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# The Impacting Factors of College Students' Willingness to Use the Online Education- an Example of Jiujiang University

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**Abstract:** Online education has many advantages, but many college students have never used the online education. Therefore, it is necessary to study the impacting factors of willingness to use the online education. In this paper, samples are collected in full-time college students of Jiujiang University. The theory of planned behavior is expanded by introducing perceived usefulness and perceived ease of use. The model of willingness to use the online education is established. Reliability analysis, validity analysis, confirmatory factor analysis and structural equation model testing are conducted by Amos20.0 and Spss17.0. The results show that: firstly, perceived usefulness and perceived ease of use of online education have a significantly positive effects on attitude; secondly, attitude, subjective norm, perceived behavioral control have a significantly positive impact on willingness to use the online education.

**Keywords:** online education, the theory of planned behavior, willingness to use, structural equation modeling

## 1. INTRODUCTION

Since the beginning of 1990s, the rapid development of modern information technology has brought about great changes of learning mode. Network as a emerging teaching medium breaks the traditional constraints of time and place. Students are able to enjoy the fun of learning anytime and anywhere. Universities in china are actively introducing the online education to build a new teaching mode, which can not only play a guiding role of teachers, but also fully embody the main role of students' learning. However, the implementation of online education is not as optimistic as that of peoples' expectation. In some universities, online education not only doesn't improve the quality of teaching, but also bring about some negative effects.

In the study of enterprise information system, people find that staffs' acceptance of information technology is a major factor affecting the success or failure of information systems. IT must be understood and accepted by employees in order to improve productivity through IT. The impacting factors which affect the success or failure of online education include not only technical factors, but also individual behavioral factors. Online education must be understood and accepted to improve the effectiveness of teaching and learning. Previous studies pay more attention to technical issues of online education and the impacting factors of college teachers' willingness to use the online education. Researches about students are few.

Based on the theory of planned behavior, this paper establishes a extended model of TPB by introducing perceived usefulness and perceived ease of use. The impacting factors of college students' willingness to use the online education are discussed. The hypotheses and model of online education are put forward. Samples are collected in full-time college students of Jiujiang University. The hypotheses and model are verified by Amos17.0 and Spss20.0. This study provides the managers of universities with a new idea to promote the use of the online education.

## 2. LITERATURE REVIEW

### 2.1 Theory of planned behavior

Theory of planned behavior is evolved from theory of reasoned action (TRA). TRA considers action is a

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direct result of actional intention (AI). Actional intention is affected by attitude (AT) and subjective norm (SN) (Fishbein, 1980)<sup>[1]</sup>. Attitude (AT) refers to a positive or negative sense of the individuals' behavior. Subjective norms (SN) refer to social pressure on a person when he decides whether to take a particular action. In other words, subjective norms are an influence which is exerted by influential individuals and groups. Subjective norms can predict the individual behavior to some extent.

The premise of TRA is that action is completely controlled by individuals' willingness, which does not match with the actual situation. Therefore, TRA can not fully explain or predict certain behaviors. Ajaen (1991)<sup>[2]</sup> increases perceived behavioral control (PBC) on the basis of TRA and forms the theory of planned behavior (TPB). PBC is a perception of degree of difficulty of certain behavior, which reflects the individual's past experience and anticipated obstacles. When an individual thinks he has more resources and less obstacles himself, perceived behavioral control is stronger. PBC increases the explanatory power of TRA. Trafimow (1996)<sup>[3]</sup> classifies PBC into two dimensions, that is, perceived control and perceived difficulties. Some scholars propose PBC includes self-efficacy and sense of control. Behavioral intentions are a person's motivation to perform a specific behavior. Theory of planned behavior believes that perceived behavioral control is positively related to behavioral intention.

## **2.2 Decomposition theory of planned behavior**

Taylor and Todd (1995)<sup>[4]</sup> propose the decomposition theory of planned behavior. Taylor and Todd believe attitude, subjective norms and perceived behavioral control should be decomposed into more detailed dimensions. Attitude is broken down into three factors: perceived usefulness (PU), perceived ease of use (PEOU), compatibility. Subjective norm can be broken down into effect of peers and superiors. Peers and superiors may treat information technology differently. For example, peers may oppose the use of a particular system because they think the system will increase their workload. However, superiors may encourage the use of the system because they expect to improve the efficiency. In this case, the impact of the two groups might offset. Subjective norms may not affect the overall willingness to use the system. Therefore, they break subjective norm into two groups, that is, peers and superiors. Perceived behavioral control is broken down into three factors: self-efficacy, conditions for resources, technical conditions. Self-efficacy is related to the ability of sensation. Study shows a high level of self-efficacy will lead to high levels of behavioral intention. Promoting conditions include two dimensions: resource factors, such as time and money; the other is technical compatibility issues. These two dimensions limit the usage of information technology. Lack of resources are obstacles to the application of information technology, which will hinder the formation of the willingness to use. However, adequate resources don't encourage the behavior of usage. Although this theory is more complex than the theory of planned behavior, this theory has a more strongly explanatory power.

