Students' choosing willingness on different types of blended courses and its influencing factors

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ABSTRACT

Promoting blended learning is the trend of teaching reform in Chinese universities. The construction of blended courses should be student-centered, in which the students' choosing willingness is of great significance. Based on summarizing the types of blended courses in colleges and universities in China, this paper analyzes the willingness of college students on different types of blended courses and the influencing factors. According to the research, faculty have different perceptions about the selection of online resources and the weight of online and offline courses in the process of blended course construction, and now, four types of blended courses have been formed in China. Students' willingness to choose different types of courses is affected by their perceptions of blended courses, curriculum design, and learning demands. In order to promote the role of blended courses in higher education, colleges and universities should scientifically design and reasonably adopt blended courses.

Keywords: Blended courses, curriculum design, teaching and learning

1. INTRODUCTION

In recent years, with the optimization of information technology and the prevalence of MOOCs, blended learning has become the trend of teaching reform in Chinese universities. For example, since 2013, Central China Normal University has implemented a blended learning model based on the H-Star that combines teaching with discussion, online courses with offline courses[1]. From 2015 to 2016, the faculty of 12 schools and departments in Peking University built a total of 27 blended courses based on MOOC[2]. In 2016, Tsinghua University launched Rain Classroom which rapidly became the most active intelligent teaching platform in China. The platform greatly facilitates teacher-student communication by sending learning materials, such as lecture notes, videos and other learning resources to students' mobile phones via WeChat, by making it[3]. In 2017, MOE of China encouraged universities to deeply integrate information technology with education and popularize the blended learning modes which combine online learning with offline learning[4]. In 2019, the MOE issued the "Implementation Opinions on the Construction of First-Class Undergraduate Courses", advocating the construction of high-quality blended courses, and will identify 6,000 national-level blended courses. With the support of national policies, Chinese universities have further promoted the exploration of blended learning.

Due to doubts about the actual effect of online learning, some universities have not shown great enthusiasm for blended learning. In early 2020, with the outbreak of the COVID-19 epidemic, China launched large-scale online education for hundreds of millions of students. Although there are many problems in the operation process, it has effectively replaced the traditional teaching model, and faculty and students' attitudes and understanding of online teaching have begun to change. Professor WANG Qiong, from Peking University, points out that online learning will become a new normal learning mode in Chinese universities, and blended learning is expected to become the mainstream learning mode in China[5]. Because of the differences in the understanding of blended teaching, faculty selection and use of "online" and "offline" resources are different, so the mode of blended teaching is also very different during practice[6]. Then, what types of blended courses currently exist in Chinese universities? Although the higher education reform in China aims to meet students' demands and promote their development, the blended learning practice often stems from the national policy orientation and faculty' individual practice, and students' voices are nearly ignored. Moreover, how about students' willingness on different types of blended courses? What factors may influence their choice in different types of blended courses? Therefore, this study analyzes students' preference for blended courses based on summarizing the types of

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blended courses in China's universities, to scientifically guide the teaching reform and improve the quality of talent cultivation.

2. LITERATURE REVIEW

There is no consensus on the concept of blended learning in academia. However, the term enjoys an increasing using frequency in the field of education[7]. It is widely believed that blended learning can realize the integration of multiple learning styles and the multi-directional extension of physical learning space, and achieve remarkable results in improving learning effectiveness, increasing access and flexibility, and improving cost effectiveness[8]. Only a few scholars believe that blended learning can also be a special mode of online learning. For example, Power (2008) proposed the concept of "blended online learning"[9]. Scholars often define blended learning as a combination of face-to-face and online learning[10]. Nevertheless, how to define it in combination with the operational level is very complicated. Ron Bleed argues that it is not an ideal model of blended learning to simply integrate "bolting" technology onto traditional courses for complex concepts teaching or knowledge supplementing. He advocates the combination of physical and virtual instruction to increase the interaction between faculty and students, students and students[11]. Some scholars believe that blended learning should be an integrated teaching method by combining offline learning with online learning in a valuable way[12]. Therefore, blended courses are not simply adding online courses to traditional face-to-face courses but an organic blend of online and offline courses. It is worth exploring how to design and construct blended courses.

