

# An Analysis of the Mental Factors of Mobile Foreign Language Learning Based on UTAUT Model

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## ABSTRACT

With the popularity of smart phones, mobile foreign language learning will become the future development trend, but at present, whether the mobile foreign language learning is accepted by students or not will become the key factor in the implementation of mobile language learning project. Therefore, the influence factors of the mobile language learning are studied in this paper. On the basis of UTAUT model, the five mental factors of mobile foreign language learning are summed up, and a questionnaire survey is designed, and the data of the survey results are analyzed by using SPSS software. The results show that perception fun, social influence and the expected effort have a significant impact on mobile language learning, while the preset self-learning management has not significant impact on it, and finally the multi group structural equation model is used for analysis. The results show that the phone type, grade, and gender do not have a role in the regulating the influence factors of Undergraduates' mobile foreign language learning.

**Keywords:** UTAUT development model; undergraduates; mobile foreign language learning; factor analysis

## 1. INTRODUCTION

As the integration of the Internet, mobile phone, with its advantages of convenience, quick and efficient, is applied to every corner of life. In view of the popularity of mobile phones, low cost, and the characteristics to obtain conditions to support mobile learning at any time, mobile phone terminal has incomparable superiority compared with other client terminals [1]. Although the mobile phone has unlimited potential, there are still some challenges, such as the small size of mobile phone screen, short battery life and low network connectivity and other defects, resulting in it difficult to popularize mobile language learning; the mobile language learning has drawn widespread concern in the field of education.

The related research on mobile learning in China is relatively late, and there is a certain gap of the research results compared with foreign countries. In the research methods, in China, there lacks quantitative analysis and development; in the research on the application of UTAUT model, since 2003, Venkatesh et al summarized technology acceptance, summed up and compared the main contacted technology acceptance and adoption model, integrated refining the typical model-- UTAUT. Practice has proved that the UTAUT model is a new technology model, which has a high

superiority in accepting new technology, and it is less applied into foreign language learning. Hennington et al analysed the acceptance of electronic medical records by using the UTAUT model, which is vital significance for the information management system and community health care; Yuan Wang et al (2012) investigated the main factors whether to accept the mobile Internet technology by using the UTAUT model, and studied the gender impact [2].

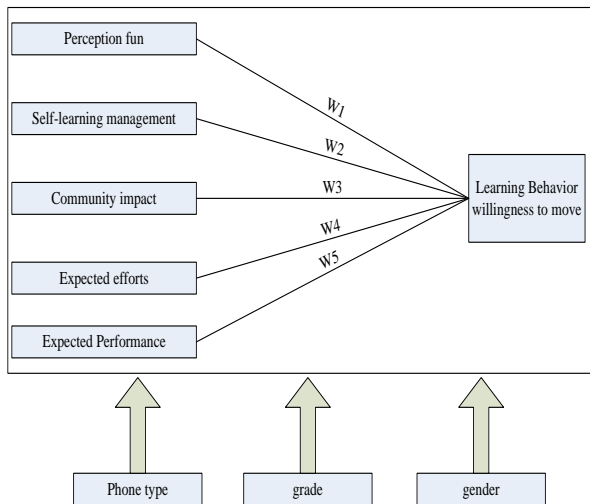
To sum up, the UTAUT model has wide and reliable application in the IT field, and UTAUT is of a certain guiding significance of assisting decision makers to introduce a new technique to accept the influence factors of mobile behaviour intention of learning foreign language. Based on predecessors' research, the influence factors of the undergraduates' mobile foreign language learning have been explored, the data are analysed by using SPSS software, the UTAUT model is used as a reference theory model to study the use influence willingness of undergraduates' mobile foreign language learning.

## 2. ESTABLISHMENT OF THE UTAUT MODEL

UTAUT belongs to the traditional information technology acceptance model, and the UTAUT in view

of mobile foreign language learning technology in part cannot fully reflect the influence factors of mobile learning, but these factors can affect the amount of users. Taking the student users and mobile foreign language learning environment factors into account, this paper draws the key variables of the UTAUT model and adds the two variables of "Perception fun", "self-learning management", so as to better study the influence factors of foreign language learning of Chinese undergraduates [3].

