

Research Article

A STRUCTURAL EQUATION MODEL OF THE DETERMINANTS AFFECTING STUDENTS' BEHAVIORAL INTENTION AND SATISFACTION TOWARDS BLENDED LEARNING OF ENGLISH AS A FOREIGN LANGUAGE AT A BANGKOK PUBLIC UNIVERSITY

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Abstract

This research intends to investigate the determinants based on the integration of Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM). By integrating TPB and TAM, the researcher developed a conceptual model of the relationships between factors that affected behavioral intention and satisfaction towards using Google Classroom as a blended learning system in an EFL course. The research was conducted in a Bangkok Public University, with 354 first-year undergraduate EFL students who enrolled in the English foundation course via an online questionnaire. The Structural Equation Model (SEM) was employed for hypotheses testing. The result revealed 7 interesting determinants which had significant positive effects with Behavioral Intention (BI) and Satisfaction (S) to use Google Classroom as a blended learning system in an EFL course; 1) Perceived Ease of Use (PEOU), 2) Perceived Behavior Control (PBC), 3) Subjective Norm (SN), 4) Computer Self-Efficacy (CSE), 4) Social Presence (SP), 5) Collaborative Learning (CL), 6) Facilitating Conditions (FC), and 7) Task-Technology Fit (TTF). In addition, the research found that all 8 determinants had a significant positive direct effect on behavioral intention. The strongest direct effect is TTF ($\beta = 0.748$, $p\text{-value} = 0.000$). Moreover, PEOU, SP, CL, FC, and TTF had a positive direct effect on satisfaction. The strongest direct effect is TTF ($\beta = 0.771$, $p\text{-value} = 0.000$). Furthermore, CSE was the only determinant which had significant indirect effect on both behavioral intention ($\beta = 0.275$) and satisfaction ($\beta = 0.289$). In SEM, the goodness of fit indices met seven specified criteria of model fit acceptance ($\chi^2/df = 1.647$, RMSEA = 0.043, SRMR = 0.033, NNFI = 0.938, TLI = 0.961, CFI = 0.974, and GFI = 0.929). The result indicated a strong fit between the structural model and the data.

Keywords: Conceptual Model, SEM, Behavioral Intention, Blended Learning, Google Classroom

Introduction

Technology has been made part of methodology in language teaching and learning for a long time (Dudeney & Hockey, 2007). Many teachers have started to use technology as a tool to improve teaching and enhance students' learning in the classrooms (Yutdhana, 2005). The need for creating engaging learning environments is employed, and new technologies are being introduced into language education. This trend leads to a relatively new learning environment called blended learning which has been defined in various ways. The blended learning has been introduced and has become a very famous approach, representing one of the educational innovations among higher educational institutions in Thailand. Most universities have also provided students with an alternative and highly flexible access to English language learning (Dennis, 2011). In consequence, this has led to a need to conduct a research that investigates the students' attitude, behavioral intention, and satisfaction towards a blended learning environment in the classroom.

Research Objectives

The purposes of this research were to develop and investigate the conceptual model of TPB, TAM, individual differences, social factors and system characteristics affecting Thai undergraduate students' attitude, behavioral intention, and satisfaction towards using Google Classroom as a blended learning system.

Literature Review

The literature review is consisted of three main aspects as followings:

1. EFL and Blended Learning in Thailand

In Thailand, English is accounted as a foreign language which has been taught in schools for decades. Integrating ICT into learning and teaching is acquired as a part of blended learning (Laohajatsang, 2010). Furthermore, teachers use a blended learning model as a pedagogical tool in the EFL classroom context to meet with students' learning goals (Banyen et al., 2016). Google Classroom becomes one of the effective blended learning platforms, accessing through any online devices (Iftakhar, 2016). Moreover, the functions of Google Classroom can facilitate teachers to create, share, grade tasks easily, and support the students in communication and collaboration (Pappas, 2015). Based on the studies, Google Classroom clearly supports a blended learning environment.

2. Theoretical Framework: Models of Individual Acceptance (TPB, TAM, and Integration of TPB and TAM)

2.1 Theory of Planned Behavior (TPB)

A social psychology is also applied to behavioral models. The model assumes that behavior is planned; therefore, it predicts how the behavioral intention of students can change intentionally (Ajzen, 1991). The core constructs of TPB are perceived behavioral control, and social norm which can affect attitude, behavioral intention, and satisfaction towards the use of technology (Fishbein, & Ajzen, 1975).