Regarding the types of blended learning, universities and faculty have advanced various curriculum construction practices based on their understanding of blended learning. Osguthorpe and Graham (2003) identify three different modes of blended learning: learning-activities blending, where students can benefit from activities in both face-to-face classroom and online learning environment; students-students blending, which integrates students from the offline classroom with those choosing online learning; and faculty-faculty blending, where students in the offline classroom can get instruction from different faculty through online learning[13]. Horn and Staker (2015) argued that there are four most common blended learning modes. The rotation mode refers to how online learning modules are added to the traditional schooling model. The flex model involves learning course content and receiving instruction online, with some face-to-face instructions from faculty. Students take courses in a brick-and-mortar school in the self-blend mode through a fully online format with online faculty - a different element from that in the flex model. As for the enriched virtual model, in addition to compulsory face-to-face learning, students can choose to complete their courses online at any place[14]. According to the proportion of different learning methods in blended learning, Feng et al. (2018) divide the blended learning model into face-to-face driving mode, online-driving, and fully integrated learning. According to the adopted teaching method, the blended learning mode can also be divided into faculty teaching mode, student self-learning mode and faculty-student interacting/cooperating mode[15].

Regarding the implementation of blended learning, scholars have mainly examined it from different perspectives of administrators, faculty and students. Among them, the students' perspectives mainly contribute to the analysis of satisfaction with blended learning and its influencing factors. Sharafuddin and Allani (2011) find that students are highly satisfied with blended learning, and their satisfaction is closely related to the academic support provided by faculty, teaching materials, curriculum, e-book resources[16]. Based on Technology Acceptance Model and Information System Satisfaction Model, Lu et al. (2012) conclude that factors influencing students' satisfaction include the perception of blended system technology, faculty and course characteristics, and students' individual characteristics[17]. Li et al. (2016) constructed a hierarchical model of factors influencing student learning satisfaction in a blended learning environment and point out that learning motivation, learning atmosphere, and interactive behavior are the most direct influencing factors, with learning style, lead faculty, course assistant, platform function design, and student learning background as the most fundamental factors[18]. According to Zhang et al. (2020), most students are satisfied with blended learning and generally prefer to choose it in the future[19].

To sum up, scholars have conducted many studies on blended learning, but there is a lack of studies exploring the types of blended courses in Chinese, and few scholars contribute to the analysis of students' preference for different types of blended courses. On this basis, this study tries to explore the choosing willingness of college students on different types of blended courses and the influencing factors. Please follow these instructions as carefully as possible so all articles within a conference have the same style to the title page. This paragraph follows a section title so it should not be indented.

3. METHODOLOGY

3.1 Research design

In this study, a progressive hybrid research design is adopted. In Stage I, a small-scale qualitative research was conducted. Ten university faculty who have offered blended courses were interviewed on the blended course offerings, with the interview questions including: (a) Why do you plan to offer blended courses? (b) How do you design the blended courses? (c) What problems have you encountered during implementation? (d) Whether blended learning can improve student learning outcomes? (e) What policies does the university provide to support blended courses construction? (f) What suggestions do you have for blended courses construction?

In Stage II, a large-scale quantitative survey was conducted. Several types of blended courses are summarized based on the interviews with faculty in Stage I. At the same time, nine students were interviewed on their participation in the blended courses. Based on interviews, the research team developed a questionnaire with reference to the studies of Du[20] and Tong et al.[21]. The questionnaire consists of three parts and 31 items in total. In Part I, students' individual situation is investigated. In Part II, the items aim to examine students' cognition of blended learning, curriculum design and students' curriculum demands and their selection in learning methods. Part III mainly focuses on students' choosing willingness on different types of blended courses, with the item of "Which type of blended course do you prefer?"

3.2 Data collection and analysis

In January 2020, the research team at Beijing University of Technology distributed the questionnaires to universities nationwide via Sojump. A total of 1,903 valid responses were obtained, see Table 1 for details. This study is conducted among undergraduates and postgraduates from universities at different levels, including 23 universities involved in the "Double First-Class" Initiative, 44 "world-class" discipline universities and 106 general universities. Therefore, the sample is representative to some extent. The internal consistency reliability of the questionnaire is estimated by using Cronbach's alpha, with the overall alpha coefficient of the questionnaire being 0.951, indicating good reliability. According to KMO (Kaiser-Meyer-Olkin) and Bartlett sphericity tests, the KMO value of the scale is 0.985 (df=2,485, Sig=0.00<0.01), showing an excellent structural validity.