## **3. HYPOTHESES AND THE ESTABLISHMENT OF MODEL**

### **3.1 Basic hypotheses**

Theory of planned behavior deems behavioral attitudes, subjective norms and perceived behavioral control are the three main variables determining behavioral intentions. These three variables are positively related to perceived behavioral control. Based on the theory of planned behavior, Zhang Yali et al. (2006)<sup>[5]</sup> analyze the impacting factors of risk communication. They include the attitude of risk communication, subjective norms and perceived behavioral control. Liu Yuwei (2008)<sup>[6]</sup> studies the relationship between the theory of planned behavior and Chinese consumers' green consumer behavior. He thinks that consumer behavior is a function of behavioral intention and perceived behavioral control. And behavioral intentions depend on the behavioral attitude, subjective norms and perceived behavioral control. Li Mengxiang et al. (2010)<sup>[7]</sup> believed attitudes and perceived behavioral control have significantly positive impact on the continued use of willingness. It can be inferred:

H1: students' attitude has a significantly positive correlation to willingness to use the online education.

H2: students' subjective norm has a significantly positive correlation to willingness to use the online education.

H3: students' perceived behavioral control has a significantly positive correlation to willingness to use the online education.

Paul A.Pavlou (2006)<sup>[8]</sup> explains the behavior of online shopping.He expanded the theory of planned behavior and introduced the two factors of technology acceptance model (TAM),i.e. perceived ease of use and perceived usefulness.He finds perceived usefulness and perceived ease of use are positively related to the attitude of purchase. Wu Xiaowei (2010)<sup>[9]</sup>considers the attitude of adopting network intelligence system is affected by perceived ease of use and perceived usefulness of network intelligence system. Li Mengxiang et al. (2010)<sup>[7]</sup> believe that perceived usefulness of service systems for mobile instant messaging has significantly positive impact on customers' attitudes. Liu Rong (2013)<sup>[10]</sup>deems that perceived usefulness and perceived ease of use have a significant impact on the attitude of consumers' willingness to use mobile Internet .It can be inferred:

H4: perceived ease of use of students is significantly positive related to the attitude of using the online education.

H5: perceived usefulness of students is significantly positive related to the attitude of using the online education.

### 3.2 The establishment of model

Based on the above hypotheses, this paper establishes a model of willingness to use the online education.The model is shown in Figure 1. PU represents perceived usefulness.PEOU represents perceived ease of use.SN represents subjective norm.ATT represents attitude.PBC represents perceived behavioral control. WTU represents willingness to use.

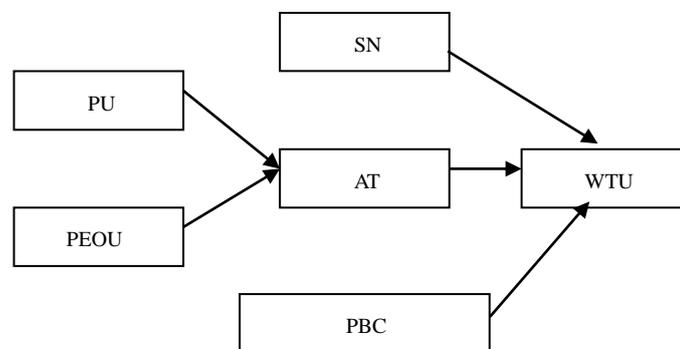


Figure 1. The model of willingness to use

## 4. DESIGN OF STUDY

### 4.1 Design of questionnaire

The questionnaire is designed on the basis of domestic and foreign similar questionnaires. Variables of questionnaire are mainly from the theory of planned behavior and technology acceptance model.The questionnaire includes 24 questions and adopts five Likert scale. 1 represents strongly disagree.5 represents strongly agree.Four questions about perceived usefulness are designed. Four questions about perceived ease of use are designed. Six questions about subjective norms are designed. Three questions about perceived behavioral control are designed. The number of questions about attitude is three. The number of questions about willingness to use is four.

