Research on the Deciding Factors of Blended Learning Effect of Law Students under the Background of Metaverse

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Abstract:
The concept of the metaverse has had a significant and far-reaching impact on the reform of higher education, and blended learning is completely in line with the concept of the metaverse. Especially for law students, thanks to the rapid update of legal knowledge, the need for blended learning is often more urgent. Thus the blended learning approach will have a significant and far-reaching impact on the students, and even have a path-dependent effect on their knowledge acquisition after graduation. Therefore, the study of the blended learning behavior of law students is necessary. Based on the technology acceptance model and the integrated technology acceptance model, this research mainly focuses on the influence of different factors on the blended learning of law students. At the same time, an equation model of blended learning for law students is constructed according to the data analysis of SPSS, in an attempt to reveal what factors will have an impact on law students and provide guidance on blended learning for law students.

Keywords: *Metaverse; Blended learning; Learning effect*

1. INTRODUCTION

Since the 21st century, with the continuous development of Internet technology, the trend of deep integration of information technology and education is increasingly obvious. The concept of the metaverse will have a great impact on the reform of education. Blended learning is an in-depth learning method that combines online and offline learning using Internet resources under the effective guidance of teachers. Blended teaching can help effectively overcome stubborn problems existing in the traditional teaching mode, and can also help avoid and overcome some drawbacks of purely online learning, therefore playing an important role in higher education of law. Blended teaching fits well with the concept of the Metaverse. In the context of blended learning, learning channels and learning resources are increasingly diversified compared with traditional offline learning. Today, when Internet technology has penetrated into the daily life of ordinary people day by day, blended teaching has natural advantages. For this reason, students' blended learning behavior under the guidance of teachers plays a very important role in achieving learning outcomes. There are three main variables for the achievement of the blended learning effect, i.e., students' capability in self-management, teachers' external monitoring ability, and students' motivation for self-learning.

2. LITERATURE REVIEW

On the basis of in-depth reflection and summary of online learning, foreign educational technology scholars put forward the concept of blended learning, which was first applied to the field of corporate training and gradually extended to higher education. Judging from the latest research on blended learning abroad, blended teaching has attracted a lot of attention from scholars. Several researchers have studied the development of blended teaching using bibliometric and content analysis. Learning effect is the most concerned and popular topic by researchers, (Charles, 2017) [1] found that the research on learning effect accounted for 28.2%, (Graham, 2006) [2] found that in the past ten years, studies related to learning effects accounted for 52.3% of doctoral dissertations. Foreign scholars mainly measure and evaluate the effect of blended learning from the aspects of academic performance and learning satisfaction. The results of numerous studies have shown that students are in favor of blended learning, with a high overall learning satisfaction, and that blended learning