2.2 Technology Acceptance Model (TAM)

This model is based on an information system theory on how users accept the use of technology. Davis (1989) proposes that the technology acceptance model is used to clarify the factors affecting information

technology use and employed to state the acceptance of technology. The model assumes a negotiating role of perceived ease of use and usefulness in association between system characteristics as external variables and system usage.

2.3 Integration of TPB and TAM

The model combines the predictors of TPB with perceived usefulness from TAM to provide a hybrid model (Taylor & Todd, 1995). The core constructs of Integration TPB-TAM are divided into characteristics of variable, established relations between independent variables: perceived ease of use, perceived usefulness, attitude, subject norm, and perceived behavioral control, and dependent variables: behavioral intention.

3. A Conceptual Model

The conceptual model is based on the technology acceptance model, the theory of planned behavior, the integration TPB-TAM model, and the possible factors, affecting students' behavioral intention, and satisfaction of blending learning. This model is developed to test hypotheses by examining the relationship among variables, shown in figure 1. The approach corrects the relationship between independent variables (computer self-efficacy, social factors, system characteristics, constructs of TPB and TAM, and attitude) and dependent variables (satisfaction, and behavioral intention) in a blended English course.

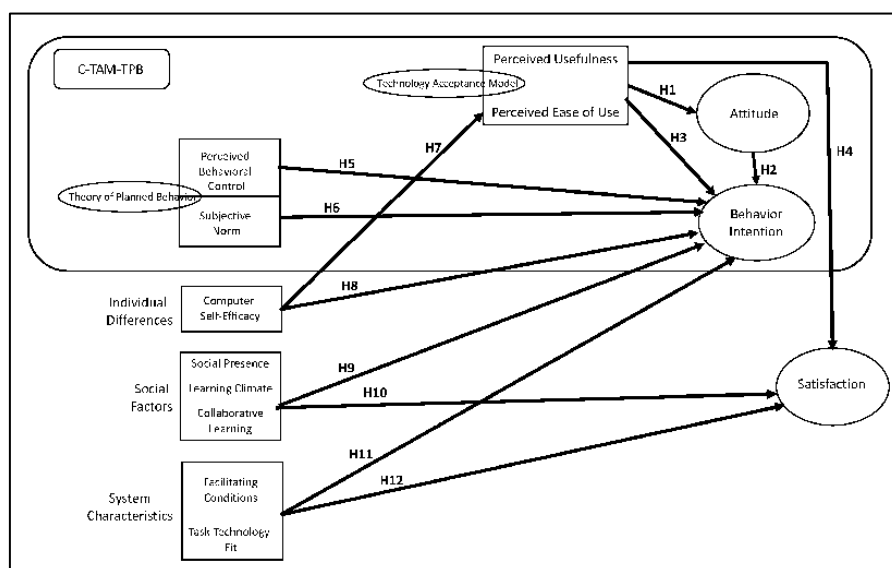


Figure 1: Conceptual Model

Al-Azawei et al. (2017) defined computer self-efficacy, described as individual difference as students' self-confidence and perception of ability to perform learning tasks within the use of a computer in an e-learning system.

Social factors constructed 3 determinants which were social presence, collaborative learning, and learning climate. Richardson and Swan (2003) explained social presence as the degree of observed person as real in mediated communication. Sorden and Munene (2013) defined collaborative learning as learners have direct learning within a social learning environment. Chen (2014) defined learning climate as a factor affecting student learning gratifications with web-based English learning.

System characteristics are system design features which are constructed of 2 determinants. First, Teo (2009) defined facilitating conditions as factors in the environment which affected a person's desire to perform a task. Whereas, Goodhue and Thompson (1995) defined task-technology fit as the degree of individuals' assessment on performing the tasks using technology.

3.1 Research Hypotheses

Hypothesis 1: Perceived usefulness and perceived ease of use have a significant positive effect on students' attitude towards using blended learning.

Hypothesis 2: Attitude has a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 3: Perceived usefulness and perceived ease of use have a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 4: Perceived usefulness and perceived ease of use have a significant positive effect on students' satisfaction towards using blended learning.