The "use behavior" in the UTAUT model is deleted in this paper, the "behavior intention of mobile foreign language learning" and various factors were analyzed, and at the same time, it is a comprehensive consideration at an early stage of undergraduates' mobile foreign language learning study in China. The model to be tested in this paper is shown in Figure 1:



**Figure 1** Original model of mobile foreign language learning acceptance

Perception fun, self-management, community impact, expected efforts and expected performance in the model to study hard and expected performance use the decisive factors in mobile foreign language learning. The object of this study is spontaneous, and not compulsory. The model includes control variables: mobile phone type, grade and gender; independent variables: perception fun, self-learning management, social influence, the expected efforts and the expected performance; the dependent variable: the behaviour intention of mobile foreign language learning. It mainly studies the effect of independent variables on the dependent variable through the statistical method and the interference between the control variables [4][5].

### 2.1 Measurement dimension and variable definition

The acceptance model of undergraduates' foreign language learning mainly includes five influence variables: perception fun, self-learning management,

community impact, expected efforts and expected performance.

#### (1) Behaviour intention

Under certain conditions, the possibilities to learn the foreign language by using their mobile phones in the future expected by users are the behaviour intention for mobile foreign language learning. In this paper, three aspects are respectively set: B11 indicates using mobile phones to learn a foreign language if the conditions allow; B12 indicates willing to use mobile phones regularly to learn a foreign language in the future; B13 indicates to be expected to use mobile phone to learn a foreign language in the future.

#### (2) Perception fun

Research shows that the perception fun has a significant impact on the use intention of the Internet. Some people think that perception fun mainly includes 3 aspects: happiness in the interaction process; the initiation of the interaction process and concentration interaction. In the process of using computer systems, people who have a happy experience are more suitable for the use of learning a foreign language. The measurement dimensions of perception fun are respectively as follows: CP1 indicates the use of mobile phone enhances classroom interaction of foreign language learning; CP2 indicates the use of mobile phone guides the exploration of foreign language learning; CP3 indicates the use of mobile phone stimulate interest in learning foreign language; CP4 indicates the use of mobile phone enhance learning fun to learn a foreign language.

#### (3) Self-learning management

Self-learning management mainly refers the self-discipline and can fully autonomous participate in learning to a certain degree, it is expected that a person's self-learning management level can have a positive impact on the behaviour intention of mobile foreign language learning. The measurement dimensions of self-learning management of foreign language learning are mainly divided into: SM1 indicates to develop a foreign language learning program on one's own; SM2 indicates effectively manage one's time for foreign language learning; SM3 indicates to have a sense of self-discipline in the process of foreign language learning, can skilfully combine learning with fun; SM4 indicates to be an independent person in the study.

#### (4) Community impact

Individual use of new technology is mainly from the impact of the community, for the influence factors of community impact of Chinese undergraduates' foreign language learning, this paper sets the three measurement dimensions, namely: SI1 indicates the use mobile phone to learn foreign languages is approved by the teacher; SI2 indicates the impact of friends' use of mobile phone

to learn foreign languages on me; SI3 indicates the recommendation of classmates' use of mobile phone to learn foreign languages affects my use of mobile phone to learn foreign languages.

(5) Expected efforts

Expected effort is a key factor in the use of mobile phone for the behaviour intention of foreign language learning, the initial use of mobile phone to learn foreign languages depends mainly on whether the mobile phone system is flexible to be accepted by students. Measurement dimensions of expected effort are respectively as follows: EE1 indicates to easily adapt to the mobile phone to learn a foreign language; EE2 can easily control the mobile phone use to learn a foreign language; EE3 indicates to easily operate mobile phone in the foreign language learning process.

(6) Expected performance

Expected performance is the best predictors of the behaviour intention to use mobile phone for foreign language learning. Age and gender have a certain effect on the expected performance. In the process of learning a foreign language, mobile foreign language learning can help students quickly and flexibly complete the task of learning. In this paper, four measurement dimensions of expected performance are chosen: PE1 indicates the important information obtained by using mobile phone at any time; PE2 indicates the uses of mobile phone can utilize the fragmented time; PE3 indicates the use of mobile phone can improve the foreign language; PE4 indicates the use of mobile phone can improve the efficiency of learning a foreign language.

