



A Study of Chinese College Students' Plans to Use Blended Learning: a Dual Moderation Model of Student Satisfaction and Social Pressure

Xinyue Li

Graduate School of Business and Advanced Technology Management, Assumption University, 592/3 Soi
Ramkhamhaeng 24 Ramkhamhaeng Rd., Bangkok, Thailand
Email: 654789964@qq.com, ORCID ID: <https://orcid.org/0009-0007-9988-9063>

Received 28/03/2023

Revised 04/04/2023

Accepted 10/04/2023

Abstracts

Background and Aim: After 2022, Chinese universities will start to build their courses in a way that includes blended learning. To make blended course design and education planning better, it is important to understand why and how learners want to use blended learning, as well as the factors that affect them.

Materials and Methods: This study used quantitative analysis and a questionnaire. A five-point Likert scale was used to collect five hundred university students' intentions and motivation to engage in blended learning, their perceptions of self-efficacy, satisfaction, and the perceived social impact of participation, and to collect demographic information about them.

Results: This study found that student motivation is a relatively stable predictor of behavioral intention. It is moderated by student satisfaction and social influence and influences student self-efficacy. The role of satisfaction also implies that the current blended learning instructional design needs to be improved to induce greater continuity in their satisfaction with the course in the present and in the acquisition of self-efficacy in their learning to support subsequent learning experiences.

Conclusion: Both motivation and self-efficacy are important predictors of whether or not a student will want to do blended learning. There is also a gap between male and female students in terms of motivation and social influence. When designing blended learning, it's important to think about not only how well the course helps students learn after it, but also how the students are and where they are in their learning.

Keywords: Blended Learning; Motivation; Satisfaction; Social influence

Introduction

Online learning, as one of the most popular new trends in teaching, learning, and the way technological developments are applied to education (Rothwell et al., 2006), has grown tremendously during the COVID-19 pandemic in China. By 2022, more than 50,000 online course resources will have been built in China, which is one of the foundations for the Chinese government to transform higher education through digitization and adopt blended learning courses (Xinhua News Agency, 2022). But blended learning is not a panacea for education development. At a United Nations summit on education reform in 2022, Guterres (2022) stated that the digital revolution is not so much a reality for the benefit of all learners as it is a widening of the educational divide and that the goal of ending educational inequality and gender discrimination has not been achieved. Digital education should not make already disadvantaged learners even more disadvantaged.

In order to minimize the problems associated with the introduction of blended learning in higher education, individual learner differences and intentions to engage in learning need to be given adequate attention. However, current research on participation in blended learning in mainland China has generally focused on changes in educational infrastructure and resources, teaching styles and design, and changes in the roles of teachers and students. There has been little research on the differences between individual learners and subjective attitudes toward learning and their willingness to engage in blended learning.

This study uses social cognitive theory as a basis for understanding students' motivation and





behavioral intentions to engage in blended learning, as well as the mediating role played by self-efficacy. Students' satisfaction with blended learning and the moderating role of social influences on their intention to participate are also included in the analysis. And also examines the differences in subjective beliefs about participation in blended learning given by students' academic year, subject and gender-based on student-centered thought. The study found that students' individual differences can indeed influence students' subjective experiences of blended learning, for example, males were significantly more satisfied than females, females had significantly higher mean scores for social influence, and self-efficacy showed significant differences across the school year. The mediating role of self-efficacy and satisfaction and the moderating role of social influence were both significant. The different significant positive or negative moderating effects provide a theoretical basis for suggesting improvements to the existing design and implementation of blended learning.

Objectives

The aims of this study are (1) to compare the behavioral intentions of undergraduates by gender, discipline, and academic year. (2) To investigate the effect of motivation and self-efficacy on behavioral intention. And (3) To test the role of satisfaction and social influence as mediators of motivation and self-efficacy on behavioral intention.

Literature Review

Blended Learning and engineering education in China

Blended learning is often defined by research in higher education as a mix of traditional and online teaching. This means that online and traditional teaching techniques, tasks, and methods are used together (Dickfos et al., 2014). Blended learning has also been shown to be a good way to improve how well students learn. Saad (2017) research backs up this point of view by showing that blended learning can help science and technology majors learn more. McMahan (2017) noted that blended learning could make it easier for students to talk to each other and give them more learning opportunities with paradigms that could help them understand what they are learning. It could provide more complex assessments of students' performance and grades to help them build confidence in the tasks (Thulstrup & Koswara, 2001). Onofrei and Ferry (2020) and Dutil et al. (2015) also mentioned that blended learning could reduce the dropout rate, but learners' abilities and individual differences should be considered.

Behavioral intention refers to the extent to which learners are willing to continue using blended learning in the future (Chang, 2013). Pirmohamed et al. (2017) pointed out that the differences between female and male learners are mainly caused by discrimination. Eagly et al. (2016) also pointed out that society shapes different gender roles and behavior through different expectations of females and males, so the behavior of individuals will be affected by gender expectations. In the study of Zaccone and Pedrini (2019), they found that for females, the positive relationship between intrinsic motivation and learning efficiency was weakened by gender moderation, and the negative relationship between external motivation and learning efficiency was increased by gender moderation. Sullivan and Kedrowicz (2012) mentioned that engineering students showed a tendency to regard engineering as a male-dominated discipline. At the same time, they showed bias towards humanities disciplines, thinking these courses belonged to the feminine. This is likely to mean that stereotypes of gender and culture are still present in the higher education environment. Therefore, this study incorporates the effect of gender on the model into the discussion.

H1: Gender has a moderating influence on behavioral intentions and its impact factors.

Social cognitive theory

Social cognitive theory is one of the key theories in social psychology. It emphasizes that human behavior is shaped by the interaction of individual behavior, perceptions, and characteristics, as well as the environment in which it is embedded. This forms the theoretical basis of this study, which seeks to understand how students' behavioral intentions in blended learning are influenced by a combination of internal and external factors.

