection to provide explanations for the results of quantitative research.

3.2 Research Hypothesis

This study assumes that factors that affect students’ choice of blended learning include student’s demographic features, students’ cognition of blended learning, the design of curriculum structure, and students’ learning needs. First of all, there are differences among demographic features of students. Students’ acceptability of blended learning may be affected by their learning foundation and learning ability [17]. Due to differences in learning patterns [18], learning strategies [19], subjective initiative and self-discipline [20] among boys and girls, the choice of blended learning may also be different. Second, according to relevant research, students do not enter the classroom without any academic foundation, and cognition of blended learning will affect their behaviour and academic performance [14]. Third, whether the curriculum design is scientific or reasonable directly affects students’ feeling of the curriculum. If the curriculum design is well structured and meets students’ psychological expectations, they will hold a positive attitude towards it; otherwise students will feel disappointed [21]. At last, traditional face-to-face learning, online learning and blended learning have their own characteristics, which can meet the different learning needs of students. The practice has proved that face-to-face teaching is more effective for students to learn languages. Students decide whether to choose blended learning according to their learning needs in different fields. Based on the above considerations, the following research hypotheses are put forward:

Hypothesis 1: Students’ willingness to take blended learning model will be affected by demographic features.

Hypothesis 2: Students’ willingness to take blended learning model will be affected by cognition of blended learning.

Hypothesis 3: Students’ willingness to take blended learning model will be affected by the curriculum design of blended learning.

Hypothesis 4: Students' willingness to take blended learning model will be affected by their learning demands.

3.3 Data Collection and Analysis

In January 2020, the research group distributed the Questionnaire on the Present Situation of Blended Learning in Colleges and Universities to colleges and universities nationwide online. A total of 1,968 responses were collected, and 1,903 valid responses were obtained after cleaning. Among them, 771 are male, and 1,132 are female, accounting for 40.5% and 59.5% respectively. There were 230 responses from colleges and universities that will be developed into world-class educational institutions, accounting for 12.1%, 805 from universities which focus on building their preponderant disciplines into first-rate ones¹, accounting for 42.3%, and 868 from other colleges or universities, accounting for 45.6%.

The questionnaire consists of three parts: The first part investigates the participants' demographic features, including gender, university, major, grade, academic performance, blended learning experience, and curriculum type preference. The second part investigates students' cognition of blended learning, the design of blended learning and students' learning needs in different fields. Among them, the investigation on students' cognition of blended learning is mainly to analyze the teaching effect, interactive effect and learning gains by comparing different learning modes. The design of blended learning mainly includes nine aspects, which are course resources, learning interest, self-learning ability, learning methods, information technology capability, learning tasks, course difficulty, problem resolution, and course arrangements. In addition, students' learning needs with the choice of blended learning, it mainly includes major course learning, preparing for entrance examination such as postgraduate entrance examination, employment training, language learning, certificate examination guidance, etc. The third part is designed to understand the students' willingness to take a blended course. The question in the questionnaire is "Are you willing to take a blended course in the future?" (Table 1).

In this study, Cronbach Alpha coefficient was used to estimate the internal consistency reliability of the questionnaire, with the overall alpha coefficient of the questionnaire being 0.951, indicating good reliability. After KMO and Bartlett's tests, the KMO value of the scale is 0.985 ($df = 2485$, $Sig = 0.00 < 0.01$), with a good structural validity. The Principal Component Analysis is adopted. The characteristic root is greater than 1, 11 factors appear after the rotation of the maximum variance, and the cumulative contribution rate of the variance reaches 78.418%.

¹ In 2017, Chinese authorities released a selected list of universities and colleges, which will participate in the country's construction plan of world-class universities and first-class disciplines. According to the list jointly released by the Ministry of Education (MOE), the Ministry of Finance (MOF), and the National Development and Reform Commission (NDRC), 42 universities and colleges will be developed into world-class educational institutions, while 95 universities will focus on building their preponderant disciplines into first-rate ones.

Table 1. The description of the variable.