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can significantly improve students' learning outcomes. The University of California launched a 14-course trial of blended instruction, which has shown some instructors and administrators that blended instruction works better than traditional lectures and that teachers and students have more time in the classroom for activities such as question and answer sessions, practices, and discussions. An online survey of blended learning was conducted by the Association for the Study of Learning Technologies at Temple University among college students from nine U.S. universities who were participating in blended learning. The results showed that 57% of students were willing to choose blended learning courses again. A quasi-teaching experiment was used to compare the effectiveness of blended courses with traditional courses. The results showed that students have positive attitudes towards blended courses and high satisfaction, but there is no significant difference in academic performance, knowledge retention, satisfaction, and attitudes; research (Henry, 2015) [3] has suggested that in blended teaching, we should not only focus on the technology used but also the way technology is used to promote interaction with deeper cognitive processes and content. Kanka (2004) [4] studied the relationship between blended learning course perception and course performance from four aspects: blended learning overall satisfaction, learning acquisition, learning engagement, and perception of learning outcomes; the results of the study showed that all four aspects were highly correlated with academic performance, and that students with good better academic performance found blended courses more convenient and engaging, had higher course satisfaction, and higher willingness to continue learning compared to students with poor performance. Meyer et al. (2014) [5] conducted a survey among 232 college students participating in a blended course, the results of which showed that computer self-efficacy, learning performance expectations, platform functions, learning content features, and interaction were the five factors that affected satisfaction with blended learning, and computer self-efficacy, platform functions, and learning content features had a significant impact on learning performance expectations, and interaction had a significant impact on learning climate. There are also some inconsistent studies. Austin (2013) [6], in *The Curriculum is Curriculum: Factor Invariance of Student Assessment in online, Blended, and Face-to-face Learning Environments*, analyzed student assessments of different instructional modalities using large sample data, and the results showed that different modalities did not affect student evaluations of the course experience, and that the course, content, instructor, and learning atmosphere were the main factors affecting the course experience. Many existing studies have analyzed the quality of blended learning by measuring and analyzing students' performance (e.g., test and exam scores) and learning satisfaction before and after engaging in blended learning. These findings show the great potential of blended learning and provide some rationale for its adoption by administrators and teaching practitioners. However, as the studies mostly used questionnaires and fewer interpretive studies, the findings cannot be used to provide guidance for blended instructional design and specific teaching practices. In the future, the learning effect will be the main research topic of blended learning, and scholars should pay more attention to further studying how to carry out instructional design to improve the effect of blended teaching.

3. METHODS

This study is based on the TAM model and the UTAUT model, supplemented by behaviorism learning theory and cognitivism learning theory, and constructs a structural equation model to study the mixed learning behavior of law students. Smartpls and SPSS software were used for data analysis to explore the internal and external influence mechanism of mixed learning behavior and provide some guidance for the mixed learning of law students.

3.1 Theoretical basis

The understanding of "the essential feature learning" in behaviorist learning theory is that learning is the change of explicit behavior and the reinforcement of response, and learners show certain behavioral responses or changes under particular environmental conditions or stimuli. The most typical study is the "stimulus-response-reinforcement (S-R)" theory proposed by Sandecker and Skinner and other representatives of behaviorism, the teaching under the guidance of which focuses on students receiving instruction from the teacher and displaying externally expected learning behaviors to achieve desired learning goals. Learning under the guidance of behaviorism learning theory is a kind of receptive learning. Cognitivism learning theory breaks through the traditional framework of behaviorism and shifts to the cognitive study of learners' internal thinking process. From the perspective of Cognitivism learning theory, learning is regarded as a process in which learners proactively build or change a cognitive structure through cognitive operations, the essence of which is to establish and develop an internal cognitive structure. In addition to behavioral changes, learning is also a cognitive development process of individual learners, which is manifested in the development of knowledge, skills, abilities, understanding, views, or attitudes. The result of learning is to obtain a method that consistent is with the objective world, so as to acquire knowledge and apply it to solve problems. The teaching under the guidance of this theory focuses on the students receiving the teaching instructions from the teacher, showing the learning behavior expected by the teacher, and achieving the expected learning goals. Understanding general principles in the process of problem-solving so that one

can apply the knowledge learned to solve new problems. On the one hand, students should acquire knowledge through learning methods and strategies to develop their own cognitive ability; on the other hand, they should understand and reflect on knowledge through social interaction to make knowledge practical. Blended learning is a learning model developed on the basis of cognitivism. Bloom's taxonomy of cognitive learning objectives, revised in 2002, analyzes the types and processes of learning acquisition from the perspectives of "knowledge classification" and "cognitive process". He specifies the four types of knowledge that might be addressed by a learning activity: factual, conceptual, procedural, and metacognitive. The cognitive hierarchy from lower order to higher order is to remember, understand, apply, analyze, evaluate and create. The lower levels of learning cognitive include remembering, understanding, and applying; while the higher levels of learning cognitive include analyzing, evaluating, and creating. At the same time, cognitivism learning theory also attaches great importance to the individual's internal learning willingness, learning motivation, and initiative. Once learners are motivated by internal motivation in learning, they tend to actively use cognitive strategies, set goals independently, understand task requirements, acquire new knowledge, and show more responsibility and learning continuity in the learning process, so as to carry out personalized deep learning.

