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Modeling English teachers' intention to use ICT: technology acceptance and TPACK

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ABSTRACT

Teachers' acceptance of technology in the teaching setting is significantly influenced by their behavioral intention to utilize information and communication technology (ICT). A considerable amount of study has been done on the use of ICT in teaching English as a foreign language (EFL). Nevertheless, there exists a significant lack of deep studies among EFL teachers in Chinese vocational colleges. Drawing on the technology acceptance model (TAM) and technological pedagogical content knowledge (TPACK) theoretical frameworks, this current study aimed to ascertain whether EFL teachers' TPACK levels could predict their intention to adopt ICT. A quantitative study was conducted with the participation of 440 EFL instructors from vocational schools in Shandong Province. The seven components met the scale's validity and reliability requirements and the partial least squares (PLS) approach was utilized to describe the structural model and examine the relationships among significant components. The findings revealed that EFL teachers' perceived usefulness (PU), perceived ease of use (PEU), and attitudes towards use (ATCU) significantly impacted their behavioral intention to use (BIU) ICT. Moreover, the TPACK framework exerted a substantial influence on their acceptance of ICT. The study's findings may provide insights and resources for subsequent theoretical research and teaching approaches centered on enhancing the integration of technology in EFL education.

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1. INTRODUCTION

As information and communication technology (ICT) become more prevalent, a variety of educational technologies have been developed to allow teachers and students more alternative options [1]–[3]. There is a growing amount of scholarly work being done to explore how technology may affect education [4], [5], the United Nations Educational, Scientific and Cultural Organization (UNESCO), also seeks to develop through international cooperation in education, training, and skill development [6]. Particularly in developing countries like China, researchers are especially concerned about how ICT influences educational institutions [7]–[10]. In a word, both national and international schools are undertaking actions to enhance teachers' competency in ICT integration, and teachers are encouraged to integrate technology into their teaching.

With the increasing prevalence of globalization, the significance of English as a global language has grown. The development of Chinese technical and vocational education and training (TVET) colleges should meet the need of a rapidly changing industry for skilled labor with English proficiency, so it is required that first-year non-English majors take vocational college English as a compulsory course. In vocational students' eyes, English is no longer seen as a particular subject but rather as an essential ability for future employment. The guidelines on college English teaching, published by the Chinese National Foreign Language Teaching Advisory Board under the Chinese Ministry of Education, assert that ICT is essential for teaching English in today's society and establish guidelines for the application and scope of technology. The way teachers use ICT influences students' learning outcomes because it makes them more motivated and helps them use it more effectively [11], [12].

Teachers' competence to meet the requirements of their students and deliver high-quality teaching depends on the levels of technological pedagogical content knowledge (TPACK) they possess [13]. Changes in teaching might cause teachers to feel uneasy because the results are unpredictable. It is crucial to comprehend the factors that support or impede teachers' acceptance of educational technology, as the success and efficacy of implementing it are heavily dependent on their positive perceptions and attitudes [14]. Previous studies have demonstrated that the integration of educational technology is a complex matter hindered by multiple challenges. In order to facilitate English as a foreign language (EFL) teachers' competence in utilizing technology, it is imperative to address the various aspects of their acceptability [15]–[17]. One important aspect influencing teachers' intentions to employ digital tools in their teaching is their level of acceptance of technology in educational settings. It is important to investigate how educators comprehend, accept, and utilize technology in the classroom. Technology acceptance refers to the degree to which a user is prepared to use technology to carry out tasks for which it was designed to provide support.

The question of how teachers use educational technology to deliver engaging classes remains, even with ample infrastructure and supporting resources available. Therefore, this study aimed to investigate the EFL teachers' behavioral intention to integrate ICT in their teaching, as well as the factors that influence the unsatisfactory ICT usage in Chinese vocational colleges. This study adopted technology acceptance model (TAM) and TPACK as its theoretical basis, which are expected to predict EFL teachers' behavioral intentions to use modern technology effectively.

2. THE THEORETICAL BASIS AND THE PROPOSED MODEL

2.1. Major determinants of TAM and the hypothesis

The TAM introduced by Davis [18] is widely recognized as the most extensively validated and precisely specified prediction model in acceptance research. Davis [18] employed the concept of behavioral intention to use (BIU) as a direct indicator of subsequent behavior which is the assessment of an individual's conscious intent to either participate in or resist specific behaviors in the future [18], [19]. Perceived usefulness (PU), perceived ease of use (PEU), and attitudes towards use (ATCU) are the components that have an impact on BIU. It suggests that the acceptance of new technology is frequently influenced by individuals' perception of how easy it is to use and how valuable the technological tools are as shown in Figure 1.