As a theory used to explain the social learning process, it includes cognitive factors such as an



individual's expectations and motivation. The social cognitive theory assumes that motivation as an internal process leads to behavioral outcomes and is an important part of the theory (Schunk & DiBenedetto, 2020). Motivation arises primarily from personal needs and acts as a psychological factor influencing the initiation, planning, and initiation of individual behavior (Touré-Tillery & Fishbach, 2014). Many studies have highlighted motivation as an important factor used to understand behavioral intentions and associated consequences (Wang et al., 2015; McShane & Von Glinow, 2005). Besides, as Braden (2000) found, students' feelings of achievement and satisfaction are related to their level of personal need for motivation. When students have a higher level of motivation, they tend to take the initiative to set goals, seek methods, and solve problems. Building on this, Strong et al. (2012) studied student satisfaction and concluded that student motivation is closely related to social and environmental factors.

H2: Motivation has a significant impact on self-efficacy.

H3: Motivation has a significant impact on behavioral intention.

Bandura (2002) noted that self-efficacy is another important part of social cognitive theory. He defines it as a belief that helps people make decisions and deal with problems by using certain solutions. Its function of it was partly dependent on society and traditional background (Richard et al., 2009). It might help people trust themselves and have the ability to handle assignments (Bandura, 2002). Billari et al. (2009) found that self-efficacy might help people learn and do better in the real world for a longer time. Warren et al. (2020) studied self-efficacy in a blended learning situation and found it to be one of the most important factors impacting students' behavior. Therefore, self-efficacy was also an important factor in this study.

H4: Self-efficacy has a significant impact on behavioral intention.

Satisfaction

Previous studies have provided evidence that satisfaction could positively impact students' learning behaviors. Chiu et al. (2005) and Chang (2013) provided that satisfaction is an important factor to influence online learners, and its system continues to use intention. For online learning, Joo et al. (2017) found that satisfaction is significantly affected by the perceived use experience. According to Stone and Baken-Eveleth (2013), satisfaction could positively impact the usage intention of an e-textbook. According to TCT, perceived usefulness, satisfaction, and attitude are the factors that predict the intention to continue using a system. Satisfaction status as an emotion is related to the previous experience and overall comment. (Foroughi et al., 2019).

H5: Satisfaction has a significant impact on the relationship between motivation and self-efficacy.

H6: Satisfaction has a significant impact on the relationship between motivation and behavioral intention

Social influence

Venkatesh et al. (2012) mentioned that an individual's behavior could be affected by important others, especially how they recognize the important people around them and how they think about new technology. Social influence in this context means students are in a group (teacher, family, and peers) that can affect their participation behavior in blended learning (Upadhyay et al., 2021). A previous study at an American university indicated that influence from peers might be more effective than that between families (Taylor et al., 2011). The effect of social influence could be disturbed by the situation, including whether the task is mandatory and the attitude towards the task (Chua et al., 2018; Yang, 2013).

H7a: Social influence 1 (teacher influence) has a significant impact as the moderating effect of satisfaction in the first half of the model.

H7b: Social influence 1 (teacher influence) has a significant impact as the moderating effect of satisfaction in a direct path of the model.

H8a: Social influence2 (family influence) has a significant impact as the moderating effect of satisfaction in the first half of the model.

H8b: Social influence2 (family influence) has a significant impact as the moderating effect of satisfaction in a direct path of the model.

H9a: Social influence3 (peer influence) has a significant impact as the moderating effect of



satisfaction in the first half of the model.

H9b: Social influence₃ (peer influence) has a significant impact as the moderating effect of satisfaction in a direct path of the model.

Conceptual Framework

According to the hypothesis, the conceptual framework of this study is as follows in Figure 1.

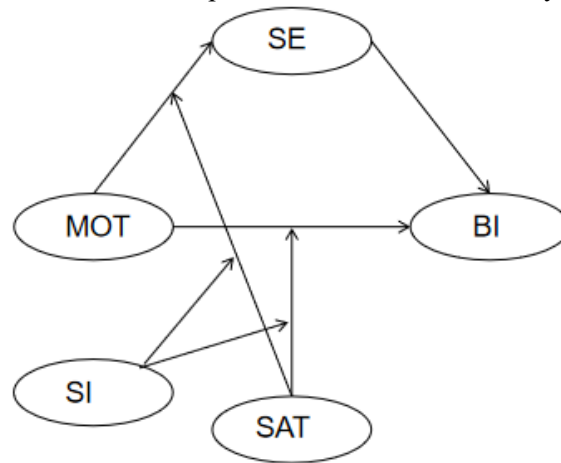


Figure 1: Conceptual Framework of Study

Methodology

Questionnaire Development: The questionnaire is divided into three parts: screening questions, demographic information, and the main part, which asks about factors that affect motivation and behavior plans for blended learning. The questionnaire contains a total of 23 questions.

Data Collection: The basic information of the five hundred valid questionnaires is shown in Table 1. Of these, 44 more male respondents than female ones were enrolled, and 30 more students were enrolled in social science disciplines than engineering disciplines.

Table 1: Demographic information

Item	Category	No.	%
Gender	Female	228	45.6
	Male	272	54.4
Academic year	1	96	19.2
	2	133	26.6
	3	184	36.8
	4	87	17.4
Disciplines	Engineering	235	47
	Social science	265	53
Total		500	100

Data and Measurement Model Analysis: The data conformed to an almost normal distribution, with a slight negative skewness and kurtosis that is essentially greater than 0. Cronbach's alpha demonstrates the internal consistency of the scale items, with all but social influence above 0.7, showing a high level of internal consistency. The three questions about social influence ask about different influences from teachers, family, and peers; even though the factor loading result of SI1 indicated a low value, the question item is retained.