3.2 Research model

This model is the combination of the TAM model and the UTAUT model as shown in Figure 1. The model includes four variables: perceived ease of use, perceived usefulness, learning atmosphere, and interaction factors, which jointly affect the willingness and effect of blended learning of law students. Antecedent variables directly affect outcome variables. Perceived ease of use and perceived usefulness are two intermediate variables, the interaction factor is the leading variable, and the learning atmosphere is the antecedent variable of the interaction factor. Introducing self-restraint as a moderating variable, self-restraint, and self-expectation interact with the desire for mixed learning. Finally, characteristic variables, such as gender, age, and grade, are taken as external variables of the whole model to establish the final model.

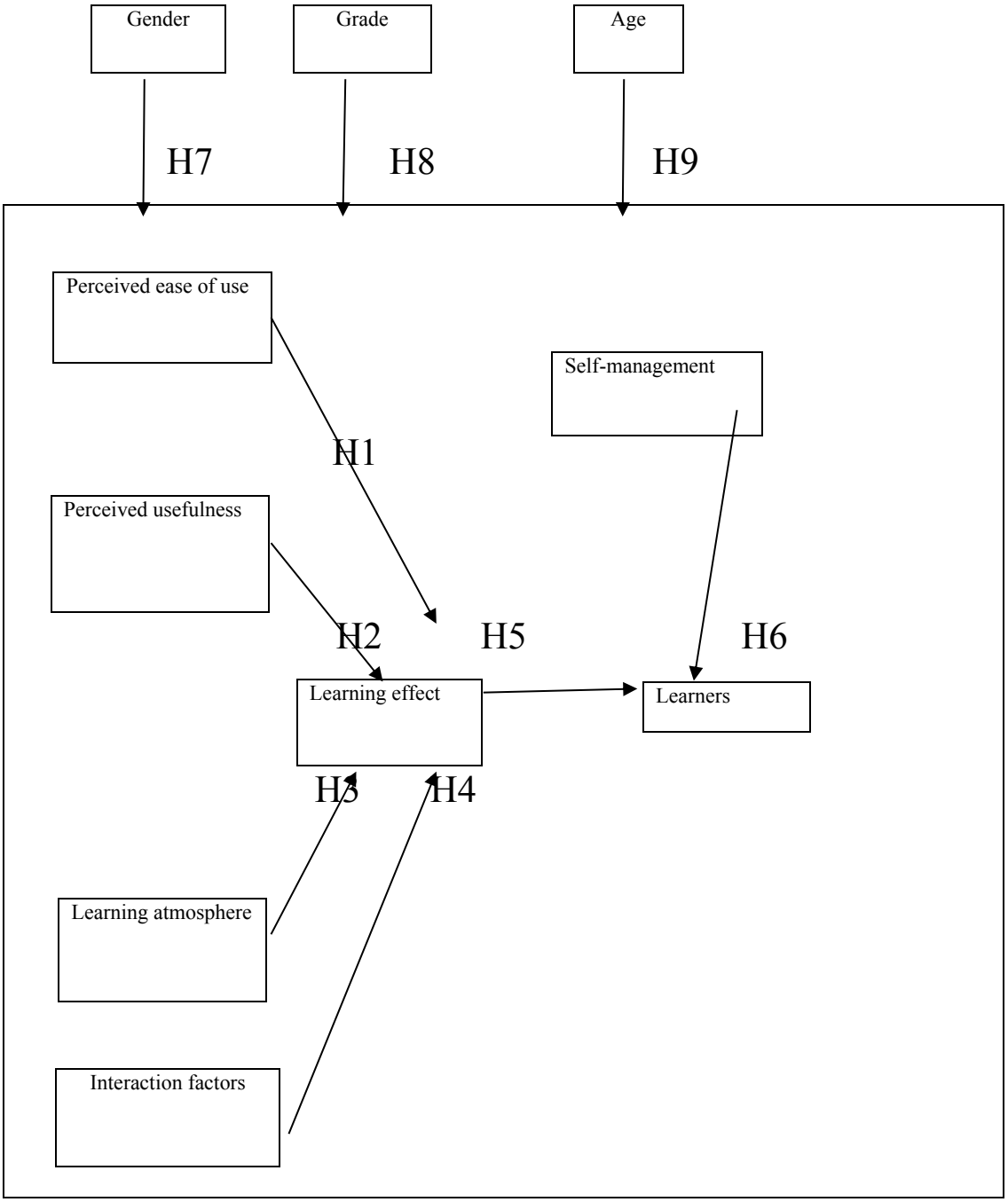

Figure 1 Blended learning effect model for law students

3.3 Hypothesis

By extracting the influencing factors of the AM model and the UTAUT model and the four important variables, the following hypotheses are proposed based on relevant assumptions.

The impact of cognitive theory on mixed Learning Behavior:

H1: Learners' perceived ease of use of the blended learning platform has a positive impact on the learning effect;

H2: Learners' ease of use of the blended learning platform positively affects the learning effect;

H3: Learners' learning atmosphere on the blended learning platform has a positive impact on the learning effect;

H4: The interaction factors of learners using the blended learning platform have a positive impact on the learning effect;

H5: The characteristics of learners have a positive impact on the learning effect of blended learning;

H6: Learners' self-management positively affects their learning intention;

H7: Learners' gender affects the learning effect of mixed learning;

H8: Learners' gender affects the learning effect of mixed learning;

H8: The grade of learners affects the learning effect of blended learning.

3.4 The research methods