## 2.2 Research hypothesis

Research hypothesis is a speculative and hypothetical interpretation, mainly at the initial stage of the study, based on the researcher's understanding of the problem, and combining the predecessors' research experience; it proposed research the temporary solution to the problem studied. According to the characteristics of the current undergraduates' use of mobile phone for foreign language learning, the control variable of mobile phone type is added. A positive impact on Undergraduates' behaviour intention to use mobile phone for foreign language learning is denoted as a; the interference of mobile phone type, gender, grade is denoted as b; perception fun is denoted as W1; self-learning management is denoted as W2; community impact is denoted as W3; expected efforts are denoted as W4, the expected performance is denoted as W5.

## 3. STUDY ON THE MENTAL FACTORS OF CHINESE UNDERGRADUATES' FOREIGN LANGUAGE LEARNING

This paper collects research data mainly through the questionnaire survey method, and establishes the basic personal information in accordance with the above process, which mainly includes the phone type, grade, gender. And it mainly analyses whether different cell types, different genders and different grades have an impact on undergraduates' behaviour intention of foreign language learning by using the mobile phone. The main body contains five variables that affect the behaviour intention of students' foreign language learning. And the measurement items of the corresponding variables are designed.

The behaviour intention of mobile foreign language learning mainly consists of three aspects of measurement items and is divided into three types in accordance with the current use situation of mobile foreign language learning. according to the analysis of behaviour intention of users' mobile language learning, the community impact is mainly made up of four measurement items, reflecting the effect of different groups of surrounding people on the users' use of mobile phone for foreign language learning [6]. For individuals, SI1 is set to be teachers, SI2 is set to be family members, SI3 is set to be the cognitive situation of students or friends to use mobile phone for learning. Self-learning management mainly refers to the level of SM1 plan development of undergraduates, SM2 refers to the time management, SM3 is self-discipline and SM4 is the composition of autonomy. EE1 measures the adaptability of mobile foreign language learning; EE2 reflects the proficiency of mobile phone foreign language learning; EE3 measures the complexity of mobile foreign language learning. The expected performance is composed of four different measurement items, reflecting the usefulness of mobile foreign language learning. PE1 measures the content provided by mobile foreign language learning; PE2 measures the relative advantages of mobile foreign language learning; PE3 measures the achievement expectation of using mobile phone for mobile learning; PE4 measures efficiency expectations of undergraduates' perception of mobile learning. The perception fun mainly reflects the happy state brought by the undergraduates' mobile learning [7].

Factors analysis is conducted on the questions keeping discrimination, so as to test the construct validity of the scale. The test result of the questionnaire is 0.607, the Bartlett spherical degree test is 412.332 (df=153),  $p < 0.001$ , proving the validity of the structure is good; the projects have the common factor, and which is suitable for the exploratory analysis. Test results are shown in Table 1:

It can be seen from the above table, after the removal of 3 choices, the questions of the above six factors are basically in agreement. Finally, the reliability of the questionnaire is tested through the Alpha method,

and the coefficient of overall  $\alpha$  is obtained to be 0.832, which shows that the reliability is better, and thus the questionnaire is determined.

**Table 1.** Exploratory factor analysis table

	Community impact	Expected efforts	Perception fun	Expected performance	Behavior intention	Self-learning management
S11	.625					
S12	.721					
S13	.903					
EE1		.627				
EE2		.777				
EE3		.887				
CP1			.689			
CP2			.797			
CP3			.852			
PE1				.847		
PE2				.616		
PE3				.852		
B11					.809	
B12					.514	
B13					.853	
SM2						.929
SM3						.904
SM4						.852

**4. STATISTICS AND ANALYSIS OF RESEARCH DATA**

**4.1 Reliability and validity analysis**

Reliability refers to the consistency of the results obtained after repeated measurements, the higher the value; the more stable the results of the questionnaire. In this paper, the reliability of the data is measured by Cronbach  $\alpha$ , which is taken as the reliability index of the data coefficient, as shown in Table 2:

**Table 2.** Coefficient evaluation criteria of Cronbach  $\alpha$

Cronbach $\alpha$	Standard
0.60-0.65	Unacceptable
0.65-0.70	Minimum acceptable
0.70-0.80	Quite good
0.80-0.90	Very nice

SPSS software is used to test the reliability of the questionnaire results, the results show that: the entire item - subscales are more than 0.75; the coefficient of

the overall  $\alpha$  scale is 0.839, which shows that the questionnaire reliability is better.