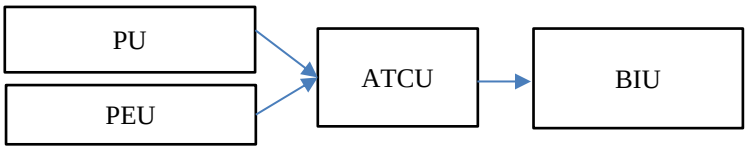

Figure 1. TAM [18]

However, accurately quantifying the extent of ICT use is challenging, and individuals are unlikely to engage deeply with anything unless it initially stimulates their behavioral intention [20], [21]. It is probable that EFL teachers demonstrate an obvious intention-behavior gap while utilizing technology. As a mediating factor, attitude towards ICT use (ATCU) is incorporated to bridge the gap between these two factors and behavioral intention. It was hypothesized that by considering behavioral intention, one may predict the actual usage of something [18]. The impact of ATCU on BIU has been extensively researched. According to Ajzen and Fishbein [22], an attitude towards behavior refers to the positive or negative assessment of engaging in that behavior. Additional research has also corroborated that attitude plays a crucial role in determining the desire to utilize technology. The robust correlation between ATCU and BIU suggests that users' behaviors

are impacted by their favorable attitudes towards technology, which serves as a complete mediator for the impacts on behavioral intention. In relation to the study question, the following hypotheses were examined: i) PU of ICT positively affects on English teachers' ATCU (H1); ii) PEU of ICT positively affects on English teachers' ATCU (H2); and iii) ATCU of ICT use positively affects on English teachers' BIU (H3).

2.2. T-TPACK and the hypothesis

Mishra and Koehler [23] proposed the term TPACK as an extension of the pedagogical content knowledge presented in Shulman [24] model. It outlines the crucial knowledge that teachers need to possess in order to be effective in utilizing technology in the classroom. Technology-dimensional TPACK (T-TPACK) examines the relationships between several knowledge domains and identifies the fundamental components of teacher knowledge required for effectively incorporating technology into teaching. To investigate the technology-related elements that impact the EFL teachers' adoption of technology, this study mainly focuses on the four T-TPACK constructs, namely technological knowledge (TK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and TPACK, which all incorporate a technological element as shown in Figure 2.

Furthermore, the introduction of T-dimensions has revealed a significant influence on the self-efficacy of preservice teachers, which in turn acts as a predictor for their willingness to incorporate technology [25]. Zhang and Chen [26] also highlighted the issue of language teachers and learners facing difficulties when using technologies. TPACK is employed in this study as a mechanism for delineating instructors' inclination to utilize ICT and their proficiency. An investigation of the relationships between teachers' T-TPACK and their intention to use ICT could yield useful insights into enhancing teachers' competence to effectively incorporate ICT into their teaching practices. With respect to current research question, the hypotheses were addressed: i) The T-TPACK of English teachers positively affects on BIU of ICT use at Chinese vocational colleges (H4); ii) The T-TPACK of English teachers positively affects on PU of ICT at Chinese vocational colleges (H5); iii) The T-TPACK of English teachers positively affects on PEU of ICT at Chinese vocational colleges (H6); and iv) The T-TPACK of English teachers positively affects on ATCU of ICT at Chinese vocational colleges (H7).

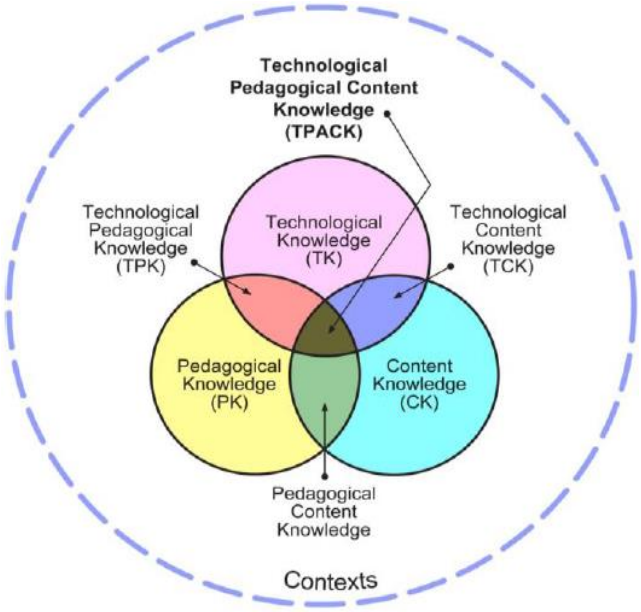

Figure 2. TPACK [23]