The questionnaire design method. A total of 218 questionnaires were collected, including 200 valid cases. The questionnaire is divided into three different sections. The first part is the introduction, which is to ensure the privacy of the questionnaire. It also provides participants with an introduction to blended learning, including descriptions of blended learning. The second part of the questionnaire is designed to obtain the relevant variable data about learners for future analysis. The third part was the design observation variables corresponding to each affecting variable. Participants were required to rate a complete list of designed questions, for which the Likert' scale was used (1 = totally disagree, 5 = totally agree). Group the questions with the structure of each measurement. The larger the number of students involved in the survey, the more realistic the results are.

The modeling method. The structural equation is used to test the research model. Structural equation modeling (SEM) is a method to establish, estimate and verify causal relationship models. Compared with the traditional regression analysis, the structural equation analysis can handle multiple dependent variables and compare and evaluate the effects of different factors on blended learning. Given that the sample size is greater than 200, the number of factors is 7, and the data shows there are differences, SEM is considered suitable for this study. The measurement tool used for sampling in this study is an online questionnaire, which is consistent with the mode of blended learning. It is designed based on pre-involved measurement variables and has been modified and validated in previous studies by other scholars.

The statistical analysis method. An online questionnaire was used to collect the corresponding data, which was analyzed using data analysis software (SmartPLs2.0 and SPSS24). Various methods were used to effectively study the data, and the structural equation model and path analysis were modified. An in-depth analysis of the various elements of blended learning and the specific path that affects the blended learning effect of college students, combined with the problems found by other scholars in their process of research, is an important part that affects the effect of blended learning, and a reasonable and effective strategy is constructed and proposed.

4. CONCLUSIONS

This study examines the impacts of age variables, gender variables, and teacher guidance on blended learning for college students.

4.1 Measurement model evaluation

A reliability analysis is required for the relevant scales used in this study.