Table 2: Normal distribution test and scale item descriptive statistics scale

	Mean	Std. Deviation	Skewness	Kurtosis	Cronbach's Alpha	Factor Loading	CR	AVE
MOT1	4.08	0.82	-0.64	0.26		0.53		
MOT2	4.22	0.82	-1.04	0.96		0.66		
MOT3	4.28	0.72	-0.99	0.96		0.82		
MOT4	4.15	0.91	-0.97	0.64	0.89	0.80	0.86	0.47
MOT5	4.17	0.88	-1.12	1.25		0.75		
MOT6	4.27	0.76	-1.06	1.58		0.81		
MOT7	4.21	0.79	-0.97	1.26		0.79		
SE1	4.05	0.78	-0.32	-0.66		0.70		
SE2	4.03	0.72	-0.31	-0.26	0.70	0.76	0.71	0.38
SE3	4.06	0.75	-0.3	-0.63		0.68		
SE4	3.88	0.73	-0.39	0.11		0.72		
SAT1	3.87	0.78	-0.52	0.63		0.60		
SAT2	3.82	0.72	0.05	-0.63	0.76	0.62	0.76	0.45
SAT3	3.75	0.76	0.15	-0.74		0.69		
SAT4	3.93	0.70	-0.33	0.32		0.75		
SI1	4.02	0.75	-0.29	-0.38		0.48		
SI2	4.14	0.74	-0.59	0.29	0.67	0.78	0.70	0.44
SI3	4.16	0.73	-0.51	-0.14		0.79		
BI1	4.09	0.76	-0.32	-0.73		0.55		
BI2	4.06	0.77	-0.45	0.02		0.67		
BI3	4.12	0.71	-0.41	0.03	0.76	0.70	0.74	0.36
BI4	4.03	0.66	-0.29	0.11		0.56		
BI5	3.94	0.66	-0.40	0.82		0.54		

Analysis method: In this study, both AMOS and SPSS were used to analyze the data. Before starting the mediation and moderated effects analysis, SPSS was used to test for differences in the demographic information, such as t-test, and ANOVA test were used to see the possible impact of students' personal characteristics on behavior. AMOS was then used to check the fit of the model and to perform structural equation analysis.

Differential Analysis

Differences in undergraduate's behavioral intention by gender and disciplines

The independent t-test showed that there is a statistically significant difference between male and female students in terms of how satisfied they are with their education and how it affects the world around them. The mean value of satisfaction was significantly higher for males (4.11) than for females (3.71). There is also a clear gender gap in social influence, with females having a higher mean value for the factor of social influence (4.23).





Table 3: Independent sample T-test result for Gender

	Female	Male	t	p
MOT	4.14±0.75	4.25±0.53	-1.77	0.08
SE	4.03±0.54	4.00±0.62	0.18	0.85
SAT	3.71±0.52	4.11±0.54	-8.46	0.00
SI	4.23±0.58	4.00±0.57	4.38	0.00
BI	4.03±0.54	4.06±0.46	-0.63	0.53

Using disciplines as a control group, a statistically significant gap was found for motivation. Engineering students had higher mean motivation scores (4.31) than social science students (4.10).

Table 4: Independent sample T-test result for disciplines

	Social science	Engineering	t	p
MOT	4.10±0.60	4.31±0.67	-3.56	0.00
SE	4.05±0.56	3.95±0.65	1.83	0.07
SAT	3.90±0.54	3.95±0.61	-0.95	0.35
SI	4.10±0.55	4.12±0.63	-0.27	0.79
BI	4.04±0.45	4.05±0.54	-0.23	0.82

Differences in undergraduate's behavioral intention by academic year

Using the academic year as a control group, the one-way ANOVA test was done on the sample, and it was found that the students were more different at different stages of the academic year. Motivation showed higher levels of mean in the upper grades (Y3 = 4.27; Y4 = 4.35), as did self-efficacy (Y4 = 4.14). On the other hand, behavioral intentions tend to fluctuate, with higher means in the second (4.20) and fourth (4.18) years.

Table 5: One-way ANOVA test result for academic years

	Y1	Y2	Y3	Y4	F	P
MOT	4.10±0.73	4.07±0.57	4.27±0.61	4.35±0.64	5.12	0.002
SE	3.88±0.70	4.07±0.47	3.96±0.56	4.14±0.74	3.78	0.01
SAT	3.82±0.61	3.94±0.54	3.92±0.52	4.05±0.66	2.50	0.06
SI	4.08±0.63	4.11±0.50	4.05±0.59	4.26±0.64	2.48	0.06
BI	3.84±0.55	4.20±0.42	3.98±0.48	4.18±0.49	13.42	0.00

It is clear that the influence of demographic factors does exist. Gender has a significant impact on the perceived satisfaction and social impact of participation in blended learning. The subject students are studying also has a more significant effect on their motivation. There was a gap in motivation, self-efficacy, and behavioral intentions between students of different academic years.

Measurement Model and SEM Analysis

The basic mediation model consists of motivation, self-efficacy, and behavioral intention; satisfaction moderates the first half of this mediation model, which is motivation to self-efficacy, and satisfaction moderates the direct effect, which is motivation to behavioral intention. According to the meaning of the moderating effect, satisfaction not only acts on these two paths but also on variables that are simultaneously associated with both ends of the path. Therefore, satisfaction is included in the measures of the model. From the data analysis, the model fits well, with GFI, AGFI, CFI, and NFI all greater than 0.90, while the CMIN to degrees of freedom ratio of the model is 2.1 and the RMSEA is 0.05.





