The Impact of Teacher Innovation Expectations on Blended Learning Usage Behavior : Usage Intention as a Mediator

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Abstracts

This study explores the mediating role of teachers' intention to use blended teaching mode between teachers' performance expectations and usage behavior. We used the teacher's use intention scale, teacher's use behavior scale, and performance expectation scale to construct the structural equation model and the research hypothesis equation model. The three scales have been revised by experts and confirmatory analysis, and have good reliability and validity. and fit. Electronic questionnaires were distributed to six colleges and universities in Jilin Province, China using scientific and valid scales, and 889 valid questionnaires were finally recovered. The analysis results show that teachers' performance expectation is a positive predictor of usage behavior, and usage intention plays a partial mediating role between usage behavior and performance expectation. Therefore, improving teachers' performance expectations can improve teachers' use behavior of blended teaching mode. At the same time, it is concluded that performance expectations have a positive impact on usage behavior through usage intentions. Schools should promote the use of blended teaching models by increasing intention to use.

Keywords: Application-oriented Undergraduate; Blended Learning; Performance Expectation; Usage Intention; Usage Behavior

Introduction

Affected by the epidemic in recent years, the application of platforms such as Moodle, Blackboard, MOOC, Lanmoyun, and Chaoxing has promoted the development of online education, and teachers and students have gradually adapted to information-based teaching methods and methods. In the post-epidemic era, teaching has returned to offline, and the online-offline hybrid teaching mode already has a certain technical foundation and application foundation. Blended teaching not only has the advantages of face-to-face organization and management of students by traditional classroom teachers, but also can make full use of the advantages of high-efficiency and high-quality information-based teaching. With the support of professional teaching software, it has broad development space. However, in the promotion process, teachers play the most important role, and the acceptance of teachers directly affects the promotion process of blended teaching.

Applied undergraduate education is a new type of education formed with the development of science and technology and the transformation of higher education from elite education to popular education. It is "relative to theoretical undergraduate education and practical technology education". Compared with ordinary colleges and universities, its teaching content, teaching requirements, student characteristics and teacher experience all have their particularity. Therefore, the acceptance of blended teaching by teachers in applied

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undergraduate colleges is studied, and the model of influencing factors for blended teaching acceptance is constructed. It is of great significance for the advancement and development of the blended teaching mode in applied undergraduate colleges and universities to analyze and give reasonable suggestions.

Literature Review

1.1 Blended Teaching

Blended Teaching evolved from Blended Learning, and was first used in employee training in large foreign enterprises in the last century, aiming to improve the overall quality and technical level of employees. Later, this new teaching idea gradually attracted the attention of the educational circles. He Kekang believes that the so-called blended teaching is to combine the advantages of traditional learning methods with the advantages of E-learning. Li Fengqing believes that "blended teaching refers to the application of appropriate media technology at the appropriate time to provide resources and activities that are in line with the appropriate learning environment, so that appropriate students can develop appropriate abilities, so as to achieve optimal teaching effects. teaching methods".

Kiviniemi concluded from a study of the impact of blended teaching methods on student performance in graduate public health courses that blended teaching is an effective means to optimize student learning and improve student performance in health science courses. Lee et al. discussed the impact of blended digital learning on taxation learning in higher education. In their study, they divided the subjects into three groups: traditional learning group, blended learning group, and completely online learning group. The results showed that students in the blended learning group achieved higher academic performance than the other two groups, while there was no difference between the traditional learning group and the fully online learning group.

Among the many models, most of the studies only do theoretical induction and deduction, and theoretically propose model construction and learning strategies, but do not conduct empirical research and analysis with sufficient evidence. Among them, teachers are the designers, organizers and evaluators of blended teaching. Exploring teachers' attitudes and acceptance of blended teaching has become a crucial issue. This is the key to whether colleges and universities can successfully carry out blended teaching and ensure its quality. A key step is also related to its future development prospects, and there are still very few studies in this area.

