pISSN: 1906 - 6406 The Scholar: Human Sciences
eISSN: 2586 - 9388 The Scholar: Human Sciences
http://www.assumptionjournal.au.edu/index.php/Scholar

The Role of Task Technology Fit to Enhance Student Satisfaction Towards Blended Learning in Chengdu, China

Wenbo Li*

Received: June 6, 2023. Revised: October 9, 2023. Accepted: October 12, 2023.

Abstract

Purpose: Blended learning had become a popular educational approach that mixed the characteristics of face-to-face lectures and online learning in the digital age. This research aimed to examine the factors of task technology fit, confirmation, cognitive presence, teaching presence, social presence, and learner-instructors interaction to impact blended learning satisfaction of college students in Chengdu, China. The research model demonstrates relationships between key varaibles. **Research design and methodology:** This research applied the quantitative method and questionnaire as instruments to survey 500 students, who majored in art and design subjects. Before distributing the questionnaires, Item-Objective Congruence (IOC) and a pilot test of Cronbach's Alpha were used to test validity and reliability. Data was analyzed by utilizing Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the model's goodness of fit and confirm the causal relationship among variables for hypothesis testing.. **Results:** The main findings revealed that confirmation, cognitive presence, social presence, and learner-instructors interaction significantly influenced satisfaction with blended learning, except task technology fit and teaching presence. Cognitive presence and learner-instructor interaction has strong and significant role to enhance students' satisfaction with hybrid learning. **Conclusions:** The study has found that the research conceptual model could predict and explain how the factors impact blended learning satisfaction.

Keywords : Blended Learning, Task Technology Fit, Satisfaction, Private Colleges, China

JEL Classification Code: E44, F31, F37, G15

1. Introduction

Blended learning mixes traditional face-to-face courses and online learning by combining the Internet and classrooms (Friesen, 2012). Cheung et al. (2010) explained that blended learning had become a popular educational approach that mixed the characteristics of face-to-face lectures and online learning in the digital age. Blended learning is a possible solution to solve pure e-learning problems. Especially, higher education has moved to personalized, effective, and cooperative learning– teaching changes that are predictable to convert the educational system from face-to-face mode to a technology-led interdependent method in which the main concern would be relied on developing creativities and potentials of the students in the best possible approaches in the current time (Bordoloi et al., 2021).

Ngan (2011) suggested that blended learning has had an important influence on current learning and teaching approaches since it concerns different needs and wants of students. Hybrid learning expands the studying time and space. By providing students with better learning control and unlimited access to online and physical course content, blended learning has been seen as a medium for improving higher education learning. Students can participate in physical classes, access online learning materials, and communicate with teachers and classmates simultaneously (Gasevic et al., 2019). According to Liu (2021), face-to-face

1*Wenbo Li, School of Art and Design, Tianfu College of Southwestern University of Finance and Economics, China. Email: liwenbo@tfswufe.edu.cn

or online courses are less effective than blended instruction. Blended learning can lead to high student performance in many aspects, such as academic reading, writing, searching, and discovering. Teachers can simplify teaching content and help more students reach their full potential rather than only playing the guiding role in traditional teaching.

Despite the needs and advantages of blended learning, developing successful programs takes work. That requires the establishment of an entire and sound strategic system. In crises such as pandemics, wars, or natural disasters, online or blended learning approaches can meet the basic learning needs of learners. Therefore, it is necessary to understand what teachers and learners think about using blended learning models in teaching and learning transactions. In and after Covid-19, the prospects and challenges of blended learning need to be closely watched and studied, including in developed countries. Developing countries with large populations, like China and India, need to study further blended learning (Bordoloi et al., 2021).

After the Covid-19 epidemic, many schools had to start online teaching and learning because of the lockdown in cities and rural areas. Teachers and students had to accept the online education approach. Some felt suitable and benefited from the extensive use of this new approach. However, online teaching and learning could be seen as a short time solution since it generated many problems and anxiety from both sides, such as technical support, communication obstructs, practical direction, and exercises. Educational researchers realized that blended learning had become a better approach to figuring out the disadvantages of purely online learning.

Meanwhile, some traditional teaching methods, such as teacher-centered and one-way communication, might affect students' learning effectiveness and efficacy. As discussed by Handover (2015), many students did not want the standard courses offered by schools but the courses that meet their needs and future career in the digital age. The learning process changed from simple classroom learning to multi-dimensional and fragmented learning, which required a full utilization of tools and resources for formal and informal learning.

This research intended to study the satisfaction of blended learning from students' perspectives. The research selected two private colleges that started blended learning in 2015—the massive use of blended learning in early 2020 as COVID-19 exposed. At present, blended learning is still used in these colleges to change educational approaches. Two private colleges are Tianfu College of Southwestern University of Finance and Economics (TFC) and Jinjiang College of Sichuan University (JJC), located in Chengdu, the capital of Sichuan Province, China. The research chose students who are in majors designing disciplines in the two private colleges as the target population.