2.3. Research question and the proposed research model

Prompted by the ICT policies for Chinese vocational colleges, a positive tendency towards the use of technology among EFL teachers has been found in many studies [12], [27]. While some research also reveals that Chinese EFL teachers have difficulty in effectively integrating technology into their courses [28]. The present study utilized T-TPACK components as external variables in the TAM to examine the impact of T-TPACK on the acceptance of ICT among EFL teachers in Chinese vocational colleges. Based on the prior

study, seven parameters, namely TK, TCK, TPK, TPACK, PU, PEU, and ATCU, were chosen as independent variables, whereas BIU was picked as the dependent variable as demonstrated in Figure 3. Hence, the present study aims to answer the following question: What relationships exist between the TAM and the T-TPACK of EFL teachers at Chinese vocational colleges, and how is their behavioral intention to use ICT?

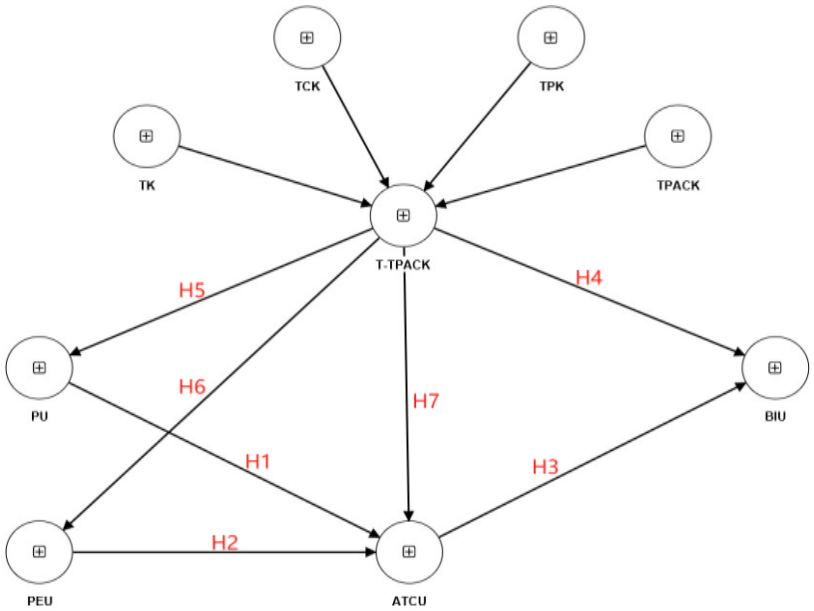

Figure 3. Proposed research model in this study

3. METHOD

3.1. Research design

To investigate a particular topic, this study employed a quantitative method with a survey research design, which is more efficient in testing the variables. To collect quantitative data, surveys with questionnaires are commonly used. The measurement instrument for this study's descriptive and inferential components consists of a series of statements or questions to which participants are asked to respond. Data were collected through questionnaires, which can be used to assess people's perceptions, opinions, knowledge, attitudes, and beliefs [29].

3.2. The participants

The target population for this study consisted of EFL teachers working at vocational colleges in Shandong Province. At the start of the semester, the EFL teachers were emailed an online invitation to take part in the survey, together with an information sheet and consent form. Altogether, 440 EFL teachers from Shandong Province, specifically employed at vocational institutions, took part in the survey. The sample consisted of male and female English language teachers of different age groups, with varying levels of teaching experience and educational background. The frequency and proportion of respondents in each category for demographic data, such as gender, age groups, education levels, and working experiences, are illustrated in Table 1. This descriptive analysis highlights the demographic characteristics to provide insights into the profile of EFL teachers in Chinese vocational colleges.