Table 1. Sample population variable distribution.

Variable		Frequency	Percentage	Variable		Frequency	Percentage
Gender	Male	771	40.5%	Major	Engineering	696	36.6%
	Female	1132	59.5%		Science, Agriculture or Medicine	193	10.1%
Class standing	Freshman	488	25.6%		Economics, Management Jurisprudence or Education	612	32.2%
	Sophomore	354	18.6%		Literature, History, Philosophy or Art	402	21.1%
	Junior	308	16.2%	University level	General universities	868	45.6%
	Senior	344	18.1%		"World-class" discipline universities	805	42.3%
	Postgraduate	409	21.5%		"World-class" universities	230	12.1%

With reference to relevant studies, the factors selected in this paper that influence college students' choice of different types of blended learning modes include individual characteristics, curriculum cognition, curriculum design, curriculum demand, etc., see Table 2 for the description of variable value.

4. RESULTS AND DISCUSSIONS

4.1 Main types of blended courses

The rapid development of information technology, the rise of intelligent teaching tools including Rain Classroom, MosoInk Cloud Class, and Ketangpai, and the construction of MOOC platforms such as Chinese University MOOC, Tree of Knowledge, and I-Course have provided technical support for the construction of blended courses in universities. As the pilot blended learning is advanced in universities, various types of blended teaching programs have emerged[22]. Previous interviews find that the emergence of different types of blended courses, on the one hand, stems from the significant differences in faculty' selection of "online" resources. Some faculty focus on the use of high-quality online resources to supplement the offline courses. Some mainly adopt intelligent teaching tools, such as Rain Classroom, to strengthen the interaction between faculty and students, attract students' attention, and improve students' participation. On the other hand, there are differences in the proportion and degree for blending "online" and "offline" components among faculty. Based on the practice in Chinese universities, the research group finds that blended learning mainly includes the following four types (see Table 3).

Type I: This blended teaching mode is dominated by traditional face-to-face classroom teaching. Faculty use Rain Classroom or other software to assist traditional classroom teaching, such as check-in, asking questions and collecting questions, and collecting students' homework. Through interviews, it is found that faculty mainly apply this mode to classes with many students. With the help of intelligent teaching tools, they can enhance effective communication and discussion between them and students, improve students' participation in class, attract students' professional interest, and motivating students to learn through process evaluation to improve the learning outcomes.

Type II: Online courses supplement this blended teaching model, students still study in the traditional classroom, faculty require students to watch online courses, preview or strengthen the learning of knowledge points in advance, and further expand the content of offline courses. This Type requires students to invest more time and higher learning initiative, particularly for students with more learning demands in professional fields to promote deep learning.

Type III: In this teaching model, traditional classroom teaching and online course learning account for half of each. Online courses are mainly for imparting knowledge, while offline courses focus on exploration and application. The offline part mainly includes group research, achievement display and test evaluation. It is conducive to cultivating students' core competencies, including communication and collaboration and innovative thinking, which can fully arouse students' learning enthusiasm.

Table 2. The variable value.

Construct	Variable	Items design
Demographic features	Student gender	Male; Female (benchmark)
	University level	"World-class" universities; "World-class" discipline universities; General universities (benchmark)
	Major	Literature, History, Philosophy or Art; Economics, Management, Jurisprudence or Education; Science, Agriculture or Medicine; Engineering (benchmark)
	Class standing	Postgraduate; Senior and above; Junior; Sophomore; Freshman (benchmark)
	GPA ranking	Top 10% = 1; 10%-25% = 2; 25%-50% = 3; The later 50% (benchmark)
	Elective experience	Have you participated in blended learning (not as a benchmark)
	Course type preference	Blended learning; Online learning; Offline learning (benchmark)
Course cognition	Teaching effects	Ditto
	Interaction effects	Ditto
	Learning gains	Ditto