1.2 Application-oriented Undergraduate Universities

Applied technology-based undergraduates refer to general undergraduate colleges that focus on applied technology rather than academic ones, and are relatively different from academic undergraduates. Application-oriented undergraduate education has played a positive role in meeting China's economic and social development, meeting the needs of high-level applied talents and promoting the popularization of China's higher education.

In order to improve the innovation ability of engineering practice of applied undergraduates, a diversified practice teaching platform including a school-enterprise joint construction practice platform and an industry-university-research innovation base has been built through the deep integration of industry-university-research, and a multi-level three-dimensional practice teaching system has been constructed. Practice has proved that the deep integration of industry-university-research, which integrates practical teaching, innovation and entrepreneurship, technology research and development, and industrial cultivation, not

only realizes the cultivation of engineering practice and innovation ability of college students, but also improves the teaching ability of young teachers and promotes " Construction of double-qualified teachers.

Excellent technology and strong operational ability will be new requirements for applied undergraduate teachers. Under this circumstance, the blended teaching mode will be a better choice of teaching method. Now for traditional teaching and online teaching. Blended teaching can more effectively guide students' practical ability.

1.3 Research on Teaching Acceptance

As one of the leaders in the classroom, the teacher's acceptance of a certain technology or a certain teaching mode has a great impact on whether it can be widely used in the field of education.

Pynoo et al. (2011) designed three teaching experiments in one school year to investigate the main factors that affect middle school teachers' acceptance of digital learning environments. The experimental results show that performance expectations and community influence can be predicted to a greater extent. Teacher acceptance. Chen et al. (2012) conducted a survey on primary school teachers in Taiwan and found that the use of digital museums can significantly increase teachers' interest in teaching. Lin Junrong et al. (Lin et al., 2013) compared the differences in the factors affecting the acceptance of campus broadcasting between teachers and students through experiments, and found that for students, hard work expectations are more valued factors, while for teachers, Enabling conditions are even more important. Tosuntaş et al. (2015) used the UTAUT model to investigate the influencing factors of teachers' acceptance of interactive electronic whiteboards, and found that performance expectations, effort expectations, and community influence have a positive impact on behavioral intentions. The behavioral intention and enabling conditions have a positive impact on the use time of the interactive electronic whiteboard. Lu Xing et al. (2011) took the teaching network of Peking University as a case to explore teachers' acceptance of blended learning, and at the same time, took cognitive usefulness and cognitive ease of use as intermediate variables to explore technical characteristics, teacher characteristics, curriculum The impact of the five dimensions of characteristics, subjective norms and service quality on teachers' acceptance of blended learning. Gao Feng (2012) investigated the adoption of online teaching methods by teachers in four colleges and universities including Peking University, and found that performance expectations, effort expectations, and community influence have a positive impact on usage intentions, and are affected by factors such as gender and online teaching experience. background effect. Zhang Hanyu et al. (2015) investigated the acceptance of electronic schoolbags by primary and secondary school teachers, and found that performance expectations, effort expectations, community influence, and enabling conditions all have a positive impact on acceptance, but each factor has no effect on different genders and ages. Significant differences. Zhang Si et al. (2016) investigated the influencing factors of primary and secondary school teachers' use of online learning space, and found that effort expectations have no significant impact on behavioral intentions, and teaching age has a negative background effect on performance expectations.

The acceptance of blended teaching by college teachers refers to the attitude and acceptance of college teachers to the new teaching mode of blended teaching. The higher the "teaching acceptance" of university teachers, the more willing they are to carry out blended teaching activities at the spiritual or practical level. Especially in application-oriented undergraduate colleges, teachers' tasks, teaching methods, and students are all unique. The

previous research results will have great reference significance for this study.

This study focuses on performance expectations and discusses its important role in blended teaching activities. Based on the above discussion, we propose the following hypotheses:

Hypothesis H1: Performance expectations have a significant positive impact on teachers' willingness to accept blended teaching, that is, "PE→UI".