I. A model was built in SmartPls2.0 and calculations were carried out to obtain three measurement indexes: Average Variance Extraction (AVE), Composite Reliability (CR), and Cronbach Alpha (Cronbach Alpha), the reliability of each is tested to measure part of the questionnaire, if AVE>0.4, CR>0.6, Cronbachs alpha>0.6, that means the questionnaire is highly reliable. The greater the value, the higher the reliability. It can be seen from Table 1 that there are only two measurement items whose coefficients are not greater than 0.6 but close to 0.6. Therefore, it does not affect the overall reliability of the scale. The scale used in the study was highly credible.

Table 1 Establishment of reliability and validity

Hypothesis	The mean value	Composite reliability	Cronbach's alpha
Perceived ease of use	0.64	0.84	0.72
Perceived usefulness	0.6	0.82	0.67
Learning atmosphere	0.66	0.89	0.82
Interaction factors	0.69	0.87	0.76

Learning effect	0.69	0.87	0.77
Learners	0.56	0.84	0.74
self-management	0.65	0.85	0.82
Gender	0.76	0.82	0.72
Grade	0.61	0.9	0.76
Age	0.63	0.84	0.72

The validity was tested using smartpls and the aggregated data are shown in Table 2. In the Loading value table, the value of each item is greater than 0.5 and is greater than other values in the table, indicating that the overall validity of the questionnaire is good; loading the value under one item that is greater than other values in the same row, indicating that the questionnaire of the item has good discriminant validity.

Table 2 Confirmatory factor analysis

	PEU	PU	LA	IF	LR	L	SM
PEU1	0.86	0.85	0.66	0.76	0.66	0.86	0.86
PEU2	0.82	0.72	0.82	0.82	0.82	0.82	0.82
PEU3	0.72	0.62	0.72	0.72	0.72	0.72	0.62
PU1	0.24	0.44	0.24	0.24	0.24	0.24	0.24
PU2	0.3	0.43	0.3	0.3	0.3	0.3	0.3
PU3	0.31	0.31	0.31	0.31	0.31	0.31	0.31
LA1	0.38	0.38	0.38	0.48	0.38	0.28	0.38
LA2	0.39	0.39	0.39	0.39	0.39	0.39	0.39
LA3	0.35	0.35	0.35	0.35	0.35	0.35	0.35
IF1	0.38	0.38	0.28	0.37	0.28	0.38	0.38
IF2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
IF3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
LR1	0.38	0.38	0.28	0.38	0.38	0.28	0.38
LR2	0.34	0.34	0.34	0.34	0.34	0.34	0.44
LR3	0.32	0.32	0.32	0.32	0.42	0.32	0.32
L1	0.42	0.42	0.42	0.52	0.42	0.42	0.42
L2	0.42	0.42	0.42	0.42	0.42	0.32	0.42
L3	0.37	0.37	0.27	0.37	0.27	0.37	0.37
SM1	0.26	0.26	0.26	0.26	0.26	0.26	0.26
SM2	0.26	0.26	0.26	0.26	0.26	0.26	0.26
SM3	0.31	0.31	0.41	0.32	0.31	0.34	0.31

The square root value of AVE in Table 3 is larger than other values in the same column, which also suggested that the questionnaire has good discriminant validity.

Table 3 Construction of reliability and validity

	Perceived ease of use	Perceived usefulness	Learning atmosphere	Interaction factors	Learning effect	Learners	self-management
Perceived ease of use	0.86						
Perceived usefulness	0.24	0.44					
Learning atmosphere	0.38	0.38	0.38				
Interaction factors	0.38	0.38	0.28	0.37			
Learning effect	0.38	0.38	0.28	0.38	0.38		
Learners	0.42	0.42	0.42	0.52	0.42	0.42	
self-management	0.26	0.26	0.26	0.26	0.26	0.26	0.26