Construct	Variable	Items design
Course Design	Course resources	Expanding curriculum resources (not as a benchmark)
	learning interest	Stimulating learning interest (not as a benchmark)
	Self-learning ability	Cultivating self-learning ability (not as a benchmark)
	Learning methods	Promoting the change of learning methods (not as a benchmark)
	Information technology capability	Strengthening information technology capabilities (not as a benchmark)
	Learning tasks	They are too heavy (not as a benchmark)
	Course difficulty	The courses online are difficult (not as a benchmark)
	Problem resolution	They are difficult to solve in time (not as a benchmark)
	Course arrangements	They are unreasonable (not as a benchmark)
Course demands	Major course learning	Do you need blended learning in this field? (not as a benchmark)
	Preparing for the entrance examination	Ditto
	Employment training	Ditto
	Language learning	Ditto
	Certificate examination guidance	Ditto
Willingness	Choosing willingness	Which Type of blended courses are you willing to take? Type V = 4; Type III = 3; Type II = 2; Type I = 1 (benchmark)

Table 3. Types of blended courses.

Type	Offline course	Online course	Intelligent teaching tool	Study time (compare with traditional face-to-face learning course)
I	●●●	○	▲	≥
II	●●●	●	△	>
III	●◐	●◐	△	=
IV	●	●●	▲	=

Notes: The number of ● represents the proportion of offline courses and online courses; ○ represents that few online courses may be used. ▲ represents intelligent teaching tools are adopted; △ represents few intelligent teaching tools may be adopted.

Type IV: This Type, of course, is dominated by online course learning, interspersed with a few offline courses, and faculty provide guidance and solve puzzles. Students mainly complete an entire course through an online platform. All curriculum

and teaching is delivered via online platforms, and offline tutoring and answering questions are provided occasionally for expansion and supplementation. Compared with other models, students selecting Type IV are more autonomous in learning, with the place, time and pace of learning mainly controlled by themselves, which highlights the dominant position of students in learning.

4.2 Willingness of college students on choosing blended courses

Regarding the types of blended course that students prefer to take, nearly 70% of students prefer face-to-face driver, among which 24.9% choose Type I, hoping that faculty use apps such as Rain Classroom to check-ins, ask questions or collect assignments; and 44.8% prefer Type II for the expansion of learning content through watching online courses; only 10.8% prefer Type IV. In addition, 19.5% of the students choose Type III. Most students are still willing to continue the traditional learning model and maintain limited expectations for new information technology and online courses. In order to further explore students' willingness to choose different types of blended courses, this study uses multiple logistic regression to analyze college students' choice intention. Type I is taken as the benchmark, and the other three types are compared with it, respectively. The log-likelihood value of the model is 3427.845, and the overall test is significant, with the results shown in Table 4.

Firstly, the students' choice in Type II or Type I blended learning are compared. According to the data, the situations in which students prefer to choose Type II includes compared with traditional offline learning, students believing the blended learning is better; students holding that the curriculum design in blended learning can effectively enrich curriculum resources and cultivate self-learning ability; students having greater demands for the instruction of specialized courses. The situations in which students prefer to choose Type I include: compared with traditional offline learning, students preferring online learning and holding that through blended learning, faculty and students can achieve better interaction; students believing that the learning tasks of blended learning are too heavy, online courses are challenging, problems encountered during learning are difficult to solve in time, and the curriculum design is unreasonable. Through comparison, Type I is featured with such advantages as strong interaction, improvement of students' classroom participation through intelligent teaching tools, and effectively activation of classroom atmosphere. However, Type II is more likely to enrich course resources and improve the learning outcomes.

Table 4. Multiple logistic regression analysis of students' choices on different types of blended courses.