| Construct | Variable | Items design |
|----------------------|-----------------------|---|
| Demographic features | Gender | Male; Female (benchmark) |
| | Major | Humanities; Science, Agriculture or Medicine; Social science; Engineering (benchmark) |
| | Class standing | Postgraduate; Senior; Junior; Sophomore; Freshman (benchmark) |
| | University level | World-class universities; World-class discipline universities; General universities (benchmark) |
| | GPA ranking | Top 10%; 10%–25%; 25%–50%; The later50%(benchmark) |
| | Elective experience | Have you participated in blended learning (No as the benchmark) |
| | Type Preference | Blended learning; Online learning; Face-to-face learning (benchmark) |
| Cognition | Teaching effects | Blended learning; Online learning; Face-to-face learning (benchmark) |
| | Interaction effects | Blended learning; Online learning; Face-to-face learning (benchmark) |
| | Learning gains | Blended learning; Online learning; Face-to-face learning (benchmark) |
| Design | Course resources | Expanding curriculum resources (No as the benchmark) |
| | Learning interest | Stimulating learning interest (No as the benchmark) |
| | Self-learning ability | Cultivating self-learning ability (No as the benchmark) |
| | Learning methods | Promoting the change of learning methods (No as the benchmark) |
| | Technology capability | Strengthening information technology capabilities (No as the benchmark) |
| | Learning tasks | Learning tasks are too heavy (No as the benchmark) |
| | Course difficulty | Online courses are difficult (No as the benchmark) |
| | Problem resolution | Learning problems are difficult to solve in time (No as the benchmark) |
| | Course arrangements | Course arrangements are unreasonable(No as the benchmark) |

(continued)

Table 1. (continued)

| Construct | Variable | Items design |
|-------------|--|---|
| Demands | Major course learning | Do you need blended learning in this field? (No as the benchmark) |
| | Preparing for the entrance examination | Do you need blended learning in this field? (No as the benchmark) |
| | Employment training | Do you need blended learning in this field? (No as the benchmark) |
| | Language learning | Do you need blended learning in this field? (No as the benchmark) |
| | Certificate examination guidance | Do you need blended learning in this field? (No as the benchmark) |
| Willingness | Choosing willingness | Are you willing to take a blended course in the future? (No as the benchmark) |

4 Results

4.1 The Basic Situation of Blended Learning in Chinese Colleges and Universities

The implication of blended learning in Chinese colleges and universities is still in its infancy. According to the data, blended courses are not commonly offered in colleges and universities. Forty-five per cent of the students are not sure whether their universities offer blended courses, seven percent of the students explicitly state that their university does not offer any blended courses. Only 48% of students believe that their universities offer blended courses. Meanwhile, the participation proportion of students in blended learning is relatively low. Fifty-nine point seven percent of the students said that they do not have any experience in participation in blended learning. As to the students who have participated in blended learning, most of them only took 1 to 2 courses, resulting in a limited understanding of blended learning. Among the students investigated, 33.8% for “Never heard about the blended learning”, 43.5% for “Know a little about the blended learning”, 18.8% for “Know quite a lot about the blended learning”, and only 3.9% for “Know much about the blended learning” (Table 2).

4.2 Comparative Analysis of Students' Views on Different Learning Models

It is worth noting that although with the poor proportion of blended courses offered as well as low participation and understanding in blended learning, students still show enthusiasm for this model. Compared with the traditional face-to-face learning model and online learning model, more than half of the students show their preference for the blended learning model. The participants were asked to compare the traditional face-to-face learning, online learning, and blended learning in terms of teaching effect, academic

Table 2. Description of blended learning setting and situation of students' engagement.

| | | | | |
|--|-------------|---------------|-----------------------|-----------------------|
| Whether your universities offer blended courses? | Don't know | Don't offer | Offer a small portion | Offer a large portion |
| | 856(45%) | 133(7%) | 773(40.6%) | 141(7.4%) |
| Do you know what blended learning is? | Never heard | Know a little | Know quite a lot | Know much |
| | 644(33.8%) | 827(43.5%) | 357(18.8%) | 75(3.9%) |
| How many blended courses have you taken? | Zero | One | Two | Three and more |
| | 1137(59.7%) | 256(13.5%) | 278(14.6%) | 232(12.2%) |

tasks, teacher-student interaction and learning gains. The survey shows that students gave high response to blended learning. Among them, 47% hold that blended learning is more effective, and 42% believe that they have gained a lot from blended learning. As to the amount of learning tasks, it is believed that the proportion of traditional face-to-face learning and blended learning having a large task burden both exceed 30%, so blended teaching may not be easy. As to the teacher-student interaction, students hold that the traditional learning model is better than the blended learning model, for they generally doubt that whether effective interaction between teachers and students can be realized online (Table 3).

Table 3. Comparative analysis of students' views on different learning models.

| | Traditional face-to-face learning | Online learning | Blended learning | Uncertain |
|--|-----------------------------------|-----------------|------------------|------------|
| Which mode do you like? | 644(33.8%) | 131(6.9%) | 961(50.5%) | 167(8.8%) |
| Which mode has better teaching effect? | 721(37.9%) | 111(5.8%) | 895(47%) | 176(9.2%) |
| Which mode has the largest task burden? | 622(32.7%) | 354(18.6%) | 594(31.2%) | 333(17.5%) |
| Which mode has a better interactive effect? | 1114(58.5%) | 116(6.1%) | 548(28.8%) | 125(6.6%) |
| Which mode did can students achieve more learning gains? | 768(40.4%) | 127(6.7%) | 800(42%) | 208(10.9%) |

4.3 Analysis of Factors Influencing Students' Willingness to Choose Blended Learning

The binary logistic regression equation is used to analyze the influencing factors of students' choice of blended learning in higher education, with the Cox & Snell R square and Nagelkerke R square of the regression equation is 0.214 and 0.414, respectively, and the results are shown in Table 4.