Table 6: Model fit result

	CFA model	SEM model
CMIN/ DF	344.12/164 or 2.10	344.12/164 or 2.10
The goodness of Fit Index (GFI)	0.94	0.94
Adjusted Goodness of Fit Index (AGFI)	0.92	0.92
Comparative fit index (CFI)	0.96	0.96
Normed fit index (NFI)	0.92	0.92
Root mean square error of approximation (RMSEA)	0.05	0.05

To test the mediation model, the study used AMOS for SEM analysis and the results, such as the standard regression weights, are shown below. It can be seen that both the direct and indirect effects are significant at the 0.001 level and the mediation model holds.

Table 7: Standardized Regression Weight and Regression Weight analysis results

	Standardized Regression Weight	Regression Weight	S.E.	C.R.	P
MOT→BI	0.57	0.55	0.07	7.46	***
MOT→SE	0.25	0.28	0.06	4.61	***
SE→BI	0.20	0.18	0.05	3.83	***

The Durbin-Watson test and multiple collinearity diagnostics then verified the samples' independence. The results are shown in Table 8. The sample results for VIF were all less than 5, and there was no multicollinearity. The data could be used to perform regression analysis.

Table 8: Model fit result

	Standardized Coefficients Beta	t	Sig.	VIF
MOT	0.30	8.07	0	1.27
SAT	0.44	12.20	0	1.21
SE	0.21	5.26	0	1.42
SI	0.05	1.29	0.20	1.38
R	0.68			
R2	0.47			
Durbin-Watson	1.78			

It was verified that the mediation model holds and that self-efficacy can play a role between motivation and behavioral intentions

Mediating Effect Model Analysis

After showing that satisfaction has an effect on each of the factors in the mediation model, the study looked into the complex moderating effects given in the framework and added the social influences on satisfaction to the measurement. Using the multiple regression analysis to calculate each of the three social influences, the following results were obtained:

Teacher Influence and Satisfaction Moderating Effect Analysis

Teacher influence can have an effect on self-efficacy and shows a positive moderating effect when it interacts with satisfaction. This means that a student's satisfaction may not have as much of a negative effect on their self-efficacy as they think it does. However, the data did not support the interaction term between teacher influence, satisfaction, and motivation.

For behavioral intention, teacher influence did not have a direct impact, but the interaction term with satisfaction was statistically significant and weakened the positive effect of satisfaction on behavioral intention.





Table 9: The moderating effects of teacher influence

	SE			BI		
	coeff	t	p	coeff	t	p
Constant	-0.12	-0.55	0.58	0.58***	3.52	0.00
MOT	0.21***	4.40	0.00	0.26***	6.85	0.00
SE	\	\	\	0.21***	5.83	0.00
SI1	0.32***	7.16	0.00	0.02	0.41	0.68
MOT x SI1	-0.02	-0.52	0.60	0.03	0.91	0.36
SE x SI1	\	\	\	-0.04	-1.34	0.18
SAT	-0.15***	-3.12	0.00	0.51***	13.62	0.00
MOT x SAT	-0.13***	-3.76	0.00	-0.10***	-3.50	0.00
SI1 x SAT	0.08 *	0.04	1.80	-0.07*	-2.06	0.04
MOT x SI1 x SAT	-0.01	0.03	-0.30	-0.02	-0.76	0.45
Disciplines	-0.19*	-2.31	0.02	-0.08	-1.16	0.25
Academic years	0.09*	2.16	0.03	0.03	0.84	0.40
Gender	0.15	1.66	0.10	-0.32***	-4.39	0.00
R ²	0.21***			0.51***		
F	12.76			42.66		
R ² -chng	MOT x SI1 x SAT	0	0.76	0		0.45
	SE x SI1	\	\	0		0.18

The moderating effect was further examined and it was found that satisfaction significantly interacted with teacher influence both at the current status and at levels lower than one standard deviation. The moderating effect of teacher influence was more significant at lower levels of satisfaction, or a higher positive effect when both are at their highest levels.

Table 10: Bootstrap test result of satisfaction and teacher influence for self-efficacy

SAT	SI1	Effect	SE	t	p	LLCI	ULCI
-1	-1	0.34	0.06	5.72	0	0.22	0.46
-1	0	0.39	0.04	8.93	0	0.31	0.48
-1	1	0.45	0.06	8.16	0	0.34	0.56
0	-1	0.22	0.05	4.04	0.0001	0.11	0.33
0	0	0.27	0.04	7.10	0	0.19	0.34
0	1	0.31	0.05	6.18	0	0.21	0.41
1	-1	0.10	0.07	1.39	0.17	-0.04	0.25
1	0	0.14	0.05	2.66	0.01	0.04	0.24
1	1	0.17	0.07	2.46	0.01	0.04	0.31

In the graph below it can be seen that the moderation of social influence is more significant when satisfaction levels are lower



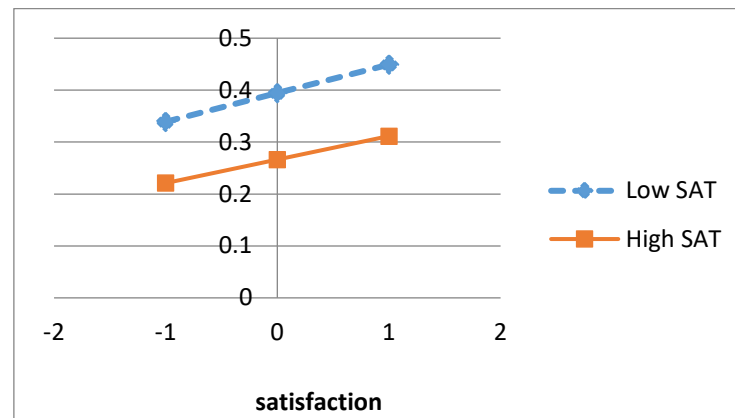


Figure 2: Moderating effect diagram of teacher influence and satisfaction

Family Influence and Satisfaction Moderating Effect Analysis

The family influence had a significant positive effect on students' self-efficacy, and the interaction term with satisfaction also had a significant positive effect, which lessened the negative effect of satisfaction on self-efficacy. Also, family influence had a big effect on both motivation and satisfaction, which made the negative effect of satisfaction even less strong

Family influence was not found to have a significant effect on students' behavioral intentions. However, it still interacted with satisfaction and formed an interaction term with motivation and satisfaction, both of which had a negative moderating effect on motivation and satisfaction.

