



A Study of Factors Influencing College Students' Engagement in Blended Learning

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Abstract. With the continuous development of information technology, college education is also in the constant process of reform and innovation. Owing to the great improvement of Internet technology, blended teaching has been rapidly developed in colleges and universities. This paper measures college students' engagement in blended learning and the factors influencing it based on the theoretical model of learning engagement. By the use of SPSSAU software analyzing the data, it was evident that college students' engagement in blended learning was inefficient, with cognitive engagement lower than affective engagement and behavioral engagement. It is found that teaching design, teaching organization, teaching interaction, and academic self-efficacy all significantly influenced college students' engagement in learning.

Keywords: blended learning · model of learning engagement · information technology · data analysis

1 Introduction

Information technology is gradually integrated into every link of education and teaching in colleges and universities, supporting the innovation of teaching and learning, and promoting the reform of teaching. As a teaching mode that combines the respective advantages of classroom teaching and online learning, mixed learning has gradually become the new normal of higher education [1].

Learning engagement is “the sum of students' behavioral engagement and psychological engagement in learning activities”. The concept of learning engagement can be traced back to the 1930s. Educational philosopher Ralph Tyler proposed the concept of “Time on Task” in his research, pointing out that the more time students devote to learning, the more knowledge they will learn. In 1982, Peath put forward the theory of Quality of Effort, which further pointed out that we should pay attention not only to the length of time students devote to study, but also to the degree of concentration of students, that is, we should pay attention to both the quality and quantity of study input. At present, there is no consensus on the definition of learning engagement in academia. In this study, blended learning engagement is defined as the continuous positive state exhibited by learners in the complex process of engaging in online and offline

learning activities and maintaining interactions with others, which be manifested in the dimensions of behavioral engagement, cognitive engagement, and affective engagement [2]. Learning engagement is both an important indicator of the quality of the student learning process and an important factor affecting student learning outcomes. As an indirect method of value-added evaluation, learning engagement can be used to predict the outcome of value-added by measuring the variable of learning engagement, and thus learning engagement can be used to reflect the quality of education in colleges and universities.

For the definition of mixed teaching, scholars mostly express it from the perspective of improving teaching effect and teaching model. Driscoll, a foreign scholar, has made a comprehensive elaboration on the term “blended teaching”. He believes that the “mixed” in this model contains three levels: the mixture of multiple educational technologies and non-educational technologies; Any form of educational technology combined with face-to-face teaching; A combination of educational techniques and specific work tasks. The representative definition in China is the one proposed by Professor Li Kedong: Blended teaching is a teaching method that adds online learning to face-to-face teaching, improves teaching efficiency while reducing teaching costs, and provides services for learners. In addition, Professor Hogg believes that mixed teaching can combine the advantages of our traditional classroom teaching and the advantages of network teaching. In the process of mixed teaching, it can not only give full play to the leading role of teachers’ supervision, but also cultivate students’ learning autonomy and creativity. Professor Li Jiahou believes that blended teaching is an integrated teaching method that optimizes, selects and recombines all teaching elements, including teaching objects, teaching methods, teaching strategies and teaching evaluation, so as to achieve teaching objectives.

2 Theoretical Model of Research

Many researchers attempted to explore the research model of blended learning engagement based on their own understanding of the connotation of engagement. Ma Jing constructs a multidimensional model of learning engagement in a blended learning environment through an empirical research method, and proposes that the learning engagement in a blended teaching environment includes six dimensions of active learning, teacher-student interaction, group collaboration, strategy use, self-management, and emotional engagement [3]. Hu Chun proposed a learning engagement degree model of the blended teaching model, taking perceived usefulness and perceived pleasure as the two direct influences on learning engagement degree and perceived gain as the output of learning engagement degree [4].