Table 4. Binary logistic regression analysis of blended course choice willingness.

| Independent variable | B | Exp (B) |
|---|-------|----------|
| Gender (Female as the benchmark) | -.537 | .585** |
| World-class discipline universities (General university as the benchmark) | -.298 | .742 |
| World-class universities | -.231 | .794 |
| Science, Agriculture or Medicine (Engineering as the benchmark) | -.434 | .648 |
| Social science | -.133 | .875 |
| Humanities | -.456 | .634 |
| Postgraduate (Freshman as the benchmark) | .038 | 1.039 |
| Senior and above | -.112 | .894 |
| Junior | -.353 | .702 |
| Sophomore | -.476 | .621 |
| Top 10%(The later 50% as the benchmark) | .341 | 1.407 |
| 10%–25% | .451 | 1.570 |
| 25%–50% | .102 | 1.108 |
| Elective experience of blended courses (No experience as the benchmark) | .445 | 1.561* |
| Prefer online learning (Traditional face to face learning as the benchmark) | .692 | 1.998 |
| Prefer blended learning | 1.675 | 5.337*** |
| Online learning effect (Traditional face to face learning as the benchmark) | .286 | 1.331 |
| Blended learning effect | .610 | 1.841* |
| Online learning interaction | .41 | 1.152 |
| Blended learning interaction | .120 | 1.128 |
| Online learning gains | -.668 | .513 |
| Blended learning gains | .737 | 2.089** |
| Expanding curriculum resources(No as the benchmark) | 1.414 | 4.114*** |
| Stimulating learning interest | .882 | 2.416*** |
| Cultivating self-learning ability | .617 | 1.853** |

(continued)

Table 4. (continued)

| Independent variable | B | Exp (B) |
|--|--------|----------|
| Promoting the change of learning methods | .595 | 1.813** |
| Strengthening information technology capabilities | .368 | 1.445 |
| Overburdened learning tasks | -.862 | .423*** |
| Difficult online courses | -.606 | .546** |
| Untimely problem resolution | -.197 | .822 |
| Unreasonable course arrangements | -1.189 | .305*** |
| Major course learning (No demand as the benchmark) | 1.138 | 3.119*** |
| Preparing for the entrance examination | .395 | 1.485* |
| Employment training | .543 | 1.721** |
| Language learning | .068 | 1.070 |
| Certificate examination guidance | .203 | 1.225 |
| Constant | -.765 | .466 |

Notes: ***represents $P < 0.01$, **represents $P < 0.05$, *represents $P < 0.1$

In terms of demographic features, a gender difference shows in the choice of blended learning, with male students 41.5% less likely than female students to choose blended learning. The experience of participating in blended learning has an impact on students' choices. The probability that students with participation experience are willing to choose blended learning in the future is 56.1% higher than that of students without experience. The preference for learning mode also influences the choice of students. Compared with the traditional face-to-face learning mode, students who prefer blended learning have a higher probability of choosing this model.

In terms of curriculum cognition, compared with the traditional face-to-face learning model, students who believe that the blended learning model has a better effect are 84.1% more likely to continue to choose such mode in the future; students who believe that they have benefited a lot from blended learning are also more likely to choose such mode.

In terms of curriculum design, according to the data, blended learning has a great attraction to students in terms of enriching curriculum resources, stimulating learning interest, cultivating self-learning ability, and promoting the change of learning methods. The obvious effect of blended learning in these aspects may significantly improve the probability of students to choose this model. While the overburdened learning tasks, difficult online courses, unreasonable curriculum arrangements and other problems in blended learning will affect the probability of students to choose in the future.

In terms of curriculum demands, students with demands on the instruction of specialized courses and entrance examinations, as well as employment training and other fields are more willing to choose blended learning, indicating that students hope to improve their learning effect in these fields through blended learning.

5 Discussions

Chinese students have a high acceptance of blended learning, and colleges or universities have the conditions to offer a wide range of blended courses. According to the data, although students have a low level of understanding and participation in blended learning, nearly half of them hold a positive attitude towards it, with the idea that blended learning can provide them with good learning effect and gains, and tend to choose blended learning in the future. The high acceptance of students towards blended learning lays a foundation for the large-scale popularization of blended learning in colleges and universities [20].