Performance expectations mean that teachers in applied undergraduate colleges believe that the blended teaching model can help them achieve better teaching results. When college teachers feel that their work efficiency or work effect can be improved and improved through blended teaching, they are more willing to accept blended teaching. Therefore, in this research model, the relationship between "performance expectation" and "intention to use" is predicted, and the hypothesis H1: performance expectation has a significant positive impact on teachers' willingness to accept blended teaching, that is, "PE→UI"

Based on the above discussion, this study hypothesizes that performance expectations have a significant impact on teachers' acceptance of blended instruction.

The acceptance of blended teaching by college teachers refers to the attitude and acceptance of college teachers to the new teaching mode of blended teaching. The higher the "teaching acceptance" of university teachers, the more willing they are to carry out blended teaching activities at the spiritual or practical level. That is to say, teachers' intention to use blended teaching will affect their use behavior. Especially in application-oriented undergraduate colleges, teachers' tasks, teaching methods, and students are all unique. The previous research results will have great reference significance for this study. Based on the above discussion, this study proposes:

Hypothesis H2: Teachers' intention to use blended teaching plays a mediating role between using behavior and performance expectations

Studies have proved that there is a significant direct correlation between individual behavioral intentions and actual behaviors, and the correlation coefficient is as high as 0.63, indicating that individual usage intentions can strongly explain actual usage behaviors. presented in this study. If the effect is significant, we will attach great importance to improving teachers' intention to use it in the future.

Research Methods

Research Tools

1) User usage behavior (Usage Behaviour, UB)

The technology acceptance model initially takes the user's acceptance of information technology as the outcome variable of the research model, and believes that the user's use behavior will be affected by the user's willingness to use. Davis FD's research in 1989 proved that there is a significant direct correlation between individual behavioral intentions and actual behaviors, and the correlation coefficient is as high as 0.63, indicating that individual usage intentions can strongly explain actual usage behaviors, so there are many scholars The behavioral intention is directly examined as the dependent variable.

2) User usage intention (Usage Intention, UI)

User intention indicates the extent to which teachers are willing to use the blended teaching mode. This study believes that college teachers must first have the intention to use blended teaching to produce corresponding teaching behaviors, and the intention to use is the most direct and main influencing factor for teachers to adopt blended teaching behaviors.

Also using intention as a mediator variable, influenced by community influence, performance expectations, effort expectations and innovation expectations.

3) Performance Expectancy (PE)

The performance expectation among the influencing factors of teachers' acceptance of blended teaching in applied undergraduate colleges and universities refers to the degree to which teachers believe that blended teaching can improve teaching effect. Performance expectations can correspond to perceived usefulness in the TAM model. Only when teachers think that the adoption and application of blended teaching mode can promote their work performance will they really accept it and apply it well. Performance expectation is also one of the important variables in UTAUT model.

3.3 Reliability Test

In terms of the reliability of each variable, if the overall Cronbach's α coefficient of the variable is above 0.8, it means that the reliability of the scale is very good; between 0.7-0.8 means that the reliability is good; between 0.6-0.7; the reliability is acceptable; and This value is below 0.6; indicating poor reliability. It can be seen from Table 1 that the overall reliability coefficients of each variable are all above .862, indicating that each variable item has good reliability and consistency.

Table 1 Analysis of questionnaire items

	Question number	Extreme group comparison	Correlation detection			Overall α for each variable
		Decision value- -CR value	The question items were related to the total score	Total score was correlated after correction	α value after deleting questions	
		≧3.0	≧.400	≧.400		
Performance expectations	Performance Expectations 1	24.247	.785**	.677	.905	.908
	Performance Expectations 2	30.655	.820**	.707	.901	
	Performance Expectations 3	34.464	.910**	.852	.869	
	Performance Expectations 4	33.243	.901**	.836	.872	
	Performance	30.257	.857**	.774	.886	

