Investigating the Factors Influencing Chinese University EFL Learners' Adoption of Mobile Technology-Integrated Vocabulary Learning Towards Student-Centered Learning

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Abstract: This research investigated factors influencing Chinese EFL university students' adoption of mobile technology-integrated vocabulary learning towards student-centered learning using the extended unified theory of acceptance and use of technology (UTAUT2) model. The theoretical framework incorporated additional constructs of privacy, trust, personal innovativeness and information quality to examine their effects along with original seven UTAUT2 determinants on behavioral intention and use behavior. SPSS-22 and AMOS-24 software were employed to analyze the data. The hypotheses of this study were tested by structural equation modeling and regression path analysis. The results demonstrated the effects of performance expectancy, effort expectancy, facilitating conditions, social influence, hedonic motivation, price value, privacy concerns, habit, personal innovativeness and information quality on behavioral intention. The investigation contributes robust initial evidence regarding the factors shaping EFL students' adoption decisions and paves the way for further confirmatory research on leveraging mobile apps to transform vocabulary acquisition.

Keywords: EFL learners, mobile technology, vocabulary learning, student-centered learning

1.Introduction

College English education occupies an important position in the discipline construction and personnel training of Chinese universities (Dafouz,2018)[1]. However, the current exam-oriented teaching mode hinders students' enthusiasm for learning English. English education in China takes test scores as the ultimate assessment goal, so it is inevitable to improve the English test score as the purpose of English learning. In this learning context with the purpose of coping with exams, it is hard for learners to understand the role of English as a tool, that is, the most practical communicative function.

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The significance of vocabulary learning in English language learning has been well accepted and thoroughly studied in the field of second language acquisition. (Ardasheva et al., 2019). Additionally, it is one of the key elements in the growth of the four language abilities. Under the traditional teacher-centered teaching mode, students cannot maintain their enthusiasm and motivation to learn second language vocabulary. Mobile learning technologies that help education have had a significant and inescapable influence on learning settings (for example, teaching techniques, learning approaches), as a result of networks technology advancement (Tran et al., 2020)[2]. So, it is a new choice to use mobile technology to integrate vocabulary learning to realize student-centered learning. However, the factors that influence English as a Foreign Language (EFL) university learners' adoption of this learning model are not clear. There are very few studies in this field.Therefore, it's important to look into the factors influencing Chinese EFL university students' adoption of mobile technology-integrated vocabulary learning.

According to Bradley (2009) and Sultana (2020), UTAUT 2 is a reliable model for explaining the usage and adoption of various technologies[3]. This is a result of the model's higher explanatory power of behavioral use technology, which has a wide range of applications in a variety of situations and capabilities. This study aims to utilize the potential of the UTAUT2 model to investigate factors influencing Chinese EFL learners' adoption of mobile technology-integrated vocabulary learning towards student-centered learning. By reviewing a large amount of literature, the researcher modifies UTAUT2 model by incorporating four variables to the original seven independent variables in order to establish the link between them and the dependent variables and test the hypothetical model constructs.

2. The Extended Unified Theory of Acceptance and Use of Technology Model (UTAUT2)

Investigating learner engagement with the mobile technology-integrated vocabulary should make use of various theoretical perspectives and conceptual frameworks. This is an important additional point to take into consideration.

The UTAUT2 is employed in this study to identify the characteristics that influence the use of mobile technology-integrated learning in EFL university learners. The UTAUT model is presently regarded to be the most up-to-date and powerful model for examining various technological applications and adoption. The UTAUT model is chosen because of its broad application, high explanatory ability of technology use behavior (more than 70%), and capability of predicting future technology use behavior (Bradley 2009)[4]. The UTAUT 2 model is developed on the basis of the original version of UTAUT (Venkatesh and colleagues 2003), including more variables into the original UTAUT model. When compared to the variation in behavioral intention and use behavior of UTAUT, which was 70 percent and 48 percent respectively, the prediction efficiency discovered in the research of UTAUT2 was high (74 percent and 52 percent) (Venkatesh et al. 2012)[5]. Several researchers take the seven basic components of the UTAUT2 model into consideration: performance expectation (PE), effort expectancy (EE), facilitating condition (FC), social influence (SI), price value (PV), and habit (HT), hedonic motivation (HM). They believe that all seven of these characteristics have influenced the behavioral intention (BI) and use behavior (UB)[6]. Age, gender, and experience

serve as intermediary variables, acting on the independent variable and the dependent variable. The model is shown in figure1.