3.3. The instrument

A web-based survey was developed and conducted to assess the model according to the objectives of the study. The instrument comprised three components: demographic information, T-TPACK structures, and EFL teachers' technology acceptance of ICT based on the previous studies with some modifications. Considering participants are English teachers, the items were presented in the original English version. The T-dimensional TPACK (TK, TCK, TPK, TPACK) instrument with 23 items was adapted from the TPACK framework and the TPACK-EFL scale by Baser *et al.* [30]. The technology acceptance of the ICT instrument included 15 items and was adapted from several studies [18], [31], adjusted to take into account the particular circumstances of the EFL teachers taking part in this research.

Table 1. Frequency distribution of sample data

Demographic type		Frequency	Percentage (%)
Gender	Male	33	10.60
	Female	279	89.40
Age	20-30 years old	43	13.80
	31-40 years old	99	31.70
	41-50 years old	127	40.70
	>50 years old	43	13.80
Education	Bachelor's Degree	96	30.80
	Master's Degree	216	69.20
Working experiences	1-5 years	68	21.80
	6-10 years	46	14.70
	11-15 years	41	13.10
	16-20 years	74	23.70
	More than 20 years	83	26.60

3.4. Data analysis procedure

This phase will start after the instruments reaches the acceptable reliability and validity required. Before distributing the questionnaire, the EFL teachers will receive information regarding the objective of the questionnaire and instructions on how to complete their responses. The researcher will distribute the online questionnaires to the participants using Qualtrics, a web-based application specifically designed for conducting online survey research. Out of the original sample of 340 EFL teachers, 28 were excluded from the analysis because they provided inconsistent responses and unreliable data.

The study employed partial least squares structural equation modeling (PLS-SEM) for data analysis and the data collected were examined utilizing a two-step assessment approach, which involved the measurement model and structural model. The selection of PLS-SEM in this research was based on several justifications. If the research attempts to investigate a current theory, it is advisable to prioritize the use of PLS-SEM which can assist in efficiently managing exploratory research that involves intricate models. Furthermore, it facilitates the simultaneous examination of both structural and measurement models, resulting in the production of precise measurements [32].

4. RESULTS

4.1. Assessment of the measurement model (outer model)

The measurement model involved assessing the reliability and validity of the concept measurements. When evaluating measurement models, it is crucial to distinguish between constructs that are measured reflectively and those that are measured formatively. In order to operationalize the measurement model, Smart PLS 4.0 software was used to generate each possible outer and inner path. Figure 4 illustrates the measurement model, and it can be shown that the second-order construct of T-dimensional TPACK (TK, TCK, TPK, and TPACK) was specified formatively. In order to address the collinearity issue resulting from the high variance inflation factor (VIF) between TPK and TPACK, the two items (TPK 1 and TPK 7) were removed from the model.

4.2. Internal consistency reliability

First, a structural model and measurement were graphically built to assess the constructs' reliability. The Cronbach's alpha and composite reliability scores of the constructs were extracted when the PLS algorithm was run. Every score exceeded the recommended thresholds, with Cronbach alpha at 0.708 and composite reliability [32] at 0.500. The Cronbach's alphas for the multi-item constructs are shown in Table 2. To address the collinearity issue resulting from the high VIF between TPK and TPACK, the two items (TPK 1 and TPK 7) were removed from the model.

4.3. Indicator reliability

Due to the possibility of a considerable outer loading being relatively light, a widely accepted guideline is that standardized outer loadings should be 0.708 or greater. The justification for this rule can be comprehended by considering the square of a standardized indicator's outer loading, which is known as the communality of an item [32]. Following this criteria, the outer loading values in Table 3 have achieved the threshold value, indicating all items had outer loading values more than 0.708.