## 4.2 Collecting and processing of data

Data are collected in Jiujiang University. Before questionnaires are issued, students are asked to browse some important online education platform. Questionnaires are distributed and collected from March to April in 2013. 545 questionnaires are issued. 391 questionnaires are recovered. Apart from 23 invalid questionnaires, the number of valid questionnaires is 368. The effective recovering rate of questionnaires is 68%. After the questionnaires are recovered, questionnaires are purified according to the CITC (item-total correlation coefficient). Five items are removed because their CITC are less than 0.5. CITC of the remaining 19 items are more than 0.5. The correlation coefficients of construct and Cronbach's  $\alpha$  are calculated by spss17.0. Reliability analysis is also carried out by spss17.0. Confirmatory factor analysis and the verification of hypotheses are carried out by Amos20.0.

## 5. RESULTS OF RESEARCH

### 5.1 The test of reliability and validity

The reliability of questionnaire is analyzed to ensure that questionnaire is stable and reliable. Reliability is judged by cronbach's  $\alpha$ . 0.7 is the minimum acceptable value. Doll (1988)<sup>[11]</sup> considers the validity can be divided into convergent validity and discriminant validity. Convergent validity refers to what extent a series of indicators converge to the same factor. There are three criteria to assess convergent validity. Firstly, all standardized factor loadings are greater than 0.5 and achieve significant level ( $P < 0.05$ ). Secondly, average variance extraction (AVE) is greater than 0.5. Thirdly, composite reliability (CR) is greater than 0.7. Jöreskog (1996)<sup>[12]</sup> considers average variance extraction =  $\frac{\sum(\text{standardized factor loading}^2)}{(\sum(\text{standardized factor loading}^2) + (\sum \text{measurement error for each measurement variable}))}$ , composite reliability =  $\frac{(\sum \text{standardized factor loading}^2)}{(\sum(\text{standardized factor loading}^2) + (\text{measurement error of the measured variable}))}$ , measurement error of the measured variable =  $1 - \text{standardized factor loading}^2$ . The results of the test of reliability and convergent validity are shown in Table 1. All cronbach's  $\alpha$  is greater than 0.7. In addition, standardized factor loadings, composite reliability and average variance extraction meet the criteria of convergent validity.

Discriminant validity is proposed by Gounaris (2003)<sup>[13]</sup>. When average variance extracted are greater than squared correlation coefficient of construct, questionnaire shows good discriminant validity. The results are shown in Table 2. Table 2 shows the square root of the average variance extracted is greater than the correlation coefficient of construct, which means that average variance extracted is greater than squared correlation coefficient of construct. Therefore, the questionnaire has good discriminant validity.

**Table 1. The test of reliability and convergent validity**

Factors	Items	standardized factor loadings	cronbach's $\alpha$	CR	AVE
PU	PU1	0.816***	0.872	0.873	0.696
	PU2	0.816***			
	PU3	0.87***			
PEOU	PEOU1	0.914***	0.889	0.895	0.742
	PEOU2	0.915***			
	PEOU3	0.744***			
AT	AT1	0.769***	0.861	0.863	0.679
	AT2	0.879***			
	AT3	0.82***			

Factors	Items	standardized factor loadings	cronbach's $\alpha$	CR	AVE
SN	SN1	0.933***	0.952	0.954	0.838
	SN2	0.987***			
	SN3	0.873***			
	SN4	0.863***			
PBC	PBC1	0.771***	0.849	0.851	0.657
	PBC2	0.86***			
	PBC3	0.798***			
WTU	WTU1	0.761***	0.859	0.867	0.686
	WTU2	0.881***			
	WTU3	0.838***			

\*\*\* indicate standardized factor loads are significant at the level of  $p < 0.001$

**Table 2. The test of discriminant validity**

	PU	PEOU	AT	SN	PBC	WTU
PU	0.834					
PEOU	0.26	0.861				
AT	0.301	0.226	0.824			
SN	0.171	0.091	0.13	0.915		
PBC	0.129	0.125	0.092	0.493	0.811	
WTU	0.372	0.328	0.377	0.386	0.355	0.828

notes:( i )The diagonal value is the square root of AVE.( ii )correlation coefficients are Pearson unilateral

## 5.2 Verify hypotheses and test the overall fit

Hypotheses of model are tested by Amos20.0. The results are shown in Table 3. Table 3 shows that H1, H2, H3, H4 and H5 are confirmed. Results indicates that perceived ease of use and perceived usefulness of online education have a significantly positive impact on the attitude. Attitude, subjective norm, perceived behavioral control have a significantly positive impact on willingness to use. In order to test the overall fit, this paper uses the following index:  $X^2/df$ , NFI, GFI, CFI, RMR, RMSEA, IFI, TLI. The results are shown in Table 4. Table 4 shows that recommended value and actual value correspond and the overall model fit is good.