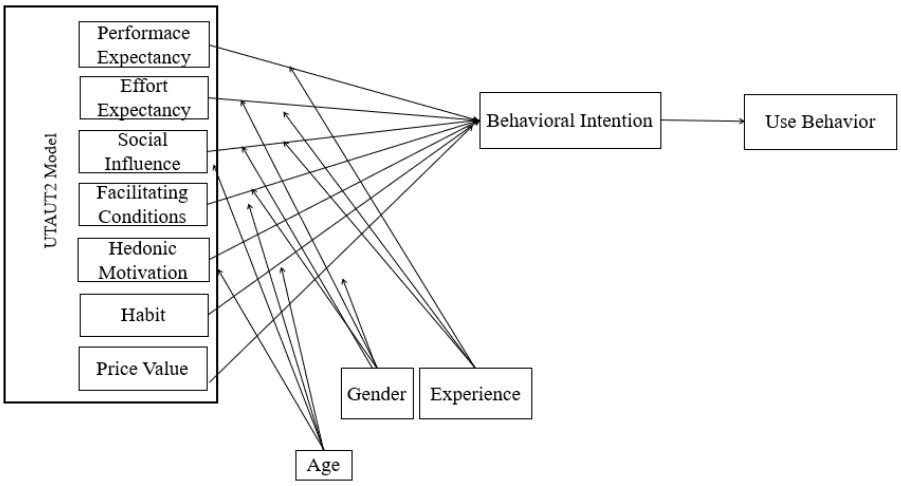

Figure 1 The Extend Unified Theory of Acceptance and Use of Technology

The Conceptual Framework

In addition to the seven basic components of the UTAUT2 model taken into consideration, the researcher has also taken into account the nature of mobile technology-integrated vocabulary learning by including four new factors, privacy, trust, personal innovativeness, and information quality based on a large amount of literature related to EFL university students' vocabulary learning and technology acceptance. The researcher aims to investigate EFL students' adoption of mobile technology-integrated vocabulary learning and explore the relationship between these eleven exogenous variables and the two endogenous variables, behavioral intention and use behavior[7]. In the current study, the mediating variables were excluded from the UTAUT2 model. By focusing solely on the direct relationships between the core UTAUT2 constructs and behavioral intention or use behavior, it can provide a more focused analysis and draw clear conclusions regarding the direct effects of the variables of interest. The conceptual framework of this study is shown in figure 2.

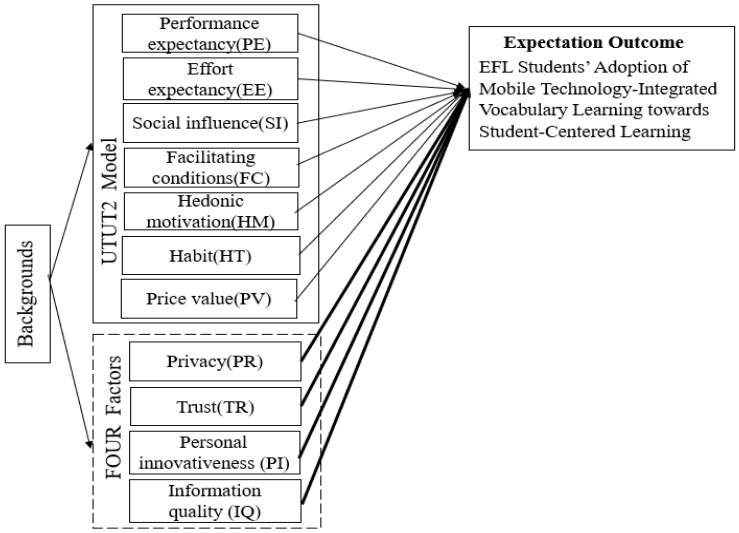

Figure 2 The Conceptual Framework

3. Hypotheses

In order to investigate how exogenous and endogenous variables interact in the conceptual model, the researcher proposed twelve hypotheses that assisted her to address the research objectives.

H1 There is a positive relationship between performance expectancy and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H2 There is a positive relationship between effort expectancy and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H3 There is a positive relationship between social influence and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H4 There is a positive relationship between facilitating conditions and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H5 There is a positive relationship between hedonic motivation and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H6 There is a positive relationship between habit and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H7 There is a negative relationship between price value and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H8 There is a negative relationship between privacy and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H9 There is a positive relationship between trust and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H10 There is a positive relationship between personal innovativeness and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H11 There is a positive relationship between information quality and behavioral intention for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

H12 There is a positive relationship between behavior intention and use behavior for EFL university learners to adopt the mobile technology-integrated vocabulary learning towards student-centered learning.

4. Method

In this study, the researcher employed quantitative research methods to explore the factors influence EFL university students' adoption of mobile-integrated vocabulary learning toward student-centered learning[8]. Questionnaire survey method was used in the study.