Hypothesis 5: Perceived behavioral control has a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 6: Subjective norm has a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 7: Computer self-efficacy has a significant positive effect on students' perceived usefulness and perceived ease of use towards using blended learning.

Hypothesis 8: Computer self-efficacy has a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 9: Social factors have a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 10: Social factors have a significant positive effect on students' satisfaction towards using blended learning.

Hypothesis 11: System characteristics have a significant positive effect on students' behavioral intention towards using blended learning.

Hypothesis 12: System characteristics have a significant positive effect on students' satisfaction towards using blended learning.

Research Methodology

The methodology of the research procedure included four major sections as followings:

1. Research Design

This quantitative research was a correlational design using an online questionnaire to collect data which was distributed to the first-year undergraduate EFL students from a public university in Bangkok.

2. Sample of Participants

To determine the sample size for SEM in this study, the researcher used Soper's (2020) prior sample size calculator for Structural Equation Model (SEM). The number of samples was calculated based on the number of observed (50) and latent variables (13), anticipated effect size (0.2), the target probability (0.05) and statistical power level (0.8). The sample for this study was 511, selected by using purposive sampling technique. The characteristics of the sample were the first-year undergraduate students, currently enrolling the English foundation course in a public university in Bangkok, Thailand, and had experiences of blended learning using Google Classroom as a mode of learning.

3. Instrument

An online questionnaire was used as an instrument to gather data consisting of participants' attitude, behavioral intention, and satisfaction which related to the previous research studies. The online questionnaire consisted of 3 parts: Part I: Data Screening (6 items), Part II Demographic Data (5 items) and Part III Measurement of Variables (50 items), composed of 13 constructs using a five-point Likert scale ranging from (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree). For the purpose of this study, the questionnaire was translated from English to Thai and translated back to English for the first-year undergraduate EFL students in a Bangkok public university.

Ensuring the content validity of the scales, three experts in the field of education and technology validated the questionnaire with the Index of Item Objective Congruence (IOC). The pilot testing for the questionnaire reliability was set up to distribute to 30 participants who were the first-year undergraduate EFL students, enrolling in English foundation course that were excluded from the 511 participants for the study. The Cronbach's alpha of the questionnaire was tested for each construct. The result was 0.97 which indicated excellent consistency.

4. Data Collection and Data Analysis

For this quantitative research, the researcher used an online questionnaire to collect data which was distributed to 511 first-year undergraduate EFL students from a public university in Bangkok. From data screening, a total of 354 data sets was used to analyze the confirmatory factor, and SEM was employed in the data analysis to test the hypotheses. All data were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to establish frequency, mean, standard deviation, and percentage for data screening and demographic profiles of respondents. A structural equation model analysis (SEM) was employed to test the hypotheses of the study. All items were first inspected for univariate normality and detection of outliers, and the exploratory factor analysis (EFA) was applied to drive the minimum number of factors before proceeding to confirmatory factor analysis (CFA) and structural equation model analysis (SEM).

Research Findings

Part 1: Descriptive Statistics

The characteristics of the participants exposed the data that comprised 81.9% of female and 18.1% of male respondents. The majority of the experienced participants used the internet at 98.6% and used the internet several times a day at 99.2%. The participants were required to have blended learning experiences using Google

Classroom. Thus, screening data was carried out to meet the requirement. The total of data screening responses was 354 (95.27%) out of 511.

Part 2: Instrument of Measurement

1. Descriptive of Variables

This study comprised 13 latent variables. The descriptive variables and normality test revealed the mean total of all constructs, indicated the high response at \bar{X} (4.21) and SD (0.50). The highest average mean was PBC (\bar{X} = 4.45, SD = 0.52), and the lowest was CL (\bar{X} = 3.73, SD = 0.91). Besides, all variation inflation factors (VIF) of all variables were lower than threshold 5.00 and tolerance exceeding 0.2 indicating that multicollinearity was not a major concern.