Table 11: The moderating effects of family influence

	SE			BI		
	coeff	t	p	coeff	t	p
Constant	-0.23	-1.20	0.23	0.63***	3.85	0.00
MOT	0.18***	4.16	0.00	0.23***	6.05	0.00
SE	\	\		0.23***	6.12	0.00
SI2	0.43***	10.58	0.00	0.01	0.19	0.85
MOT x SI2	0.02	0.50	0.62	0.06	1.51	0.13
SE x SI2	\	\	\	0.03	0.96	0.34
SAT	-0.15***	-3.48	0.00	0.54***	14.29	0.00
MOT x SAT	-0.14***	-4.42	0.00	-0.09***	-3.08	0.00
SI2 x SAT	0.15***	3.59	0.00	-0.08*	-2.27	0.02
MOT x SI2 x SAT	0.09*	2.12	0.03	-0.09**	-2.58	0.01
Disciplines	-0.22***	-2.86	0.00	-0.06	-0.94	0.35
Academic years	0.10**	2.45	0.01	0.01	0.20	0.84
Gender	0.25***	2.96	0.00	-0.36***	-4.95	0.00
R ²	0.33***			0.52***		
F	23.54			44.77		
R ² -chng	MOT x SI1 x SAT	0.01**	0.03	0.01**		0.01
	SE x SI1	\	\	0		0.18



Table 12: Bootstrap test result of satisfaction and family influence for self-efficacy

SAT	SI1	Effect	se	t	p	LLCI	ULCI
-1	-1	0.19	0.07	2.58	0.01	0.04	0.33
-1	0	0.36	0.05	8.04	0	0.27	0.45
-1	1	0.54	0.06	9.55	0	0.43	0.65
0	-1	0.15	0.06	2.47	0.01	0.03	0.27
0	0	0.24	0.04	6.29	0	0.16	0.31
0	1	0.33	0.05	6.72	0	0.23	0.42
1	-1	0.11	0.08	1.37	0.17	-0.05	0.27
1	0	0.11	0.05	2.22	0.03	0.01	0.22
1	1	0.12	0.08	1.55	0.12	-0.03	0.27

Bootstrap test results show that the influence of family is similar to the influence from teachers and is also significant at the current and one standard deviation lower levels. And when satisfaction was low and family influence was at a high level, it had a stronger moderating effect on students' high self-efficacy.

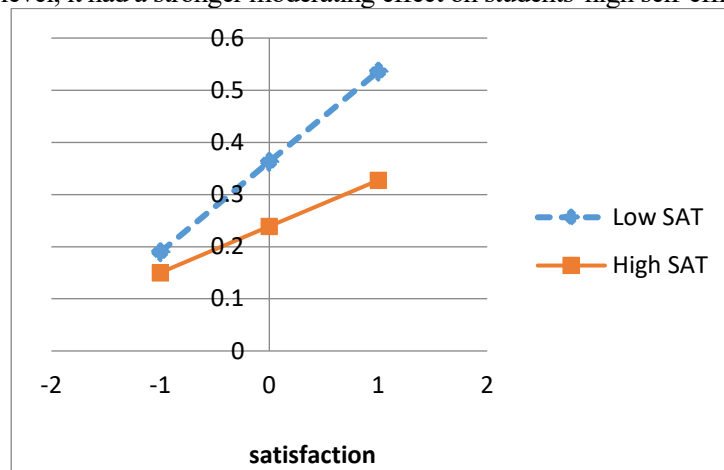


Figure 3: Moderating effect diagram of family influence and satisfaction

As can be seen in the moderating effect diagram below, the two can show a positive effect at high levels of family influence.

Peer Influence and Satisfaction Moderating Effect Analysis

Peer influence is similar to teacher influence and family influence. Peers can provide a significant positive direct influence on students' self-efficacy, and this influence can diminish the negative effects of satisfaction. Together with motivation and satisfaction, they form an interaction term that weakens the negative effects of satisfaction. Peer influence also didn't have a direct effect on how students planned to act, and it always made the interaction term of satisfaction weaker.

Table 13: The moderating effects of peer influence

	SE			BI		
	coeff	t	p	coeff	t	p
Constant	-0.18	-0.94	0.35	0.59***	3.59	0.00
MOT	0.16***	3.64	0.00	0.25***	6.63	0.00
SE	\	\	\	0.22***	5.70	0.00
SI3	0.42***	10.23	0.00	0.01	0.22	0.82
MOT x SI3	0.05	1.13	0.26	0.08*	2.09	0.04



	SE			BI		
SE x SI3	\	\	\	0.01	0.43	0.67
SAT	-0.14***	-3.29	0.00	0.52***	13.99	0.00
MOT x SAT	-0.15***	-4.48	0.00	-0.10***	-3.46	0.00
SI3 x SAT	0.17***	3.94	0.00	-0.10**	-2.74	0.01
MOT x SI3 x SAT	0.07*	2.34	0.02	-0.03	-1.06	0.29
Disciplines	-0.19*	-2.40	0.02	-0.06	-0.96	0.34
Academic years	0.05	1.38	0.17	0.02	0.49	0.63
Gender	0.25***	2.94	0.00	-0.34***	-4.65	0.00
R ²	0.32***			0.52***		
F	22.65			43.86		
R ² -chng	MOT x SII x SAT	0.01*	0.02	0		0.29
	SE x SII	\	\	0		0.67

Peer influence was weaker than the first two. The peer effect is only significant when satisfaction is below one standard deviation, and is only significant at higher levels of peer influence when satisfaction is at the current level.