Independent variable	Type II		Type III		Type V	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp (B)
Gender (Female as the benchmark)	.521	1.103	.412	.852	.824	.947
World-class discipline universities (General university as the benchmark)	.208	1.222	.990	1.003	.985	.995
World-class universities	.307	.789	.327	.750	.809	.917
Science, Agriculture or Medicine (Engineering as the benchmark)	.737	1.083	.727	1.108	.582	.807
Economics, Management, Jurisprudence or Education	.894	.976	.361	1.234	.866	1.049
Literature, History, Philosophy or Art	.728	1.074	.823	1.060	.113	.572
Postgraduate (Freshman as the benchmark)	.699	1.089	.324	1.313	.610	1.193
Senior	.933	.982	.179	1.422	.949	1.022
Junior	.470	.853	.515	.830	.197	.619
Sophomore	.527	.880	.853	.954	.280	.698
Top 10% (The later 50% as the benchmark)	.425	1.186	.493	.829	.235	.666
10%-25%	.353	.829	.229	.737	.174	.650
25%-50%	.450	.858	.792	.936	.647	.868

Independent variable	Type II		Type III		Type V	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Elective experience of blended courses (No as the benchmark)	.127	1.237	.534	1.114	.051	1.537*
Prefer online learning (Offline learning as the benchmark)	.008	.378***	.512	.762	.608	1.283
Prefer blended learning	.495	.880	.216	.730	.871	1.054
Online learning effect (Offline learning as the benchmark)	.891	1.056	.017	3.102**	.010	3.881***
Blended learning effect	.023	1.591**	.000	3.848**	.031	2.115**
Online learning interaction	.613	.857	.900	.953	.543	.762
Blended learning interaction	.007	.610***	.505	1.151	.794	.931
Online learning gains	.814	.920	.976	1.014	.184	1.904
Blended learning gains	.381	.835	.308	1.309	.821	.926
Expanding curriculum resources (No as the benchmark)	.000	2.243***	.324	1.221	.013	1.959**
Stimulating learning interest	.749	.950	.487	1.154	.141	1.488
Cultivating self-learning ability	.033	1.413**	.088	1.431*	.035	1.771**
Promoting the change of learning methods	.907	1.020	.086	1.438*	.067	1.669*
Strengthening information technology capabilities	.545	.892	.652	.896	.092	1.656*
Overburdened learning tasks	.017	.696**	.002	.557***	.065	.641*
Difficult online courses	.022	.711**	.893	1.025	.041	.612**
Untimely problem resolution	.046	.738**	.847	1.037	.311	.782
Unreasonable course arrangements	.025	.697**	.092	.709*	.762	.927
Major course learning (No demand as the benchmark)	.013	1.413**	.093	1.346*	.973	1.008
Preparing for the entrance examination	.804	1.035	.656	1.080	.692	.917
Employment training	.611	.933	.571	1.103	.760	.936
Language learning	.327	.872	.601	1.098	.381	.823
Certificate examination guidance	.190	1.209	.209	1.263	.008	1.869***
Constant	.366		.00		.00	

Note: *** indicates $P < 0.01$, ** indicates $P < 0.05$, * indicates $P < 0.1$; Type I as the benchmark.

Secondly, students' choice of blended course Type III or Type I are compared. The situations in which students prefer Type III include: compared with traditional face-to-face learning, students thinking that online learning and blended learning have better effects; curriculum design having the ability to effectively cultivate students' self-learning ability and promote the change of learning methods; students having a greater demand for the instruction of specialized courses. The situations in which students prefer Type I include: students believing that blended learning tasks are too heavy, the organizational form of courses is messy, or the curriculum design and arrangement are unscientific. The curriculum design of Type I is less different from that of traditional learning, with only intelligent teaching tools added. Comparatively speaking, the amount of learning tasks in Type III remains unchanged, with 50% in online courses and the other half in offline courses. However, the composite learning format of Type III is more appealing to students.

Thirdly, students' choice of blended course Type V or Type I are compared. The situations in which students prefer Type V include: having a participation experience in blended learning; compared with offline learning, students believing that

online learning and blended learning have better effects; curriculum design having the ability to expand curriculum resources, cultivate students' self-learning ability, promote the change of learning methods, and strengthen their ability to use tools such as network and new media; students having greater demands for the instructing of technical qualification certificate examination. The situations in which students prefer Type I include: students consider the learning tasks are too heavy and difficult to finish on time; online courses are challenging, and do not compatible with their learning bases. Type I applies intelligent teaching tools to traditional learning, which effectively enhances faculty-student interaction and ease the teaching process. Type V is dominated by online learning, with its advantages lying in flexible time arrangement, which highlights students' dominant position in the learning process. However, at the same time, it put forward higher requirements for self-learning and the ability to use information technology.