2. Evaluation of Measurement Model

In order to identify the structure of the relationship between the variables and the respondents, the exploratory factor analysis (EFA) was used to reduce the underlying structure of a large set of variables into a smaller set of summary variables. The Oblique (Promax) rotation in SPSS was applied to find multiple cross loadings and indicate the redundancy of the data that should be excluded. The results revealed that KMO and Bartlett's Test was at 0.956, and Initial Eigenvalues % of Variance exceeded 2.00. The communality of all items was also greater than 0.40. Factor loading magnitude in this study exceeded 0.5. The factor pattern matrix contained the coefficients for the linear combination of the variables, grouping the most potential main constructs into 9, out of 13 components, deleting items based on the component loading results.

Confirmatory Factor Analysis (CFA) was used to figure out if a relationship between a set of observed variables and the underlying constructs exists, while performing hypothesis testing. The factor loadings of all observed variables were adequate ranging from 0.598 to 0.934 which were potential to be included and confirmed to the convergent validity test in the model (Hair et al., 2006). Then, the square root of AVE was computed to measure the discriminant validity. PEOU, CSE, SP, CL, and FC had the square root of AVE higher than the construct's correlation. However, SN, TTF, BI, S did not have good discriminant validities. Nonetheless, the exclusion of a certain variable was not always necessary as it may alter the nature of construct (Hair et al., 2016). Thus, all constructs were kept as the main part of conceptual model. The Cronbach alpha was 0.945, indicated excellent consistency. Additionally, the value of AVE was from 0.25 to 0.55 and the composite reliability was from 0.67 to 0.89. The values of all construct validity and reliability were acceptable.

Table 1 revealed 7 criteria, satisfied the measurement of Goodness Fit. This was assured that the model would be suitable for further analysis.

Table 1 Goodness of Fit of Measurement Model

Fit Index	Criteria	Result	Goodness of Fit
χ^2/df	< 2.00 Good	1.565	Fit
	2.00 – 5.00 Fair		
RMSEA	< 0.05 Good	0.040	Fit
	0.05 – 0.10 Fair		

Fit Index	Criteria	Result	Goodness of Fit
SRMR	< 0.05	0.032	Fit
NNFI	> = 0.90	0.942	Fit
TLI	> = 0.90	0.966	Fit
CFI	> 0.95 Good 0.90 – 0.95 Fair	0.978	Fit
GFI	> 0.95 Good 0.90 – 0.95 Fair	0.934	Fair

Part 3: Evaluation of Structural Equation Model (SEM)

The results of SEM estimated the path coefficients and the significant level, used to explain how much constructs were related to other constructs as shown in figure 2. The modification indices were suggested to improve the model fit.

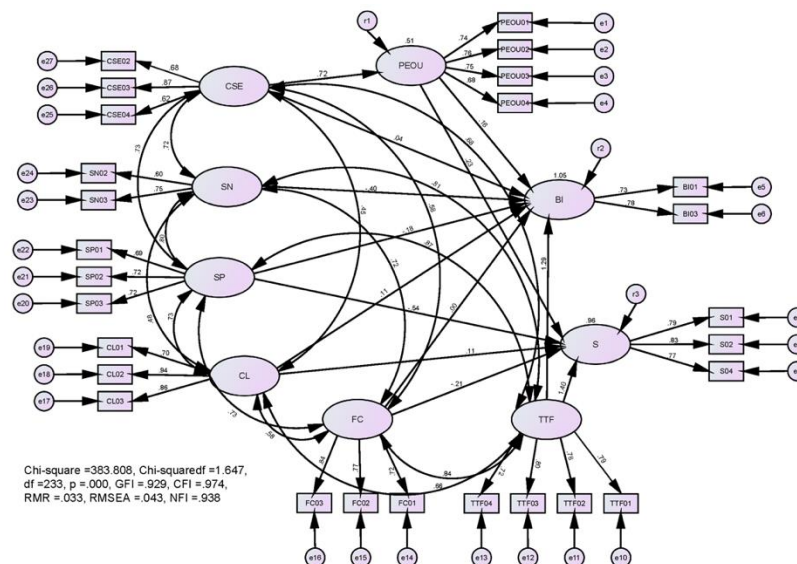


Figure 2 Structural Model After Adjustment (Final Model)

After the model adjustment, the goodness of fit was rechecked and found to be improved ($\chi^2/df = 1.647$, RMSEA = 0.043, SRMR = 0.033, NNFI = 0.938, TLI = 0.961, and CFI = 0.974). All indicated the model fit, except GFI which was 0.929, making the fair fit within the interval of 0.90-0.19, suggesting acceptable.