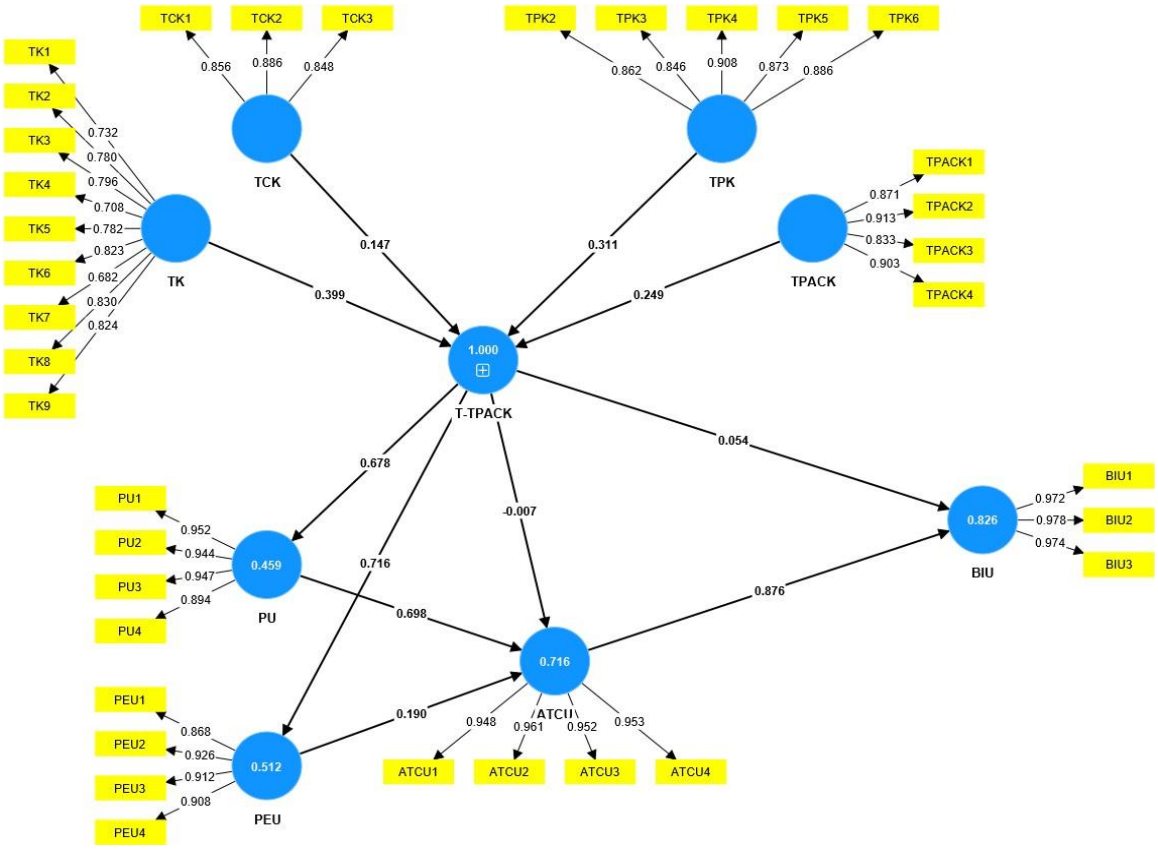

Figure 4. Measurement model of English teachers' technology acceptance and TPACK on their intention to use ICT

Table 2. Construct reliability scores

Constructs	Sub-constructs	Items	Cronbach's alpha	Composite reliability
TPACK-EFL	TK	9	0.916	0.931
	TCK	3	0.830	0.898
	TPK	5**	0.924	0.942
	TPACK	4	0.903	0.932
Internal factors	PU	4	0.951	0.965
	PEU	4	0.925	0.947
	ATCU	4	0.967	0.976
	BIU	3	0.974	0.983

*1 item deleted; **2 items deleted

4.4. Measurement of the significance of outer weights of T-TPACK

The data in Table 4 shows that all the indicators for the formative construct satisfy the VIF criteria, with values consistently below the threshold of 5 [32]. As shown, the two items (TPK 1 and TPK 7) were discarded from the model to overcome the collinearity issue due to the high collinearity in the VIF between TPK and T-TPACK. It can be concluded that in any of the formative structures, the level of collinearity of this study reached critical levels. Therefore, there is no multicollinearity problem with the results.

4.5. Convergent validity

Convergent validity is frequently assessed at the construct level using the average variance extracted (AVE) measurement. The mean of the squared loadings of the construct-related indicators is used to calculate the criterion. The result is then divided by the total number of indicators once the sum of the squared loadings has been calculated. After calculating the sum of the squared loadings, the result is divided by the total number of indicators. The AVE is a measure of the extent to which a construct shares common characteristics [32]. Table 5 shows the construct reliability for the measurement model, and all constructs have met the minimal AVE criteria. Hence, the measurements for all constructs exhibit a satisfactory degree of convergent validity.