4.2 Analysis of main effects

Figure 2 shows the values for each key impact indicator. The relationship between perceived usefulness, perceived ease of use, learning atmosphere, and interaction behavior variables is obvious, which is fully consistent with the assumptions of the TAM theory; the deciding factors of the two variables extracted from the UTAUT theory could not significantly affect (T < .95) the blended learning effect (assuming H1 was invalid). That is probably because mobile devices have become very popular among college students, and students were relatively young when they first came into contact with mobile devices, thus this kind of factor does not have a significant impact on the learning effect; learner characteristics in perceptual theory do not affect (T<1.95) learning outcomes (assuming H5 is false) and is not a key factor in affecting blended learning outcomes. Positive effects of variables in blended learning theory are evident.

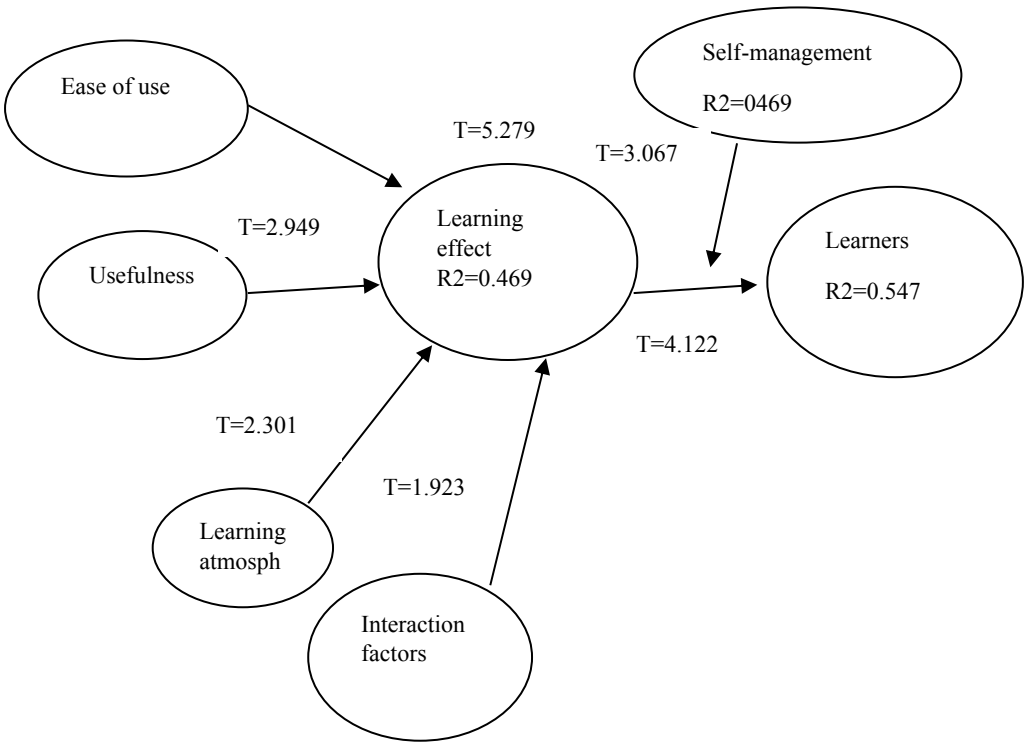

Figure 2 Path estimation based on SmartPLS analysis

4.3 Adjustment effect analysis

As shown in Figure 3, there is a significant moderating effect of teacher's instruction on the relationship between willingness to use and blended learning behavior (T>2.575, **p<0.001). The effect between willingness to use and blended learning behavior increases when teachers have excellent guiding skills; when teachers' guidance ability is weak, the relationship between willingness to use and blended learning will be weakened.