**4.2 Validity analysis**

It is not difficult to see from Table 4 that the validity test of the questionnaire showed that the fitting number exceeds the reasonable range of 1-3, the adaptation degree of the model cannot the realize the best effect. And the models of 1-5 are allowed; the smaller of CFI, MFI, FNI, TKI, the worse of the model adaptation degree, the closer the number is to 1, the better the model is.

**4.3 Model development**

Revise the hypothetical original model so as to make the fitting index of the model reach the standard.

Model1: On the basis of the original model, after the removal of the self-learning management, the behaviour intention of mobile foreign language learning is taken as dependent variable and perception fun, community impact, expected efforts and expected performance are taken as exogenous variables.

Model 2: The behaviour intention of mobile foreign language learning is taken as dependent variable and self-learning management, community impact, expected

efforts and expected performance are taken as the external variables.

**Table 3.** Reliability of item - subscale

Variable	Number of Problem	Criteria of Cronbach a
Expected performance	3	.769
Expected efforts	3	.813
Community impact	3	.771
Self-learning management	3	.743
Perception fun	3	.866
Behavior intention	3	.777
Entirety	18	.839

**Table 4.** Overall fitting degree of the initial model

Statistical test quantity	Fitting values of the model	Adaptation criteria or the critical value
RMSEA value	.007	<.05(Good-adaptation)<.80(Reasonable-adaptation)
CFI value	.866	>.90
TLI value	.824	>.90
IFI value	.868	>.90
NFI value	.829	>.90
X/df	3.776	1~3 better fitting degree of the model

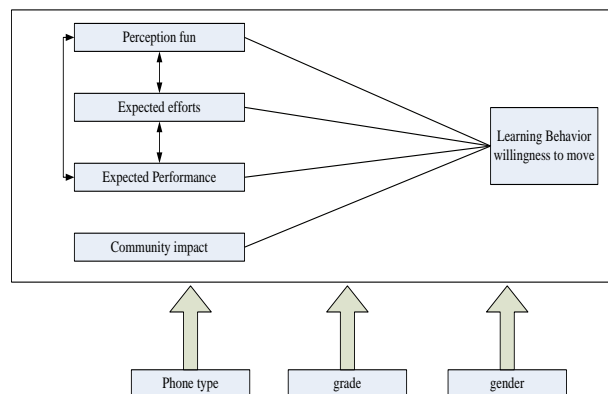
**Table 5.** Overall fitting degree comparison of each model

	RMSEA	CFI	TLI	IFI	NFI	x/df
Original model	.077	.916	.824	.868	.829	3.776
Model 1	.092	.866	.801	.859	.830	5.000
Model 2	.051	.857	.922	.943	.901	2.234
Model 3	.060	.942		.943	.912	2.685

Model 3: On the basis of Model 2, the self-learning management is removed, and the behavior intention of mobile foreign language learning is taken as dependent variable and community impact, expected efforts and expected performance are taken as the external variables.

The above three revised models are tested by AMOS, and the results are shown in Table 5:

It can be known that the fitting indexes of Model 2 and Model 3 are between 2 and 3, so two models are ideal and the approximation error is less than 0.08, the relative fitting index is greater than 0.9, proving Model 2 and Model 3 are reasonable. In the case of a comprehensively considering the five factors, the influence factors of undergraduates' mobile foreign language learning are identified, as shown in the following figure:



**Figure 2** Selection of research model

### 5. ANALYSIS OF RESULTS TESTED BY HYPOTHESIS

The results of the final overall path are shown in the following table. The parameters in Table 6 are the

standard parameters, which indicate that the test results of W1 to W5 are corresponding to the corresponding hypothesis.