Table 3. Outer loadings values

Constructs	Sub-constructs	Item label	Outer loadings (≥0.5)
Internal	ATCU		0.876
		ATCU1	0.948
		ATCU2	0.961
		ATCU3	0.952
		ATCU4	0.953
			0.190
	PEU	PEU1	0.868
		PEU2	0.926
		PEU3	0.912
		PEU4	0.908
	PU		0.698
		PU1	0.952
		PU2	0.944
		PU3	0.947
		PU4	0.894
T-dimensional TPACK	TK		-
		TK1	0.731
		TK2	0.780
		TK3	0.796
		TK4	0.708
		TK5	0.782
		TK6	0.823
		TK7	0.682
		TK8	0.830
		TK9	0.824
	TCK		-
		TCK1	0.856
		TCK2	0.886
		TCK3	0.848
	TPK		-
		TPK2	0.862
		TPK3	0.846
		TPK4	0.908
		TPK5	0.873
		TPK6	0.886
	TPACK		-
		TPACK1	0.871
		TPACK2	0.913
		TPACK3	0.833
		TPACK4	0.903
BIU		BIU1	0.972
		BIU2	0.978
		BIU3	0.974

Table 4. Significance of outer weights and collinearity issue

Constructs	Sub-constructs/Items	Outer weights	P-value	VIF
T-dimensional TPACK	TK	0.399	0.000	2.474
	TCK	0.147	0.000	2.653
	TPK	0.311	0.000	4.383
	TPACK	0.249	0.000	4.380

Table 5. Construct reliability and validity

Constructs	Sub-constructs	Composite reliability (CR≥0.7)	Average variance extracted (AVE≥0.5)
TAM	ATCU	0.976	0.909
	PEU	0.947	0.817
	PU	0.965	0.873
T-TPACK	TK	0.931	0.600
	TCK	0.898	0.745
	TPK	0.942	0.766
	TPACK	0.932	0.776
BIU	-	0.983	0.950

5. FINDINGS

Following an assessment of the measurement model's validity and reliability, the structural model is used to evaluate the relationship between the endogenous and exogenous constructs and determine the

measurement model's strength. PLS-SEM allows for hypothesis testing using path analysis by utilizing a bootstrap approach. The outcome of the structural model would demonstrate the degree to which the collected data substantiates a hypothesis or concept. Based on the criteria established by Hair *et al.* [32], we implemented the six stages during the examination process. First, we began by examining the issue of collinearity, which was then followed by analyzing the path coefficients (β) in stage 2. Furthermore, the R^2 coefficients of determination were examined during stage 3. During step 4, we assessed the significance of the internal constructs by measuring the effect size of f^2. Subsequently, in steps 5 and 6, we computed Q^2 and its impact.

5.1. Collinearity issue

In order to evaluate collinearity, it is necessary to quantify the VIF values, similar to how formative measurement models are assessed. Table 6 displays the exogenous construct T-TPACK's VIF value in the structural model. The result shows that the VIF value of T-TPACK to BIU is 1.568, lower than the required threshold of 5.0.

Table 6. VIF values

Constructs	VIF
T-TPACK->BIU	1.568

5.2. Structural model relationship

The significance of the relationships between the independent and dependent variables needs to be assessed in the present investigation. Given a level of significance of 5%, all relationships indicated in the structural model are statistically significant. The path coefficients and the significance of the results were evaluated to ensure the stability of the structural model in Table 7. The fourth hypothesis is: EFL teachers' T-TPACK has a positive influence on their BIU of ICT in Chinese vocational colleges. The results indicate that there is a significant association between T-TPACK and BIU (p-value=0.162). At the 5% level, this coefficient is not significant. In addition, it should be noted that the significant relationship shows the value of negative path coefficient (β=0.054). H4 is not supported, demonstrating that EFL teachers' T-TPACK has no influence on their BIU. Regarding the primary constructs of TAM, PU has a significant effect on ATCU (β=0.698; p=0.000) and PEU on ATCU (β=0.190; p=0.001). ATCU has a significant influence on BIU with β=0.876; p=0.000. Furthermore, EFL teachers' T-TPACK both significantly influence PU (β=0.678; p=0.000) and PEU (β=0.716; p=0.000). In summary, the PLS-SEM results suggest that all hypotheses are supported except H4.