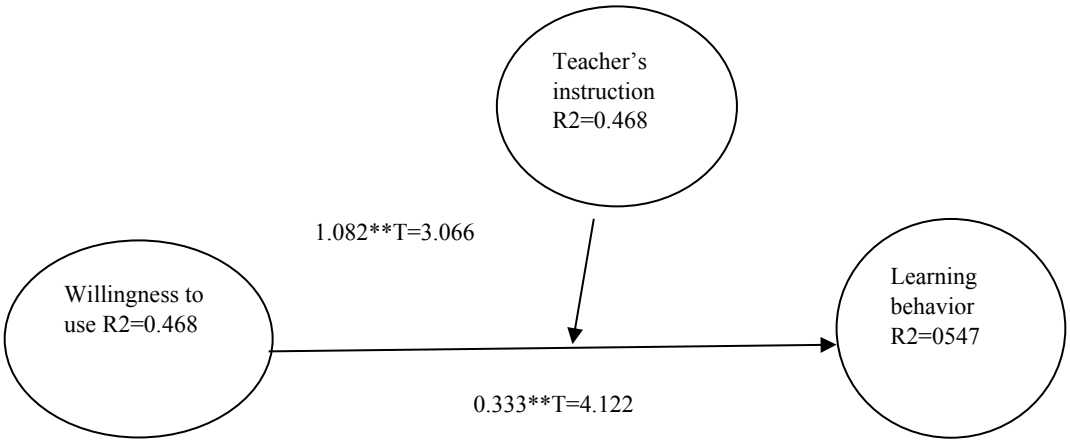

Figure 3. Analysis diagram of adjustment effect

4.4 Mediating effect analysis

As can be seen from Table 4, behavioral intentions partially mediate the impact of perception. The influence of usefulness, perceived ease of use, and learning atmosphere and interaction factors on blended learning behavior fully mediates convenience and perceived risk of autonomous learning behavior. Learning motivation moderates the impact of self-monitoring on self-management to some extent. Perceived ease of use partially moderated the effect of perceived usefulness on behavioral intention.

Table 4. Results of mediation test

Independent variable	Mediator	Dependent variable	Path coefficient				Mediation existence
			IV→DV	IV→M	IV+M→DV		
					IV→DV	M→DV	
PU	LR	L	T=12.753	T=8.270	T=4.812	T=10.045	Partial
PE	LR	L	T=9.744	T=8.353	T=4.313	T=11.346	Partial
LA	SM	L	T=8.735	T=10.262	T=1.914	T=12.047	Partial
IF	LR	L	T=6.756	T=8.456	T=1.615	T=11.248	Partial

4.5 Gap analysis

The test of difference is to study the difference sample test, chi-square test, and one-way ANOVA of variables in different dimensions through independent methods. In this analysis, the independent sample test and one-way ANOVA were used primarily based on the characteristics of the data. This software analyzed the data by spss24. In terms of gender and major, the results of the significance test of the difference in each variable are significantly greater than 0.04, so the null hypothesis cannot be rejected, suggesting that there is no difference between students of different genders and majors in each variable. From the perspective of age, among the 12 dimensions, there are only two dimensions enabling conditions and self-ability. The significant differences in test results are 0.026 and 0.022 which are significantly less than 0.05, indicating there is an age difference in management. Therefore, assuming that Hb is true, according to the results of multiple comparisons, we can see that the condition of contribution is age, and 18-25 years old is greater than 26-30 years old. This result shows that the younger the learners were when they were influenced by Internet technology, the more attention they would receive in blended learning. Likewise, in terms of self-management, older age has less impact on blended learning behaviors. The reason is that most of the students under the age of 18 are freshmen who have just

taken the college entrance examination. Due to the influence of high school learning factors, they do not have a deep understanding of blended learning and are still accustomed to the knowledge imparting teaching method in high school; at the same time, because of the fundamental difference between the study of professional courses during college and high school, many students need a period of time to familiarize themselves with the learning process of college, which will also affect the effect of blended learning. Meanwhile, with a more relaxed regime and constraints of students during the university period than that in high school, the time spent on learning will be less, resulting in the learning effect may be reduced.