Table 14: Bootstrap test result of satisfaction and peer influence for self-efficacy

SAT	SII	Effect	se	t	p	LLCI	ULCI
-1	-1	0.33	0.07	4.86	0	0.19	0.46
-1	0	0.30	0.05	6.12	0	0.20	0.39
-1	1	0.26	0.06	4.22	0	0.14	0.39
0	-1	0.11	0.07	1.72	0.09	-0.02	0.24
0	0	0.14	0.04	3.30	0	0.06	0.23
0	1	0.17	0.06	2.95	0	0.06	0.29
1	-1	-0.10	0.09	-1.11	0.27	-0.27	0.08
1	0	-0.01	0.06	-0.12	0.91	-0.13	0.11
1	1	0.08	0.09	0.10	0.32	-0.08	0.25

The moderating effect diagram shows that when student satisfaction is at a low level, stronger peer influence further weakens its effect on self-efficacy. The condition with higher levels of satisfaction, on the other hand, shows an upward trend.

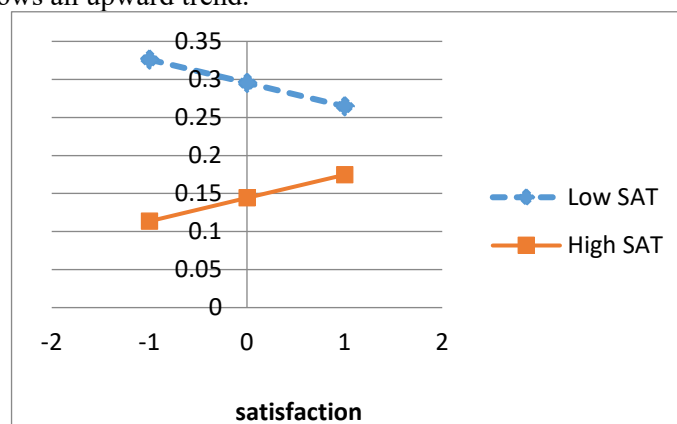


Figure 4: Moderating effect diagram of peer influence and satisfaction





Conclusion

Results of descriptive statistics and demographic difference

Overall, students' feedback on their motivation, self-efficacy, satisfaction, behavioral intentions, and social influence to participate in blended learning was positive, as the mean scores for all items measured by the questionnaire ranged from 3.75 to 4.28. The demographic information shows that gender plays a significant moderating role in student satisfaction, with male students having a significantly higher mean satisfaction score than female students. In terms of students' discipline, students in the upper grades were in a better overall position to approach the issue of their intention to engage in blended learning with higher levels of motivation and self-efficacy.

Results of a hypothesis test

Hypotheses 1–3 regarding the relationship between motivation, self-efficacy, and behavioral intentions were supported by the data. Satisfaction was also shown to moderate both the first half of the model and the direct impact, with hypotheses 4 and 5 holdings. On this basis, the moderating effects of student satisfaction and social influence were analyzed. H6a was supported by the finding that teacher influence had a direct effect on students' self-efficacy and was able to form a significant interaction term with satisfaction and weaken the negative effect of student satisfaction on self-efficacy. H7b was also supported by the data through the formation of a significant interaction term between teacher influence and satisfaction. Hypotheses H7a and H7b regarding family influence were also both supported by the data and were more significantly associated with satisfaction than teacher influence, as well as the interaction term between satisfaction and motivation being statistically significant. The peer influence effect was not only significant on its own for students' motivation and self-efficacy pathways but also formed a significant interaction term with satisfaction, the interaction term between satisfaction and motivation, respectively, justifying the H8a hypothesis. As for the behavioral intentions of the students, peer influence can also act as a moderator by forming significant interactions in terms of motivation and satisfaction, respectively. H8b is also supported by data. It is noteworthy that all three social influence-satisfaction and their interaction terms, although significantly related to student self-efficacy, were significantly moderated only at low levels of satisfaction. Peer influence not only has this characteristic but also has a weakening moderating effect when student satisfaction is low.

Discussion

Gender, disciplines, and academic years

The data showed that males were more satisfied and motivated by blended learning, which is consistent with the findings of previous studies. According to Zaccone and Pedrini (2019), for females, gender moderation increases the negative relationship between external motivation and learning efficiency while weakening the positive relationship between intrinsic motivation and learning efficiency. This means that females have a higher value for social influence. This may, in part, indicate that females are more concerned with the perceptions of those around them in a blended learning environment. It may be suggested by Eagly et al. (2016) that society shapes different gender roles and behavior through different expectations of females and males so that the behavior of individuals is influenced by gender expectations.

On the other hand, the higher motivation of engineering students may be related to the gender ratio of students in the subject. In 2019, 17,508,204 undergraduate students were studying in universities, of which 5,879,763 were studying engineering, accounting for 33.58% of the total. The proportion of female students in engineering colleges was only 38% (ShanghaiRanking, 2021). In some of China's top engineering universities, the gap was more pronounced. For example, at the University of Electronic Science and Technology of China in 2020, 941 new female students were enrolled, only 18.93%, and at Harbin Institute of Technology, 230 were enrolled, only 16.7%.

In general, students in the upper grades rated blended learning higher, especially in terms of motivation. This may be because upper-year students have a better understanding of the curriculum and its benefits, and have found suitable learning partners and good social support in previous years of study.