	Expectations 5					
Use intention	Intention 1	32.390	.930**	.841	.843	.906
	Intention 2	35.361	.927**	.837	.847	
	Intention 3	25.519	.900**	.766	.908	
Use behavior	Behavior 1	27.997	.877**	.725	.819	.862
	Behavior 2	32.354	.898**	.749	.799	
	Behavior 3	34.462	.883**	.747	.801	

Note: The correlation is reached in the table***p ＜0.001。

3.4 Confirmatory factor analysis

Confirmatory factor analysis was used to further verify the construct validity of the design variables in this study. Confirmatory factor analysis mainly depends on whether the fitting index of the measurement model meets the standard, which indicates that the validity of the scale is good. Indicators were used to comprehensively evaluate the results of confirmatory factor analysis. Fitting indicators include: χ2/df, RMR, RMSEA, GFI, CFI, TLI, IFI. Among them, when χ2/df is between 1-5, it means that the model fit is good (χ2/df is greatly affected by the sample size, and generally the results cannot explain the fitting of the overall model). When GFI>0.8, CFI, TLI, IFI>0.9, PNFI, PCFI>0.5, and RMR less than 0.08 and RMSEA less than 0.10, it indicates that the model fits well. For detailed indicators and judgment criteria, see the questionnaire reliability and validity test results table. After the model fitting index is satisfied, it is necessary to observe whether the factor loading of each item on each dimension of the scale is greater than 0.5. When it is greater than 0.5, it indicates that each item has a good representativeness in each dimension.

Table 2. Results of the confirmatory factor model fitting

Quantitative statistical inspection	metric	standard value	Identification results	Model adaptation judgment
	χ^2	The smaller the better	1381.230	-
	χ^2/df	＜ 5.000	6.278	inconformity
Absolute matching indicators	RMR	≤ 0.500	.029	accord with
	AGFI	≥ 0.800	.886	accord with
	RMSEA	≤ 0.100	.077	accord with
Incremental matching index	NFI	≥ 0.900	.902	accord with
	RFI	≥ 0.900	.887	inconformity
	IFI	≥ 0.900	.916	accord with
	TLI	≥ 0.900	.903	accord with
	CFI	≥ 0.900	.916	accord with
Streamline matching	PNFI	≥ 0.500	.784	accord with

indicators	PCFI	≥ 0.500	.796	accord with

It can be seen from Table 2 that the confirmatory factor model fits well, and most of the fitting indicators meet the standards. In addition, the confirmatory factor loads of each topic on the corresponding dimension are all 0.62 or above. Therefore, the three variables designed in this study Has good construct validity.

Research Framework

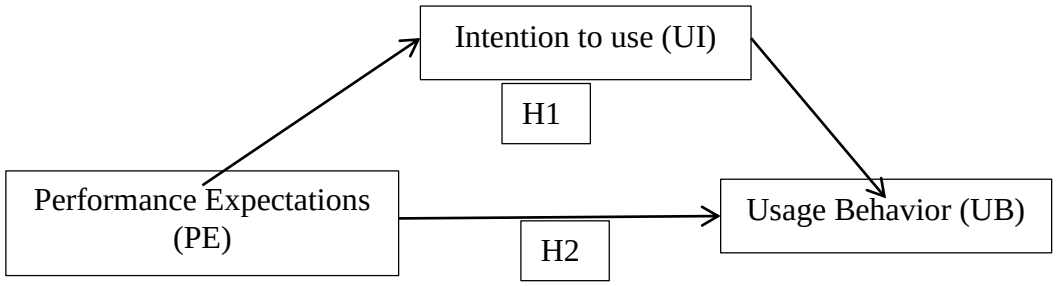

Figure 1. Research Hypothesis Framework

Research Results

1. Common Method Sheet Bias

The self-report method was used to collect data in this study, which may have common method bias effect. Therefore, the Harman single factor test method was used to diagnose the common method bias that may appear in this study. If a factor is extracted or the explanation rate of a certain factor is particularly large, it can be judged that there is a serious common variance bias. Factor analysis showed that there were 3 factors with characteristic roots greater than 1 without rotation, and the first factor variance explained 34.410% (<40%), so there was no obvious common method bias.