Table 7. Results of structural model

Hypotheses	Path	Path coefficient (β)	P-value	Results
H1	PU->ATCU	0.698	0.000***	Supported
H2	PEU->ATCU	0.190	0.001**	Supported
H3	ATCU->BIU	0.876	0.000***	Supported
H4	T-TPACK->BIU	0.054	0.162	Not supported
H5	T-TPACK->PU	0.678	0.000***	Supported
H6	T-TPACK->PEU	0.716	0.000***	Supported
H7	T-TPACK->ATCU	-0.007	0.882	Not supported

***significant at 1% level, **significant at 5% level

5.3. Coefficient of determination R^2

A model's power to accurately represent the data by calculating the degree of connection that the PLS path model demonstrates is known as its explanatory power. A structural model's ability to explain the data is primarily assessed using the coefficient of determination (R^2). In this calculation, the correlation between the observed and predicted values of a particular endogenous component is squared. The coefficient calculates the extent that each of the external hidden factors influences the internal latent variable overall [32]. According to Hair *et al.* [32], R^2 values of 0.75, 0.50, and 0.25 can be categorized as substantial, moderate, and weak, respectively. The R^2 value for BIU is 0.826, as seen in Table 8. The data in this study can be deemed to possess a high level of predictive accuracy. Based on Table 8, the R^2 value for the model was 0.826 for BIU. This implies that 82.6 % of the total variance in the BIU can be explained and predicted by the exogenous constructs linked to it respectively. Meanwhile, the R^2 adjusted value explains that the significant predictors account for 82.5% of the total variance in the BIU.

Table 8. R^2 and R^2 adjusted values

Constructs	R^2	R^2 adjusted
BIU	0.826	82.5%

5.4. Effect size (f^2)

The effect size of the structural model was assessed to see if the rise in R^2 is proportional to the amount of unexplained variance in the endogenous construct [32]. Researchers can assess the impact of removing a specific predictor construct on the R^2 value of an endogenous construct. The f^2 effect size metric is partially duplicative of the magnitude of the path coefficients. Referring to Table 9, the analysis of effect size reveals a substantial effect size for internal factors towards BIU (f^2=0.903). The effect size of T-TPACK and external factors towards internal factors (f^2=0.317, 0.158 respectively) reveals both medium levels. No effect size (f^2=0.008, 0.001 respectively) for external factors and T-TPACK towards BIU was found at the same time.

Table 9. Effect size (f^2) values

Variable	f^2 values	Effect size
PU->ATCU	0.663	Substantial
PEU->ATCU	0.044	Medium
ATCU->BIU	2.811	Small
T-TPACK->BIU	0.011	Medium
T-TPACK->PU	0.849	Medium
T-PACK->PEU	1.051	Medium
T-PACK->ATCU	0.000	Small

Note: 0.02- small effect size, 0.15- medium effect size, 0.35- substantial effect size

5.5. Assessing predictive relevance (Q^2)

The predictive relevance of the suggested model was assessed in the final step using Stone-Geisser's (Q^2) measurement. According to Hair *et al.* [32], a model must possess predictive relevance in order to effectively forecast the data of the indicators. A model is considered to have satisfied the predictive relevance if its Q^2 value is greater than 0. In addition, a Q^2 value of 0.02 is classified as small, 0.15 as medium, and 0.35 as large. Table 10 displays the outcome of the predictive relevance. The Q^2 value of BIU was found to be 0.332, indicating that all endogenous constructs in the model have strong predictive relevance.

Table 10. Results of predictive relevance

Variable	Q^2 values	Predictive relevance
BIU	0.332	Medium

6. DISCUSSION

The success of using technology in the classroom is significantly influenced by the EFL teachers' behavioral intention on ICT use. In order to evaluate teachers' BIU to utilize technology, many models have been developed and modified in various contexts by include a variety of independent factors in addition to the two original variables of the TAM [33]. This study, drawing on previous empirical research on TAM and TPACK, identified the effect of EFL teachers' T-TPACK on their technology acceptance with the PLS-SEM model. In the hypothetical model, we proposed that T-TPACK may serve as a predictor of ICT acceptance by EFL teachers at Chinese vocational colleges.