When designing and promoting blended learning courses, the teaching style and focus on students



can be adapted according to the group of students being taught. For example, more support for female students is appropriate, as is proactive communication with students' families to help parents understand that blended learning enables students to get more help. In addition, guidance can be provided to younger students throughout their academic careers to help them understand the importance of blended learning for their future studies and graduation. All these initiatives can help students with different characteristics to have a better learning experience in blended learning.

Satisfaction's moderation effect on behavioral intentions to engage in blended learning

The moderating role of satisfaction in the model is somewhat specific. It shows a positive moderating effect on both students' behavioral intentions to engage in blended learning. However, satisfaction plays a direct inhibiting role in students' self-efficacy. When various social influences were moderated, satisfaction and its interaction term only had a positive impact on students' self-efficacy, but this effect did not last along the trajectory of behavioral intentions.

This may suggest that the current design of blended learning does not meet students' expectations of self-efficacy. Based on what self-efficacy means, it is thought that there are two main reasons for this. First, the design of blended learning hasn't been able to provide good continuity in curriculum development. This means that students' satisfaction with what they're learning now can't be transferred as the course goes on, regardless of pace or discipline, and can't affect their self-efficacy in other or future learning. Instead, it's limited to certain areas and courses. Secondly, the interactions, whether with the teacher's family or peers, significantly and positively influenced self-efficacy, perhaps suggesting that, in the absence of a return to campus, students using blended learning still desire interpersonal interaction and that their self-confidence and sense of success are affected.

Social Influence in a blended learning situation

Due to the particular way in which blended learning is implemented, it can take place not only in the traditional classroom but also in a place where close contact with the student's family and peers, and social influences are undoubtedly very important for students participating in blended learning. Interestingly, in this study, three kinds of social influences often moderated student satisfaction at lower levels. This may suggest that social influence is an important force in supporting students to develop higher self-efficacy when they are less satisfied with blended learning.

Furthermore, peer influence, although significant at lower levels of satisfaction, showed a tendency to decrease. This may mean that when students are less satisfied with blended learning, this evaluation is spread among their peers. This reminds teachers and course designers to keep an eye on students' attitudes toward learning to prevent negative evaluations and dissatisfaction from affecting their sense of self-efficacy. At the same time, peer influence tends to have a positive moderating effect when satisfaction is high, suggesting that if group work or peer assessment in a course is well done and feedback and satisfaction are good, it can contribute to students' self-efficacy.

Furthermore, this finding also suggests that motivation is a more consistent predictor of students' intention to engage in blended learning. Although students still need support from a variety of sources to develop high levels of self-efficacy, for students with high levels of motivation, their behavioral intentions to engage in blended learning are still more directly influenced by motivation. Instructional design and guidance should focus on the intrinsic motivation of learners to become highly motivated learners, in addition to paying attention to details such as the environment and interactions in which they are engaged.



Limitation and recommendation

The factors that influence motivation and behavioral intentions are many. This study is based on social cognitive theory, but only the key factors have been selected to be explored. Therefore, the framework does not have a strong explanatory power on the question of students' intention to engage in blended learning.

Secondly, the study was conducted after three years when COVID-19 influenced Chinese university teaching and studying at home, and using online learning was not an autonomous option for students, which somewhat affected their satisfaction and changes in social influence.

Future research could conduct a longitudinal survey to track students' perceptions of changes in motivation, self-efficacy, behavioral intention, and the moderators associated with them.

Reference

- Bandura, A. (2002). Social Cognitive Theory in Cultural Context. *Applied Psychology*, 51(2), 269–290. <https://doi.org/10.1111/1464-0597.00092>
- Billari, F.C., Philipov, D., & Testa, M. R. (2009). Attitudes, Norms, and Perceived Behavioural Control: Explaining Fertility Intentions in Bulgaria. *European Journal of Population / Revue Européenne De Démographie*, 25(4), 439–465. <https://doi.org/10.1007/s10680-009-9187-9>
- Braden, A.P. (2000), “McClelland’s theory of needs”, *WordPress*, Retrieved 24 July 2021 from: <https://www.change.com.files.wordpress.com>
- Chang, C.C. (2013). Exploring the determinants of E-Learning Systems Continuance intention in academic libraries. *Library Management*, 34(1/2), 40-55. <https://doi.org/10.1108/01435121311298261>
- Chiu, C.-M., Hsu, M.-H., Sun, S.-Y., Lin, T.-C., & Sun, P.-C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45(4), 399–416. <https://doi.org/10.1016/j.compedu.2004.06.001>
- Chua, P. Y., Rezaei, S., Gu, M.-L., Oh, Y. M., & Jambulingam, M. (2018). Elucidating social networking apps decisions. *Nankai Business Review International*, 9(2), 118–142. <https://doi.org/10.1108/nbri-01-2017-0003>
- Dickfos, J., Cameron, C., & Hodgson, C. (2014). Blended learning: Making an impact on assessment and self-reflection in accounting education. *Education + Training*, 56(2/3), 190–207. <https://doi.org/10.1108/et-09-2012-0087>
- Dutil, I., Prakash, V., Nogami, J., & Ramsay, S. (2015). Introduction of reusable learning objects in a first-year materials science and engineering course. *Proceedings of the 2015 ASEE Annual Conference and Exposition, Article 26*. <https://doi.org/10.18260/p.24370>
- Eagly, A. H., & Wood, W. (2016). Social Role Theory of sex differences. *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies*, 1-3. <https://doi.org/10.1002/9781118663219.wbegs183>
- Foroughi, B., Iranmanesh, M., & Hyun, S. S. (2019). Understanding the determinants of mobile banking continuance usage intention. *Journal of Enterprise Information Management*, 32(6), 1015–1033. <https://doi.org/10.1108/jeim-10-2018-0237>
- Guterres, A. (2022). *Education transformation needed for 'inclusive, just and peaceful world' – un chief* | | *IUN news*. United Nations. Retrieved October 11, 2022, from <https://news.un.org/en/story/2022/09/1127011>
- Joo, Y. J., So, H.-J., & Kim, N. H. (2018). Examination of relationships among students' self-determination, technology acceptance, satisfaction, and continuance intention to use K-MOOCs. *Computers & Education*, 122, 260–272. <https://doi.org/10.1016/j.compedu.2018.01.003>
- McMahon, R. (2017). A comparison amongst face-to-face, blended, and mostly online course options. *Proceedings of the 18th Annual Conference on Information Technology Education*. <https://doi.org/10.1145/3125659.3125663>
- McShane, S. L., & Von Glinow, M. A. (2005). *Organizational Behavior*. 3rd edition. McGraw-Hill/Irwin.