2. Literature Review

2.1 Theories Used in This Research

Potential determinants of satisfaction with blended learning were decided based on the four theories, which refer to The Expectation Confirmation Model (ECM), learning management systems (LMS), The Task-Technology Fit (TTF), and the model of a community of inquiry (CoI). Scholars of ECM theory advocated evaluating individuals' ongoing use intentions and long-term success in different IT situations, which depend on continued utilization, not initial usage. Satisfaction was related to the difference between cognitive evaluation results and expected performance. In this theory, confirmation indicates the level to which people's expectations from IT service are met through their experience (Bhattacherjee, 2001a; Cheng, 2014; Foroughi et al., 2019; Huang, 2016; Oliver, 1980; Rahi et al., 2018). The variables adopted for ECM were confirmation and satisfaction in this research context.

LMS was developed by Andronie (2014), who stated that LMS and IS bonded together to form E-learning support systems, which afford the functions of user management and trace action in learning. LMS was considered software that could be used to manage, track, and report on learners' training activities. In this research, the variables associated with LSM were satisfaction and task technology fit.

Goodhue and Thompson (1995) claimed that the TTF model had become critical as it concentrated on matching technology and task requirements, especially in E-learning. The variable adopted in this research includes task technology fit.

CoI, contributed by Garrison et al. (1999), presented this model as a process, which means learners in group participation in knowledge learning and empirical investigation about difficult circumstances. The variable adopted from this model refers to the cognitive presence, teaching presence, social presence, and learner-instructor interaction.

2.2 Task Technology Fit

Goodhue (1995) defined the original task technology fit (TTF) concept that predicts the performance of an organization and technology usage by watching the participation of a single learner. McGill and Klobas (2009) stated that TTF means a capability of an e-learning system that can facilitate learners through accessing studying learning materials, doing online assessments, and interacting with others while adapting various learners' capabilities. Larsen and Sreb (2009) suggested that the TTF model is crucial to explain learners' online learning intentions of continuance. TTF is a main predictor of e-learning

satisfaction (Gu & Wang, 2015). In TTF theory, Wei and Liang (2004) argued that fit is the first dimension between technology and task. Lin and Huang (2008) explained that technology is a combination of user enablement and information technology (such as software, hardware, and data) to transform input into a valuable outcome, a task activity performed to meet people's needs. TTF is a theory that an information provider can support technology matching tasks with task requirements (Joseph & Gliem, 2003). TTF theory refers to new technologies that are more likely to be used and positively impact individual performance if their technological abilities match users' task performance (Goodhue & Thompson, 1995). McGill and Klobas (2009) suggested that the TTF theory is important to cognize the technology to the performance chain in LMS. As argued by two researchers, TTF is widely applied to assess how IT influences user performance through matching technical characteristics and task features (Wu & Chen, 2017). Hence, the researcher proposed the following hypothesis:

H1: Task technology fit has a significant impact on confirmation.

H2: Task technology fit has a significant impact on satisfaction.

2.3 Teaching Presence

Shea et al. (2003) suggested that teaching presence facilitates, designs, and directs social and cognitive processes, which means achieving better learning outcomes with personal meaning and educational value. Vaughan (2004) defined that when implementing e-learning, teaching presence is a vital factor in teachers' professional development. Teaching Presence helps students achieve meaningful and valuable learning goals through curriculum design, facilitation, and orientation. Teaching presence is important for establishing a curriculum system, facilitation approaches, and teaching methods (Garrison, 2011). Based on Anderson et al. (2001), teaching Presence begins before course delivery; teachers must plan and prepare learning materials and implement teaching in the classroom. Teachers' teaching tasks also include assisting in discussions and presentations during teaching and providing direct instruction to students when needed. Teaching Presence affects students' online learning and exploration processes. It significantly affects the communication and interactions in e-communities where content presentation, questioning, coaching, summarization, and diagnosis of misunderstandings occur all the time. Therefore, establishing and maintaining an inquiry learning community requires a thoughtful and focused teaching presence (Garrison et al., 2010). Teaching Presence is essential for higher-level teaching (Garrison & Cleveland-Innes, 2005). As proposed by Szeto (2015), teachers' performance worked a leading role and was more critical than cognitive and social presences in certain educational backgrounds, for example, in engineering lectures. Teaching presence positively affected social and cognitive Presence, but in contrast, it had not directly influenced learning performance. Dempsey and Zhang (2019) demonstrated a research result that tested a hypothesis between cognitive Presence and teaching presence by using social Presence as a mediator. Teaching presence had essential predictive impacts on cognitive Presence. Hence, the researcher proposed the following hypothesis:

H3: Teaching presence has a significant impact on cognitive presence.

H6: Teaching presence has a significant impact on satisfaction.