6.1. Discussion of the relationships in the original TAM

According to the results, TAM is a valid theoretical framework for explaining teachers' intentions to use ICT. The majority of the relationships that were hypothesized in the original TAM were confirmed, including the impact of PU and ATCU, PEU on ATCU, and ATCU on BIU. The intention to use ICT in EFL instruction in technical and vocational colleges is significantly influenced by PU, according to the literature. Research has indicated that PU significantly influences EFL teachers' ATCU and their intention to utilize technology-based teaching methods. Furthermore, it has a clear impact on individuals' intentions and attitudes towards utilizing ICT, as some researchers have identified it as the primary influential element in users' willingness to adopt new technology.

The degree to which individuals expect to utilize new technology without having major obstacles is known as perceived ease of use [18]. This suggests that individuals are more inclined to employ technology

when it is user-friendly [34]. Prior studies have demonstrated a relationship between PEU and both ATCU and BIU. Study by Huang [35] showed that it directly and favorably affects the uptake of new technology. The attitude of EFL teachers towards ICT has been influenced by its PU and PEU, as indicated by previous studies. This suggests that these factors have an impact on the actual utilization of technology-based teaching tools. The results of the current study showed that attitude is a defining characteristic of the behavior that EFL teachers display about ICT, which functions as a conduit for improving language instruction's effectiveness and performance.

6.2. Discussion of the relationships between T-TPACK and TAM

Effective technology integration requires teachers to possess a certain level of knowledge and experience. The capacity to teach English, possess personal English language competency, and be proficient in using technical resources are the main prerequisites for successful technology integration for EFL teachers [26], [36]. But until teachers become aware of the benefits of technology or the integration aligns with their views on technology, they are neither useful nor efficient [20], [37], [38]. Previous studies [12], [39] demonstrated that there were positive correlations between the attitudinal aspects of PU and PEU of technology, and the overall TPACK levels of Chinese EFL teachers. This association was observed when TPACK was considered as an external variable in the TAM. Verification of these findings reinforces the suggested theoretical framework and offered hypotheses [19], [40].

According to Bui [41], before using technology in the classroom, language teachers need to understand its usefulness and practicality. The digital devices, whiteboards, and presentation software that are used in classroom instruction are among the well-known and well-established technical instruments in EFL teaching classrooms. With increased knowledge of the benefits and ease of use of those technologies, Chinese English teachers could propose a higher frequency of use [26]. It was discovered in previous literature that teachers' acceptance and TPACK views are often closely associated by using correlation analysis to study the relationship between TPACK and technology acceptance [19]. Though the findings in this study indicate that T-TPACK does not have a substantial direct effect on BIU and ATCU, T-TPACK can indirectly influence technological adoption by affecting PU and PUE. Policymakers and educational stakeholders have to acknowledge teachers' behavioral intention to utilize technology in the classroom in order to assist them in developing adequate TPACK abilities [42]–[45].

7. CONCLUSION

This study developed a conceptual model to investigate the proposed interactions between T-TPACK and TAM variables from a theoretical perspective. Chinese EFL teachers need to exert significant effort in utilizing technology to enhance their teaching methods in order to promote sustainable development. The study found that PU and PEU of technology, as well as attitudes towards ICT, significantly influenced the behavioral intention to utilize technology. According to the TPACK framework, identifying the potential for using technology to improve teaching and learning requires an understanding of how pedagogy, content, and technology interact to generate distinct sectors of expertise. Practically speaking, the study clarified the roles of EFL stakeholders, such as EFL instructors, school administrators, educational software/application designers, and policymakers. This study emphasizes the critical role that Chinese EFL instructor competence and understanding in integrating technology played in both directly influencing participants' technology-using behaviors and indirectly influencing their attitudes towards technology. The results of the study have wide-ranging consequences for both professionals and educators. Teachers who seek to effectively incorporate ICT into EFL classes require the technical skills and the TPACK necessary for managing the technology. According to this, teachers who obtain substantial TPACK are more likely to engage fully in knowledge development activities. To address ineffective use of technology, educational institutions and teacher educators need to focus more on the incompetence of EFL teachers to integrate technology.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
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CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

- The data that support the findings of this study are openly available in Web of Science at https://www-webofscience-com.
- The data that support the findings of this study will be available in https://ijere.iaescore.com.
- The data that support the findings of this study are available on request from the author, [LC]. The data, which contain information that could compromise the privacy of research participants, are not publicly available due to certain restrictions.
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