2. Correlation Analysis

Table 3 shows the overall correlation coefficient of each variable. It can be seen from the table that innovation expectations are significantly positively correlated with use intentions and use behaviors, that is, the higher the scores of use intentions and use behaviors are for the teachers' innovation expectations. There is a significant positive correlation between usage intention and usage behavior, that is, the higher the teacher's usage intention, the higher the usage behavior score.

Table 3: The correlation matrix of the individual variables

variable	*M*	*SD*	Performance expectations	Use intention	Use behavior
Performance expectations	2.387	0.681	1		
Use intention	2.247	0.628	.474**	1	
Use behavior	2.493	0.655	.444**	.577**	1

3. Structural equation modeling

It can be seen from Figure 2 that when the main effect of performance expectation on usage behavior is tested alone, the positive and significant predictive effect of performance expectation on usage behavior is .51 (t=13.806, p<.01). Demonstrate the relationship between performance expectations and usage of what should be.

Structural equation modeling is used to test this model, in which performance expectation is the independent variable, use intention is the intermediate variable, and use behavior is the outcome variable to build a model. The whole model fits well ($\chi 2$=259.911, df=41, $\chi 2$/df=6.339, RMR=.0.23, AGFI=.917, RMSEA=.078, TLI=.958, CFI=.969), see the detailed path coefficient Figure 3 and Table 4.

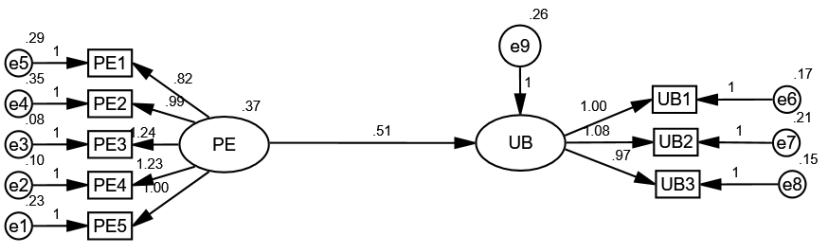

Figure 2 The structural model diagram of the main effect of performance expectation on usage behavior

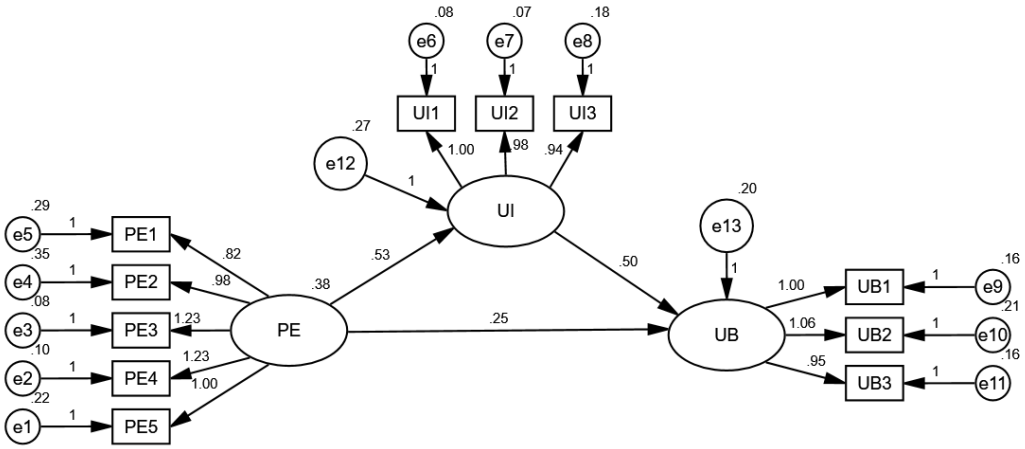

Figure 3 Structural Model Diagram of Performance Expectation, Use Intention and Use Behavior