4.1 Sample and Sampling Method

The target population for this study is Chinese EFL university learners adopting mobile technology-integrated vocabulary learning by using student-centered learning framework. The sample is selected from a population of 2642 EFL students from the 2 Chinese universities by random sampling method. According to ROSCOE'S SIMPLE RULES OF THUMB (Roscoe, 1975), it is advised to employ a sample that is 10% the size of the parent population between these bounds (30 to 500)[9]. Therefore, 300 samples were selected. The sample framework included Chinese EFL mobile technology-integrated vocabulary learners in Fujian province of two universities.

4.2 Instrument Development

A questionnaire on Mobile Technology-Integrated Vocabulary Learning towards Student-Centered Learning was designed with reference to UTAUT2 questionnaire (Venkatesh et al.)[10]. Dimensions on privacy, trust, personal innovation, and information quality were added to the questionnaire to examine their effects along with original UTAUT2 determinants, which was evaluated by two Chinese experts in the field of pedagogy. The survey consisted of two components. The first section covers demographic data on the participants' age, gender,

educational background, prior learning experiences, and Baicizhan app usage. The second part was meant to elicit participant input on their experiences using mobile devices to learn English at Chinese universities, with the goal of identifying the factors influencing their intention to adopt mobile technology-integrated vocabulary learning. The samples give their opinion on a five-point Likert scale.

5. Result

5.1 Data Preparation

The study collected 300 raw data points from participants who were students enrolled in language courses utilizing mobile technologies. Boxplots were employed to visualize the distribution of scores for each variable in the 300-questionnaire dataset. The researchers used a criterion based on interquartile ranges (IQR) to classify outliers. Consequently, a total of 14 cases exhibiting outliers that were "extreme" were found and afterwards eliminated from the dataset. After this step, the sample size was reduced to 286[11].

5.2 Demographic Profile of Respondents

The demographic data and user characteristics of the respondents are shown in Table 1. which highlights the key information about the sample size and distribution across different variables.

Table 1 Demographic profile of respondents

		Frequency	Percent
gender	male	134	46.9
	female	152	53.1
age	18-20 years old	107	37.4
	21-22 years old	115	40.2
	23 years and over	64	22.4
Education background	freshman	95	33.2
	sophomore	73	25.5
	Junior	76	26.6
	Senior	42	14.7
Past mobile technology learning experiences	Learning from online resources	87	30.4
	MOOC study	74	25.9
	Blended learning of different technologies	125	43.7
Use Baici to cut client time	1-3 months	86	30.1
	4-6 months	122	42.7
	7 months and above	78	27.3
The average weekly time of using Baicizhan APP	1-3 hours	71	24.8

	4-6 hours	123	43
	7 hours and above	92	32.2
The first time to use the Baicizhan APP	4-6 months ago	208	72.7
	7 months ago and above	78	27.3
Frequency of using Baicizhan APP in the past 6 months	1-4 times	85	29.7
	5-8 times	138	48.3
	9 times and above	63	22

5.3 Reliability Analysis

The reliability of each scale in the questionnaire was evaluated using Cronbach's coefficient, as is shown on table 2. The scales of PE, EE, SI, FC, TR, PI, IQ, and UB exhibited high internal reliability, as their Cronbach's coefficients are larger than 0.9. Besides, the scales HM, HT, PV, PR, and BI demonstrated high reliability, falling within the range of 0.8 to 0.9. All of the dimension's coefficients are higher than 0.7, above the 0.7-level cutoff value (Oliveira & Roth, 2012), which demonstrating satisfactory consistency in measuring their constructs[12].

Table 2 The Cronbach's coefficients of variables

scale	Cronbach's Alpha	N of Items
PE	0.934	4
EE	0.940	4
Si	0.924	4
FC	0.954	6
H M	0.886	3
HT	0.893	3
PV	0.891	3
PR	0.895	3
TR	0.952	5
P.I.	0.932	4
IQ	0.910	3
BI	0.894	4
UB	0.961	6

6. Conclusion

The analysis supports the proposed hypotheses, highlighting the significance of performance expectations, effort expectations, facilitating conditions, social influence, hedonic motivation, habituation, price value, personal innovativeness, information quality, and privacy concerns in shaping individuals' behavioral intentions. Among these factors, performance expectancy, effort expectancy, hedonic motivation, facilitating conditions, social influence, habitation, personal

innovativeness and information quality as key drivers, while privacy and cost concerns emerged as notable barriers. The study also shows that behavioral intentions did in fact influence real use behavior. However, the behavior intentions of students to use the mobile vocabulary learning tool did not demonstrate a meaningful connection to trust.

While the empirical results largely confirm the hypothesized relationships, the limitations of the path analysis method preclude definitive claims of causality between the constructs. Further experimental and longitudinal designs are necessary to establish causal links and ascertain the temporal sequencing of effects. There is also potential to increase explained variance and model fit by examining additional moderator variables like gender, education level and prior technology experience. Expanding the framework to incorporate vocabulary learning specific constructs could provide further contextual insights.

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