4.3 Analysis of factors influencing college students' choice of different types of blended learning

First, students' cognition affects their choice of different types of blended learning. If students believe that they can benefit from online learning, they are more inclined to choose blended learning dominated by online courses. Some students think that blended learning is more effective, but they are unwilling to choose the mode with intelligent teaching tools supplemented, because the teaching mode relying only on intelligent teaching tools cannot actually optimize the teaching effect while enhancing classroom interaction. Although integrating intelligent teaching tools into the traditional classroom learning model has improved interaction and participation, students don't think that curriculum resources can be effectively expanded. With the passage of time, its attraction may gradually fade. Therefore, technical means 't be regarded as the long-term solution to attract students' interest in learning, but enriched curriculum content for meeting students' learning demands will prevail.

Second, curriculum design may affect students' choose. A well-designed curriculum is more attractive to students to choose blended learning, while the poor-designed one will cut the possibility of students choosing blended learning. Curriculum design is also one of the decisive factors for students to choose different types of blended courses. According to the data, if the students are overburdened with learning tasks with great difficulties and dissatisfied with the unscientific content cohesion and poor faculty-student interaction in the blended learning, they will prefer Type I with the least blending of traditional face-to-face learning and online learning. Type I only uses intelligent teaching tools to simply upgrade and transform the traditional learning model, which has no significant difference with the traditional curriculum. If the course schedule can guarantee the free time arrangement and the flexibility of learning format, the students will be more inclined to choose blended learning with a more significant proportion lying in online courses. Students widely favor online learning because of its advantages of freedom, convenience, and openness, and if the curriculum design of blended learning can give full play to these advantages, the students' choosing willingness will be enhanced. Students are fond of learning methods with a more flexible learning style, freer time arrangement and more diversified curriculum resources, and without increase in learning tasks and academic burden. As Jokinen and Mikkonen mentioned that teachers need professional support in curriculum design[23]. Teachers' support is not an arbitrary activity. During the design of blended curriculum, in addition to considering the teaching contents, vital and complex knowledge, faculty should also consider students' learning situation, and adjust the design content based on students' characteristics and learning styles, to complete the teaching activities designed by faculty with high quality.

Besides, the actual demands of students also influence their willingness. In terms of curriculum demands, students hope to adopt Type II and Type III in their specialized courses learning, that is, based on traditional face-to-face learning, they want to improve their learning effect by effectively expanding the curriculum resources and strengthening curriculum flexibility enabled by attending online courses. Students' reluctance to take online learning dominated mode may result from their needs for faculty-student interaction, which is the soul of the learning experience and an essential factor influencing the learning effect. Most students have a poor interactive experience in online learning, so they prefer the blended learning, with a large proportion lying in offline courses. According to the Theory of Transactional Distance, dialogue, structure, and autonomy are the three significant factors that affect the interaction between faculty and students in online learning[24]. In online learning, technology facilitates the communication between faculty and students; E-mail and interactive communication platform not only improve the level of interaction but also shorten the transactional distance between faculty and students. However, the spatial separation between faculty and students cannot enhance students' perception of the interaction in a blended curriculum. This may reflect students' psychological dependence on the physical space of faculty-student interaction. In the case of technical qualification certificate examination tutoring, type V dominated by online learning is widely preferred by students owing to the flexibility of scheduling and the more targeted course content for examinations.

5. CONCLUSION

Blended learning is one of the hot topics in China's teaching and learning reform. According to the survey, the blended learning modes in Chinese universities can be roughly divided into four categories with different characteristics. The effectiveness of blended learning depends on whether the curriculum is scientifically designed. The construction of a blended learning is not a simple addition and subtraction of online resources and offline resources. Only through deep integration of high-quality online courses and offline courses can achieve an optimal learning effect. Therefore, scientific design of blended courses will be an inevitable trend of teaching reform in universities. Besides, the blended learning model shall be made good use of for a better effect. Different types of blended learning modes can satisfy various learning demands of students. As a result, faculty should choose the appropriate blended learning mode from students' perspective and the needs of schools to maximize the use efficiency of education resources, and universities should scientifically design and adopt blended learning mode.

ACKNOWLEDGMENT

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