The total effects in table 2 included results of both direct and indirect effects.

Table 2 Summary of Total Effects

Variables	R ²	Effects	Independent Variables						
			PEOU	CSE	SN	SP	CL	FC	TTF
PEOU	0.21	Direct	-	0.47	-	-	-	-	-
		Indirect	-	-	-	-	-	-	-
		Total	-	0.47	-	-	-	-	-

Variables	R ²	Effects	Independent Variables						
			PEOU	CSE	SN	SP	CL	FC	TTF
BI	0.62	Direct	0.49	0.44	0.43	0.61	0.57	0.61	0.75
		Indirect	-	0.28	-	-	-	-	-
		Total	0.49	0.72	0.43	0.61	0.57	0.61	0.75
S	0.62	Direct	0.52	-	-	0.56	0.51	0.58	0.77
		Indirect	-	0.29	-	-	-	-	-
		Total	0.52	0.29	-	0.56	0.51	0.58	0.77

Part 4: Results of Hypothesis Test

According to the output, all probability (sig) included variables of hypothesis value were < 0.05. The results were all supported by 9 hypotheses (H3, H4, H6, H7, H8, H9, H10, H11, and H12). Nevertheless, the direct effect of PU on BI and S, CSE on PU, LC on BI and S did not appear in the research hypothesis because variables were excluded from the model during EFA analysis.

Discussion and Conclusion

The results of the analysis proposed that the behavioral intention (BI) of students towards using blended learning in classroom could be predicted by TTF, FC, CL, SP, SN, CSE, and PEOU ($R^2 = 0.62$). The satisfaction (S) of students towards using blended learning in classroom could also be predicted by TTF, FC, CL, SP, CSE, and PEOU ($R^2 = 0.62$).

According to the results, TTF was the strongest effect (0.75) on BI towards using blended learning in classroom, followed by CSE and FC. Whereas TTF was the strongest effect (0.77) on S towards using blended learning in classroom, followed by FC and SP.

In this study, the researcher investigated the determinants that affected students' behavioral intention, and satisfaction. The literature review provided general support for the relevance of the conceptual model which created hypotheses regarding the relationships among the determinants of the model. In these results, significant effects were found in regard to Hypotheses 3 and 4. In TAM, PEOU had a significant positive direct effect on BI (0.49), and S (0.52). An excluded variable, PU had a significant positive direct effect on BI (0.58), and S (0.59). According to Al-Azawei et al. (2017), when students perceived Google Classroom as useful and easy to use, they had higher behavioral intention, and satisfaction towards using blended learning in classroom.

In addition, the analysis results regarding Hypotheses 6, 7, and 8, indicated that in TPB, SN had a significant positive direct effect on BI (0.43). An excluded variable, PBC had a significant positive direct effect on BI (0.53). According to Bokolo et al. (2020), when students had positive perceptions of subjective norm, and perceived behavior control of Google Classroom, they had higher behavioral intention towards using blended learning in classroom. In the individual difference, CSE had a significant positive direct effect on PEOU (0.47) and BI (0.44). According to Park (2009), when students perceived computer self-efficacy, they perceived Google Classroom as easy to use and had higher behavioral intention towards blended learning in classroom.

Furthermore, the analysis results regarding Hypotheses 9 and 10, indicated that the direct effect of Social Factors and BI with the path coefficient were SP (0.61) and CL (0.57) while the direct effect of Social Factors and S with the path coefficient were SP (0.56) and CL (0.51). The excluded variable, LC had a significant positive direct effect on BI (0.64) and S (0.60). According to Sorden and Munene (2013); Zhang and Dang (2020), when students had positive perceptions of social factors in Google Classroom, they had higher behavioral intention and satisfaction towards using blended learning in classroom.

Additionally, the analysis results regarding Hypotheses 11 and 12, indicated that in system characteristics, FC had a significant positive direct effect on BI (0.61) and S (0.58) while TTF had a significant positive direct effect on BI (0.75) and S (0.77). According to Mei et al. (2017), and Zhang and Dang (2020), when students had positive perceptions of system characteristics in Google Classroom, they would have higher behavioral intention and satisfaction towards using blended learning in classroom.

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