**Table 3. The test of hypotheses**

hypotheses	Coefficients of path	results
H1	0.357***	support
H2	0.154**	support
H3	0.276***	support
H4	0.166**	support
H5	0.392***	support

\*\*\*, \*\*, \* indicate Coefficients of path are significant at the level of  $p < 0.001, 0.01, 0.05$ .

**Table 4. The situation of the overall model's fit**

fit index	recommended value	actual value	consistent or not
X <sup>2</sup> /df	<5	1.714	consistent
NFI	>0.9	0.952	consistent
GFI	>0.9	0.938	consistent
CFI	>0.9	0.979	consistent
RMR	<0.05	0.023	consistent
RMSEA	<0.08	0.044	consistent
IFI	>0.9	0.979	consistent
TLI	>0.9	0.975	consistent

## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Conclusion

In this paper, samples are collected in full-time college students of Jiujiang University. Data is processed by spss17.0 and amos20.0. Results shows perceived usefulness and perceived ease of use of online education have a significantly positive impact on the attitude. Ji zhi (2013)<sup>[14]</sup> makes a similar conclusion. Path coefficient of perceived usefulness to attitude is 0.392 and path coefficient of perceived ease of use to attitude is 0.166, which indicates that the impact of perceived usefulness is greater than that of perceived ease of use. Attitude, subjective norm and perceived behavioral control have significantly positive impact on willingness to use. Zhang Haofeng et al. (2012)<sup>[15]</sup> makes a similar conclusion based on literature review. Path coefficient of students' attitudes to willingness to use is 0.357. Path coefficient of subjective norms to willingness to use is 0.154. Path coefficient of perceived behavioral control to willingness to use is 0.276. The impact of attitude to willingness to use is greatest. The impact of perceived behavioral control to willingness to use is medium. The impact of subjective norms to willingness to use is least.

### 6.2 Suggestion

Students' willingness to use the online education can be enhanced from three aspects: firstly, perceived usefulness and perceived ease of use of online education should be increased to encourage students to develop a positive attitude; secondly, perceived behavioral control should be enhanced; Finally, students' subjective norms should be strengthened.

#### 6.2.1 Increasing perceived usefulness and perceived ease of use of online education

Perceived usefulness and perceived ease of use reflect the quality of the information of online education. A high-quality online education should have a wealth of content, a variety of forms, beautiful pages, good links, friendly interface to meet different students' demand for learning resources. Thus, the students' willingness to use the online education will be enhanced. On the contrary, monotonous content, inappropriate page design will reduce the students' willingness to use the online education. In students' opinion, the importance of perceived usefulness is greater than that of perceived ease of use. Consequently, first of all, designers of online education should pay attention to the content of online education, such as creating a three-dimensional teaching resource library, providing e-mail Q & A, establishing forum and so on. Secondly, designers should develop the forms of online education, for example, good navigation, friendly interface, comprehensive help, diverse teaching materials and so forth.

#### 6.2.2 Enhancing students' perceived behavioral control

Individual self-efficacy is obtained mainly from his own experience of success and failure. If someone encounters the number of failures much larger than the number of success, he will doubt his own ability. Therefore, in order to enhance students' perceived behavioral control, teachers should help students obtain

experience of success. When students get very little progress, teachers should encourage and praise students timely. For example, when the students are active on the network teaching platform, platform should awarded to students with a virtual "Medal of Honor" promptly and guide students to be more successful. It helps students produce a successful experience and enhance students' perceived behavioral control.

### 6.2.3 Strengthening students' subjective norms

In the e-learning platform, it is necessary to create a good atmosphere of a respect for knowledge and promoting sharing. Individual behavior is affected by the surrounding environment. If there are many active participants in the surrounding environment, someone will be consistent with other people unconsciously and shows a positive behavior, which is the power of example. For example, teachers can put a "Hall of Fame" on the home page. The contents of "Hall of Fame" are lists of students who often logon the online education, which can encourage active students and stimulate inactive students.

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