4. The mediating effect of intention to use

It can be seen from Table 4 that the confidence interval estimates of the overall effect, indirect effect and individual indirect effect of performance expectation on usage behavior do not contain 0, indicating that their parameters are all statistically significant. The overall impact of performance expectations on usage behavior is .519, the direct impact is .252, and the indirect impact is .267. The direct effect of performance expectation on usage behavior is reduced to .252, and it is significant at the 95% confidence interval. The total effect, direct effect and indirect effect of performance expectation on usage behavior indicate that usage intention partly mediates the relationship between professional identity and academic achievement. effect. Therefore, research hypothesis two (H2) is established.

Table 14 Path coefficient table

Total, direct, and indirect effect	Path Coefficien	Bias-Corrected		Percentile	
		Lower	Upper	Lower	Upper
Total effect（PE→UB）	.519***	.439	.605	.429	.602
Direct effect（PE→UB）	.252***	.153	.357	.142	.352
Indirect effect（PE→UB）	.267***	.220	.320	.219	.319

Discussion

The higher the teachers' performance expectations, the higher the intention to use blended teaching, which is consistent with previous research. Especially in application-oriented undergraduate colleges and universities, more emphasis is placed on practical teaching. Traditional offline teaching or pure online teaching cannot achieve good teaching effects, and the popularity of blended teaching has significantly improved the teaching effect of such schools. promote. This research shows that improving teachers' performance expectations can significantly improve the use intention of blended teaching. The work efficiency of teachers is improved through blended teaching, which naturally makes teachers like to accept new things and new teaching modes, which has a significant impact on whether teachers can carry out blended teaching mode well. This has a positive effect on the promotion of blended teaching.

Teachers' intention to use blended teaching plays a mediating role between teachers' performance expectations and blended teaching use behavior. High performance expectations of teachers will increase teachers' use intention, and the increase of use intention will also lead to the improvement of teachers' use behavior.

Research proposal:

The research shows that performance expectations have a positive and significant impact on teachers' intention to use blended teaching in colleges and universities. How teachers' intention to use blended teaching mode can really be transformed into usage behavior makes the blended teaching mode in application-oriented undergraduate colleges be well received. Implementation and development is a problem. Through the modeling and verification of the relationship between teachers' performance expectations, use intentions and use behaviors, this study has obtained that teachers' performance expectations are an important factor affecting teachers' use intentions, and teachers' use intentions are related to performance expectations and use behaviors. play an intermediary role. Therefore, improving teachers' intention to use and developing teachers' performance expectations are effective ways to implement teachers' use behavior of blended teaching mode.

As an exploratory study, the shortcomings of this study are: the model and ideas need to be further improved; teachers' acceptance of blended teaching and its influencing factors are a dynamic process that requires long-term follow-up research; the research is only in Jilin Some colleges and universities in the province carry out blended teaching, which affects the applicability of the conclusions, and a wider range of research can be considered in the future.

Conclusions

1) Performance expectations have a significant positive impact on the behavioral intention of college teachers' blended teaching

Performance expectation refers to whether teachers can improve their work performance through the blended teaching mode in teaching, and its performance lies in whether the learning effect of students is improved or whether the blended teaching mode is compatible with their own teaching ideas. When the teacher's work effect, efficiency, and effectiveness are improved, it will have a positive impact on the teacher's intention to use it. This shows that teachers in applied undergraduate colleges want to improve the teaching effect, and the key lies in the teachers' own performance expectations. Only when teachers' performance expectations are improved can they have a positive effect on the problem.

2) Teachers' intention to use blended teaching has a significant impact on actual use behavior, that is, "UI → UB"

Studies have proved that there is a significant direct correlation between individual behavioral intentions and actual behaviors, and the correlation coefficient is as high as 0.63, indicating that individual usage intentions can strongly explain actual usage behaviors. presented in this study. If the effect is significant, we will attach great importance to improving teachers' intention to use it in the future.

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