Only the perceived ease of use differed in the hierarchy as the significant difference test result is 0.026, which is significantly less than 0.05. From the results of multiple comparisons, we can see that the perceived ease of use is more obvious in the grade variable, the second-grade students are better than the first-grade freshmen, the third-grade students are better than the second-grade students, the fourth-grade students are better than the third-grade students and so on. Based on this result, it can be observed that the higher the grade level, the more familiar the students will be with the various functions of the Studypass platform and this will also make them more proficient in using blended learning. And the Studypass platform is more user-friendly in operation and is convenient, which will encourage students to use it. Female students put more effort into the blended learning process than their male counterparts, and therefore achieve better learning outcomes than their male counterparts.

5. DISCUSSION

This study examines multiple factors that affect the blended learning effect of college students, such as teacher guidance variables, perception variables, and self-direction. Some hypotheses are not valid, but most hypotheses are supported by data. Through the analysis of the data, some thought-provoking conclusions have been drawn. Firstly, this study confirms that the instructor's instructional behavior is an important constraint factor on the learning effect of blended learning. While blended learning emphasizes the need to change the traditional teacher-centered delivery model to a student-centered learning model where the entire teaching and learning process is transformed into the self-learning of students, we have found that instruction from teachers, or interaction, plays a crucial role in the achievement of learning outcomes. Teachers are not an optional presence. On the contrary, they play an indispensable and important role in students' case discussions, exercise discussions, and learning direction guidance. And teachers' answering of students' questions in blended learning also plays an important role in the learning effect. Therefore, it is of great practical significance to strengthen the capacity development of teachers in blended learning. This kind of ability training is not only the training of the Studypass platform technology but also the training of teaching content and teaching organization under the background of blended teaching.

Secondly, it should be noted that we have also found that the learning effect in blended learning depends largely on the learner's willingness to learn. With a high willingness to learn, we can see a higher completion rate of learners in terms of completing tasks and the chapter tests on the Studypass platform. And its regurgitation ratio will be higher, the students will be more involved in the deep learning, and the accuracy of the completed chapter tests will be higher, too. Therefore, their learning outcomes are better than those of students who are less willing to learn. The self-management ability of learners is also very important, some learners are willing to learn but they cannot complete learning with high quality due to their poor self-management ability, thus failing to achieve better learning results.

Thirdly, we have found that the blended learning effect varied in different grades. The effect of blended learning among the first-and second-grade law students is not very satisfactory because they are new to the blended learning model and methods due to the influence of their high school learning patterns. Conversely, the third- and fourth-grade students, who have already acquired initial blended learning skills after a period of time, can be able to achieve better results, indicating that the grade factor is more influential than other factors in the model. The factor of the learning atmosphere also has a great influence on the effect of blended teaching. Under the influence of a good learning atmosphere, the learning effect of the learner will be significantly improved. On the contrary, under the influence of a relatively poor learning climate, the learning effect of the learner will be significantly reduced, indicating that the learning atmosphere factor is an influential factor in the model, too.

In the meantime, there are certain limitations of this study. First, our data collection was conducted at Shandong University of Political Science and Law, and the only major surveyed was the law major. Since blended teaching is implemented in basically all majors, future research should continue to study the problems faced by other majors in blended learning as different majors have different disciplinary characteristics, and there may be other different factors that affect the blending effect of learning. Second, questionnaires may be subject to sampling bias. The participants in this study were mainly law students, who were more engaged in the course and more willing to participate in blended learning. Although the students who participated in the survey all engaged in blended learning, these samples may not be

representative of students in all majors. Future studies can further confirm whether the results of this study can be evenly distributed to other user groups.

Third, it draws on two theories of technology acceptance of TAM and UTAUT. Other related theories may be adopted in future studies, such as TPB, SOR, etc., to guide the investigation of blended learning effects among college students. Finally, we included three demographic variables in the model to test the differences. For future research, we can focus on other demographic variables to expand the depth and breadth of our study.

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