Community of Inquiry (CoI) is composed of three interrelated elements: social presence, cognitive presence and instructional presence. It is an effective learning framework in online learning and blended learning environment, and can create profound and meaningful learning experience process through these three elements. Specifically, social presence can be defined as “the ability of learning participants to project their personal characteristics into the community in order to present themselves to other participants as real people”. Cognitive presence refers to “the extent to which learners construct meaning through continuous reflection and communication in a critical inquiry community”.

Instructional presence, on the other hand, is “the realization of meaningful and valuable learning through the design, promotion and guidance of cognitive and social presence”. The existence of teaching includes three sub-dimensions: instructional design and organization, facilitating interaction and direct instruction. More and more data studies prove that learners’ perception of teaching existence is related to learners’ learning satisfaction and learning results. Joo et al. pointed out that the existence of teaching has a positive correlation with the learning satisfaction of learners, and the existence of teaching indirectly affects the persistence of learning. Similarly, Khalid and Quick pointed out that learners’ perceived teaching presence is positively correlated with course satisfaction.

Guided by exploring the existence of teaching, one of the core elements of community theory, this study constructs the dimensions of teaching existence in the model of influencing factors of college students’ mixed learning involvement through the dimensions of teaching design and organization, direct guidance and promoting interaction in the existence of teaching.

In terms of learning engagement theory, Astin (1991) proposed the I-E-O (Input-environment-outcome,) model [5]. As shown in Fig. 1, the I-E-O model is an assessment research model to analyze the quality of learning, with its core idea of assessing the “output” by means of “environment” and “input”. According to Astin, assessing the quality of learning requires a comprehensive consideration of three aspects: student input, educational environment, and student output. Specifically, student input refers to students’ personal characteristics at the beginning of learning, including demographic characteristics, academic and social experiences, and family background; educational environment refers to students’ perception process of the learning environment or their own learning experiences during the learning process; and student output refers to students’ achievement of learning goals and progress in ability.

By referring to the existing literature on factors influencing learning engagement, this paper examined four major elements: teaching design, teaching organization, teaching interaction, and academic self-efficacy. The specific model of influencing factors is shown in Fig. 2.

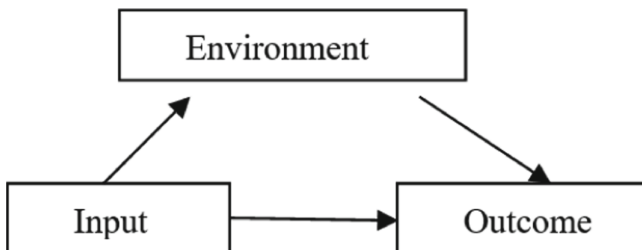


Fig. 1. I-E-O model

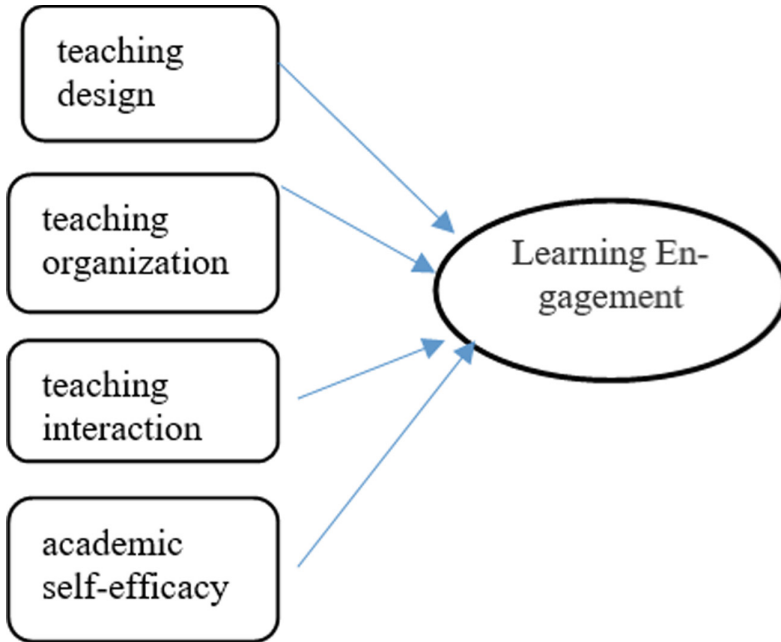


Fig. 2. Model of factors influencing learning engagement Learning Engagement

3 Materials and Methods

The research targets on the college students from freshmen to senior students, who have at least two months of blended learning experience. Since the research covers most majors and grades of the school, the sample is representative.