**Table 6.** Regression coefficient of path standard and the corresponding results tested by hypothesis

Path specification	Pass or not	Correspondence hypothesis	P value	Coefficient of path
Perception fun to Behavior intention	Yes	W5a	p<0.01	0.370
Community impact to Behavior intention	Yes	W3a	p<0.01	0.284
Expected efforts to Behavior intention	Yes	W2a	p<0.05	0.125
Expected performance to Behavior intention	Yes	W1a	p<0.01	0.348

It can be seen from the above table that W1a, W2a, W3a and W5a all pass the hypothesis, and standardized coefficients are between 0.12 and 0.5. The results show that community impact, perception fun, expected efforts, as well as the expected performance have a significant impact on the intention. W4a didn't pass the test, indicating the self-learning management has no significant impact on the intention. The pairwise correlation coefficients of perception fun, expected effort and expected performance are shown in Table 7:

**Table 7.** Correlation coefficients

Related relationship	P value	Correlation estimate
Perception fun and Expected performance	p<0.01	0.570
Expected efforts and Perception fun	p<0.01	0.470
Expected performance and Expected efforts	p<0.01	0.545

Whether mobile phone type, grade and gender and other factor have interference effect hypothesis on foreign dependent variable on the external dependent variables, a group structure models are used for analysis. The judgment standard is the absolute value of critical ratio of the path coefficients differences between groups in pairs greater than 1.96. If it is less than 1.96, it is assumed that the two are equal by weight, namely, invariance between groups. Otherwise, it is considered that the path coefficient is different. In order to verify the hypothesis, two groups of boys and girls were randomly selected to compare, and the results are shown in Table 8:

It is shown in the above table that all of the hypotheses pass the test, which proved that gender, perception fun, community impact, expected efforts and expected performance had no interference effect on the behaviour intention of moving foreign language learning.

**Table 8.** Critical ratio of path parameter differences between gender groups and results tested by hypothesis

Path specification	Pass or not	Correspondence hypothesis	Gender
Community impact to Behavior intention	No	W3b1	0.576
Perception fun to Behavior intention	No	W5b1	-1.872
Expected efforts to Behavior intention	No	W2b1	0.946
Expected performance to Behavior intention	No	W1b1	-0.240

**Table 9.** Critical ratio of path parameter differences between age groups and results tested by hypothesis

Path specification	Pass or not	Correspondence hypothesis	Age
Community impact to Behavior intention	No	W3b2	1.375
Perception fun to Behavior intention	No	W5b2	-0.539
Expected efforts to Behavior intention	No	W2b2	-1.270

Expected performance to Behavior intention	No	W1b2	0.695
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Table 10. Critical ratio of path parameter differences between experience groups and results tested by hypothesis

Path specification	Pass or not	Correspondence hypothesis	Type of phone
Community impact to Behavior intention	No	W3b3	0.466
Perception fun to Behavior intention	No	W5b3	0.928
Expected efforts to Behavior intention	No	W2b3	-1.456
Expected performance to Behavior intention	No	W1b3	0.121

In accordance with the above hypothesis model and parameter estimation and analysis results of multi group result model, the path of the model obtained is shown in Figure 3:

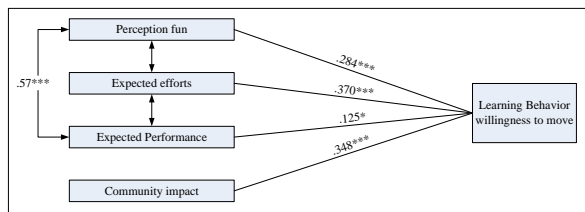


Figure 3 Path coefficient diagram

It is not difficult to see from the above diagram that community impact, perception fun, expected efforts and expected performance all affect the willingness of mobile foreign language learning, and self-learning management have no limitations on it. In accordance with the order of the four factors of influence degree from weak to strong, it can be obtained that expected efforts < community impact < expected performance < perception fun, in which, the condition variables are: the impact of mobile phones, grade and gender on the interference of various factors is not significant.

Through the above analysis, the results show that the W1a, W2a, W3a and W5a in the hypothesis were validated by the data, and the corresponding other results did not pass the validation.

6. CONCLUSIONS

Based on referring to the UTAUT model, and after the addition of the two factors of "self-learning management" and "perception fun", the UTAUT development model is constructed to explore the influence factors of behavior intention of undergraduates' mobile foreign language learning in China. The results show that the community impact, expected efforts and expected performance have significant impact on the behavior intention of mobile foreign language learning. The results of data analysis show that the factor of "self-learning management" has no significant effect on the intention behavior of mobile foreign language learning. However, "perception fun" has a significant effect on the behavior intention. This

study not only verifies the UTAUT model but also expands the applicability of the UTAUT model in Chinese undergraduates' foreign language learning field.

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