Demographic features influence students' willingness to choose blended learning. On the one hand, compared with male students, female students are more inclined to choose blended learning. Some researchers have found that most female students work harder than male students in online learning and participate positively in online learning activities according to curriculum demands or teachers' suggestions [22], reflecting that female students may be better than male students in time management, learning initiative and participation in the learning process. Therefore, female students are more adaptable to blended learning and show a stronger willingness to choose this model. On the other hand, compared with students who have no experience in participating in blended learning, students with participation experience are more inclined to take blended courses. This research also shows that students' attitudes become more positive after participating in blended learning, and they have formed a clearer understanding of blended learning. Blended learning meets students' learning needs well. Students have experienced the learning effect of blended learning personally and achieved a high degree of satisfaction. This result conforms to the theoretical explanation of the impact of such factors as customer expectations, overall perceived quality and perceived value on customer satisfaction in the customer satisfaction index [23].

Students' cognition influences their willingness to choose blended learning. People who hold a positive attitude towards blended learning are more inclined to attend blended courses. Statistics in this study indicate that students who think that blended learning has a good effect, and have gained a lot from it are more inclined to choose blended learning in their future studies. The technology acceptance model can explain the phenomenon of college students' strong willingness to choose blended learning due to their high recognition of this mode. The model points out that the higher a person's recognition of the use of technology to improve their performance, the more inclined they are to use such technology [24]. Obviously, the cognition of blended learning will affect students' value judgment and future choices, which also confirms Ron Owston's research that students' attitude towards blended learning is closely related to their academic performance and curriculum choices [14].

The design of the curriculum structure will affect students' choice of blended learning. Whether the blended learning mode can achieve better teaching effect depends on the curriculum design. The only well-designed curriculum can attract students to participate in blended learning. The students' willingness to participate in different types of blended learning also depends on the curriculum design. The study finds that scientific and reasonable curriculum design is often favoured by students. In general, the students hold expectations towards blended learning to change the traditional learning mode. Students are fond of learning methods with flexibility, free time arrangement and

diversified curriculum resources. However, students do not want blended learning to increase their learning tasks and academic burden, which is a challenge to the reform of education. As Pirkko Jokinen and Irma Mikkonen argued, teachers have to consider the issue in curriculum design. Only the problems in curriculum design are solved can students more actively choose and participate in blended learning [25].

Students' learning needs can also affect their willingness to choose blended learning. The data shows that students tend to choose blended learning in the fields of major course learning, preparing for entrance examination such as postgraduate entrance examination or employment training. Through interviews, it is found that students tend to choose the face-to-face mode in language learning, and online mode in skills training, respectively. When students were choosing a learning mode, they will take the following factors into consideration: which field the knowledge belong to, the degree of mastery required, the time, effort and cost they need to invest, and the learning outcomes. Although students are more inclined to choose blended learning for their compulsory subjects, preparing for an entrance examination or employment training they may have different learning motivation. Student believe that face-to-face learning can effectively solve their puzzles and inspire them to think deeply through interaction with teachers when you study their compulsory subjects. However, Massive Open Online Courses (MOOCs) are rich and varied, and online courses can support repeated learning, which is conducive to mastering professional knowledge. When they need to prepare for the entrance examination and employment, students tend to choose blended learning model as the model seems to be more efficiently, and also hope to obtain practical experience and suggestions through face-to-face communication to help them make scientific and reasonable decisions. In language learning, students generally believe that the greatest difficulty lies in improving listening and speaking ability and practical application of language. Face to face learning method is more convenient for the effective interaction between teachers and students and helps students overcome obstacles in listening and speaking. For the skill training courses, students are more inclined to use the form of online learning because of its flexibility and avoidance of conflicts with daily learning activities and its fast-track to complete the courses within a short time.

6 Conclusion

This paper aims to analyze students' willingness to choose blended learning and its influencing factors. As an important measure to optimize the teaching environment, blended learning not only needs to consider the requirements of the government and the position of teachers but also needs to listen to the voice of students. In the process of education, students are no longer passive subjects and have the right to choose learning model. For colleges and universities, only when they truly understand the demands of students can they provide appropriate education modes. Therefore, it is necessary to analyze the demands for blended learning from the perspective of students.

According to the study, although most students have no experience in participating in blended learning and know a little about it, they generally have a positive attitude to the blended learning model. Compared with the traditional face-to-face learning, students believe that blended learning has a better effect and can benefit more from it, reflecting

that the students' expectation to change the traditional learning mode. The students' perceptions of significantly affects their willingness to choose the blended learning model. Students relatively admiring blended learning are more inclined to choose this mode in the future. Compared with online learning and traditional face-to-face classroom learning, blended learning can better meet the demands of students for compulsory courses learning, preparing for postgraduate entrance examination and employment. It should be pointed out that whether blended learning can achieve better effect depends on the design of blended courses. Therefore, the teaching reform of colleges and universities should be guided by the needs of students, scientifically design blended learning to improve the quality of education.

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