The questionnaire is designed in two parts. On one hand, it is used to measure students' blended learning engagement in three dimensions: cognitive engagement, affective engagement and behavioral engagement in blended learning. The scale is referenced from Fredricks' Classroom Learning Engagement Scale, which uses a Likert scale to classify learning engagement on a 5-point scale from "never" to "always". There are four items of behavioral engagement, four items of cognitive engagement, and four items of affective engagement. On the other hand, the factors influencing students' engagement in blended learning are examined in terms of four aspects: teaching design, teaching organization, teaching interaction, and academic self-efficacy on learning engagement.

The survey was conducted through Sojump to distribute questionnaires, lasting from May to June 2022. In the end, 351 questionnaires were collected, and 14 invalid questionnaires were removed, with 96 percent of questionnaire efficiency rate. The specific information of the research object is shown in Table 1.

Table 1. Information of the research object

Item	Option	Frequency	Percentage (%)
Gender	Female	222	65.88
	Male	115	34.12
Grade	Freshmen	46	13.65
	Sophomore	91	27
	Junior	56	16.62
	Senior	144	42.73
Registration	Rural	196	58.16
	Urban	141	41.84

4 Data Analysis

The reliability of the blended learning engagement scale was analyzed by SPSSAU software. The standardized Cronbach α coefficient of the questionnaire was 0.889, and the KMO value was 0.877, which shows good reliability and validity.

4.1 Descriptive Statistical Analysis of Learning Engagement

SPSSAU software is used to analyze the results, as shown in Table 2, which is mainly reflected in the following points.

First, the performance of students' blended learning is general.

In the descriptive statistical analysis in Table 2, the scores of each item generally ranged from 3 to 4, between "average" and "relatively engaged". The highest score was 4.3018 for "I will complete the online tests assigned by the teacher", which means that most students will complete the online tests assigned by the teacher. After the interviews, it is learned that students generally take the test assignments seriously as they will be related to their usual grades in the subject. The second highest score is "I will watch the teacher's live course completely" with 3.92 points, which means that most students will participate in live online learning. After the interview, it is found that students have basically gotten used to the teacher's live broadcast. And the fact that

Table 2. Descriptive statistical analysis of learning engagement

Variable	N	Minimum	Maximum	Average	Deviation
Cognitive engagement	337	1	5	3.347	0.88
Affective engagement	337	1	5	3.457	0.91
Behavioral engagement	337	1	5	3.814	0.91
Learning engagement	337	1	5	3.539	0.89

many teachers interact with students in the live broadcast plays a supervisory role for students to participate in live learning.

Second, the cognitive engagement is relatively low.

In the descriptive statistical analysis of learning engagement in Table 2, the mean cognitive engagement was 3.347, the mean affective engagement was 3.457, the mean behavioral engagement was 3.814, and the overall learning engagement was 3.539. The average cognitive engagement is the lowest, and in the whole questionnaire test, the two lowest scores “I will apply the learned theories and methods to solve practical problems” and “I will connect the new knowledge with the original knowledge” are both cognitive engagement, with scores of 3.1 and 3.2 respectively. After the interview, it is learned that students can basically participate in the blended teaching and learning process, but for most of them, learning mostly stays at a superficial level. They spent less time on in-depth learning of knowledge and skills, lack of deep thinking, which made the score of cognitive engagement relatively low.