- Onofrei, G., & Ferry, P. (2020). Reusable learning objects: A blended learning tool in teaching computer-aided design to engineering undergraduates. *International Journal of Educational Management*, 34(10), 1559–1575. <https://doi.org/10.1108/ijem-12-2019-0418>
- Pirmohamed, S., Debowska, A., & Boduszek, D. (2017). Gender differences in the correlates of academic achievement among university students. *Journal of Applied Research in Higher Education*, 9(2), 313–324. <https://doi.org/10.1108/jarhe-03-2016-0015>
- Richard, L., Dedobbeleer, N., Champagne, F., & Potvin, L. (2009). Predicting Child Restraint Device Use: A Comparison of Two Models1. *Journal of Applied Social Psychology*, 24(20), 1837–1847. <https://doi.org/10.1111/j.1559-1816.1994.tb01578.x>
- Rothwell, W. J., Maldonado, C., Li, J., Hunt, D., & Butler, M. (2006). *The Handbook of Training Technologies: An Introductory Guide to Facilitating Learning with Technology--from planning through evaluation*. Pfeiffer.
- Saad, I. (2017). The role of cooperative learning method in the teaching of science subject at elementary school level: an experimental study. *Bulletin of Education and Research*, 39(2), 1–17.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832. <https://doi.org/10.1016/j.cedpsych.2019.101832>
- ShanghaiRanking. (2021). ShanghaiRanking-Universities. Retrieved October 31, 2022, from <https://www.shanghairanking.cn/institution>
- Stone, R. W., & Baker-Eveleth, L. J. (2013). Students' intentions to purchase electronic textbooks. *Journal of Computing in Higher Education*, 25(1), 27–47. <https://doi.org/10.1007/s12528-013-9065-7>
- Strong, R., Wynn, T.J. and McCleur, M.M. (2012), "Investigating students satisfaction with eLearning courses: the effect of the learning environment and social presence". *Journal of Agricultural Education*, 53 (3), 98-110. doi: 10.5032/jae.2012.03098.
- Sullivan, K. R., & Kedrowicz, A. A. (2012). Gendered tensions: Engineering student's resistance to communication instruction. *Equality, Diversity, and Inclusion: An International Journal*, 31(7), 596–611. <https://doi.org/10.1108/02610151211263405>
- Taylor, D. G., Voelker, T. A., & Pentina, I. (2011). Towards the acceptance of RSS to support learning: an empirical study to validate the technology acceptance model in Lebanon. *International Journal of Mobile Marketing*, 6(2), 60–70.
- Thulstrup, E. W., & Koswara, J. (2001). Participation of East Asian women in Higher Education with particular emphasis on science-based fields. *International Journal of Sociology and Social Policy*, 21(1/2), 72–83. <https://doi.org/10.1108/01443330110789592>
- Touré-Tillery, M., & Fishbach, A. (2014). How to Measure Motivation: A Guide for the Experimental Social Psychologist. *Social and Personality Psychology Compass*, 8(7), 328–341. <https://doi.org/10.1111/spc3.12110>
- Upadhyay, N., Upadhyay, S., & Dwivedi, Y. K. (2021). Theorizing Artificial Intelligence Acceptance and Digital Entrepreneurship Model. *International Journal of Entrepreneurial Behavior & Research*, 28(5), 1138–1166. <https://doi.org/10.1108/ijeb-01-2021-0052>
- Venkatesh, Morris, Davis, & Davis. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425. <https://doi.org/10.2307/30036540>
- Wang, Y., Han, X., & Yang, J. (2015). Revisiting the blended learning literature: using a complex adaptive systems framework. *Journal of Educational Technology and Society*, 18(2), 380–393.
- Warren, L., Reilly, D., Herdan, A., & Lin, Y. (2020). Self-efficacy, performance and the role of blended learning. *Journal of Applied Research in Higher Education*, 13(1), 98–111. <https://doi.org/10.1108/jarhe-08-2019-0210>
- Xinhua News Agency. (2022). *Building a new form of higher education through digitalization*. Presentation by the Director of Higher Education, Ministry of Education. Retrieved November 10, 2022, from <https://baijiahao.baidu.com/s?id=1740009396480767736&wfr=spider&for=pc>
- Yang, H. C. (2013). Bon Appétit for Apps: Young American Consumers' Acceptance of Mobile Applications. *Journal of Computer Information Systems*, 53(3), 85–96.



International Journal of Sociologies and Anthropologies Science Reviews (IJSASR), 3 (3):
May-June 2023, page 1-16. ISSN: 2774-0366
Website: <https://so07.tci-thaijo.org/index.php/IJSASR/index>
DOI: <https://doi.org/10.14456/jsasr.2023.30>

<https://doi.org/10.1080/08874417.2013.11645635>

Zaccone, M. C., & Pedrini, M. (2019). The effects of intrinsic and extrinsic motivation on student's learning effectiveness. exploring the moderating role of gender. *International Journal of Educational Management, ahead-of-print(ahead-of-print)*. <https://doi.org/10.1108/ijem-03-2019-0099>