4.2 Comparative Analysis of Differences

From Table 3, it can be seen that from the gender perspective, the mean value of female students' learning engagement is higher than that of male students, which may be caused by the fact that there are more majors in literature and history than in science and technology in this university. Thus, there are more female students than male students, who are more practical and self-disciplined in the process of blended teaching and learning.

From the perspective of the original household registration before enrollment, the students with urban household registration is slightly higher than rural household registration in terms of learning engagement. The reasons may lie in that students with urban household registration have a relatively better educational background and better study habits.

From the perspective of grades, there is no significant difference in the learning engagement average. Because of the epidemic, students in all grades have had a rich blended teaching experience and have basically developed relevant habits, so there is not much difference in learning engagement in terms of grade level.

Table 3. Comparative analysis of learning engagement

Gender	Female		Male	
Learning engagement average	3.614		3.433	
Original registration	Rural		Urban	
Learning engagement average	3.479		3.643	
Grade	Freshman	Sophomore	Junior	Senior
Learning engagement average	3.572	3.586	3.533	3.522

Table 4. Correlations analysis

	Learning engagement	
teaching design	Correlation coefficient	0.430**
	p value	0
teaching organization	Correlation coefficient	0.396**
	p value	0
teaching interaction	Correlation coefficient	0.400**
	p value	0
Academic self-efficacy	Correlation coefficient	0.355**
	p value	0

* $p < 0.05$ ** $p < 0.01$

4.3 Analysis of Factors Influencing Learning Engagement

As seen in Table 4, the correlation coefficient value between teaching design and learning engagement was 0.430, showing a significance at 0.01, thus indicating a significant positive correlation between teaching design and learning engagement. The value of the correlation coefficient between teaching organization and learning engagement was 0.396, showing a significance at 0.01, thus indicating a significant positive correlation between teaching organization and learning engagement. The correlation coefficient value between teaching interaction and learning engagement was 0.400, showing a significance at 0.01, thus indicating a significant positive correlation between teaching interaction and learning engagement. The value of the correlation coefficient between academic self-efficacy and learning engagement was 0.355, showing a significance at 0.01, thus indicating a significant positive correlation between academic self-efficacy and learning engagement.

5 Conclusion and Suggestion

The data analysis shows that the performance of blended learning engagement of college students is general, especially cognitive engagement. Teaching design, teaching organization, teaching interaction, and academic self-efficacy all affect students' blended learning engagement. In order to improve students' engagement in blended learning, the following suggestions are put forward.

5.1 Improve Teachers' Teaching Design Ability

Teachers should fully recognize the characteristics and differences between online and offline learning, in order to carry out targeted teaching design. Combining the characteristics of the course and the cognitive level of students, they should design classroom teaching and offline extension in a reasonable way. In the process of teaching, teachers can learn more from other experienced colleagues.

5.2 Enhance the Frequency of Teacher-Guided Interaction

Teachers can encourage students to express their opinions more often, by discussing online, liking or evaluating other students' responses. By giving guidance to each group leader, the group leader can drive each group member to actively participate in the discussion. Teachers should also strengthen their academic guidance to students. During the teaching process, they should ask students who have difficulties in their studies more and guide them to deepen their understanding of knowledge.

5.3 Improve Teachers' Teaching Organization

Teachers can combine the differentiated needs of students in the process of teaching organization, so that students with strong learning ability can learn contentedly and students with poor acceptance ability can learn properly. When course assessment is conducted, the assessment basis should be refined. We should not only examine the learning results of students, but also pay attention to the learning process of students.

5.4 Enhance Students' Academic Self-efficacy

Teachers should give more positive feedback to students during their learning process to enhance their confidence and self-efficacy, which will increase students' engagement in learning. Teachers can verbally praise, show in class, encourage progress and other ways to make students feel successful in learning. Students can mobilize their sense of self-efficacy after getting positive incentives from teachers.

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