2.4 Cognitive Presence

Cognitive Presence refers to constructing the perception of meaning through ongoing and long-term communication (Garrison, 2003, 2011; Garrison et al., 1999, 2000, 2001). Cognitive Presence describes students' efforts and attempts to find the most effective solutions to learning problems and ultimately apply those solutions (Kozan & Richardson, 2014). Cognitive Presence includes integrating the whole process of accepting, exploring, reflecting, and interacting with learning content and the ability to solve learning problems. Cognitive Presence contributes to the CoI model through its cooperative information exploration and creation (Garrison & Akyol, 2013). Hilliard and Stewart (2019) suggested that cognitive Presence ensures the possibility of further learning in a skills-based curriculum. Schwartz and Gutierrez (2015) suggested that meaning and understanding in the learning process are important concepts for creating a cognitive presence for learning outcomes. Through reflection and communication, cognitive processes facilitate students' analysis, construction, and validation of learning content, meaning, and understanding. Understanding cognitive Presence is a priority, providing deep and meaningful learning outcomes through integrating the educational experience in students' public and personal environments. According to existing research, teaching and cognitive Presence essentially became highly socialized correlation factors (Garrison et al., 2010; Shea et al., 2003). This viewpoint also could be expressed that teaching presence had a predictive relationship with cognitive Presence, whereas social Presence was a mediator. However, according to the correlational and regression analysis contributed by Kozan and Richardson (2014), some studies stressed the mediating relationship of cognitive Presence. Hence, the researcher proposed the following hypothesis:

H4: Cognitive presence has a significant impact on social presence.
H8: Cognitive presence has a significant impact on satisfaction.

2.5 Confirmation

Confirmation refers to the perceived agreement between users' expectations for using information technology and its actual performance (Bhattacherjee, 2001). Hadad (2007) found that technology competencies lead to a high confirmation of building blended learning. Huang (2016) agreed that the success of blended learning depends on students and teachers gaining the confidence and ability to engage in this new way of learning. Learners' expectations of a particular technology about their experience of using it led to confirmation. Bhattacherjee (2001) pointed out that continuation intention means the user's willingness and behavior to continue to use the service after receiving the service. Confirmation is a key factor in the expectation confirmation model (ECM). The confirmation of expectation theory shows that learners obtain expected benefits through the experience of using information technology, which positively impacts learning satisfaction. The validation model is expected to serve as a reference benchmark for validation evaluation. Users' perceived usefulness to information technology positively impacts satisfaction with technology (Bhattacherjee, 2001a). Hence, the researcher proposed the following hypothesis:
H5: Confirmation has a significant impact on satisfaction.

2.6 Social Presence

Lowenthal (2010) pointed out that social existence comes from computer-mediated communication (CMC), not from learning science. Social presence was considered lost or missing from the communicative experience as researchers studied the CMC model recently. Early researchers referred to social presence as salience to others in mediated communication and the corresponding salience of interpersonal communication (Short et al., 1976). With the development of various communication and interactive media, such as video streaming, interactive TV, and online learning environments, many social presence definitions have arisen (Tammelin, 1998; Whiteside & Garrett Dikkers, 2008). Previous research about social presence falls into two distinct categories. The first type of research regards social presence as an attribute of the medium in media communication: a missing or absent communication attribute within the medium. The second research category about social presence refers to behaviors, perceptions, or participants' attitudes in mediated interactions (Rettie, 2006). Alsadoon (2018) claimed that social presence plays a role in the relationship with individual satisfaction.

Similarly, social presence in online learning is an emotional and social connection between members, including emotional expression, group cohesion, and open communication with peers in the course. Social presence includes acknowledging and trusting others (Rubin et al., 2013). Under the context of blended learning, Garrison (2011) defined social presence as a student's ability to engage with peers in learning, including the ability to trust, communicate with classmates, and shape personal and positive relationships. Hence, the researcher proposed the following hypothesis:
H7: Social presence has a significant impact on satisfaction.

2.7 Learner-Instructor Interaction

Learner–instructor interaction refers to the interaction between learners and teachers, which is essential to stimulate students' curiosity and is an effective motivator to achieve learning goals. Formal or informal interaction is necessary in the online learning mode (Moore, 1989). According to Wickersham and McGee (2008), learner satisfaction means engaging and influencing learners' study efficiency, motivation, and achievement. Learner–instructor interaction is critical to predicting satisfaction in the online learning environment (Battalio, 2007; Bolliger & Martindale, 2004; Thurmond, 2003). Evans and Gibbons (2007) claimed that interactivity is the essential factor in technology-based enhanced learning environments, and it drives practitioners to concern about its impact when considering the design of online learning systems. Learner–instructor interaction fosters social relationships by exchanging social emotions, interests, learning atmosphere, and perspective interactions (Cheng, 2013; Paechter & Maier, 2010). Juwah (2006) suggested that teacher-student interaction is a key activity and necessary responsibility for teachers to play a central role in traditional teaching methods. Interaction between teachers and students helps students connect or integrate their knowledge with information to form new concepts, assimilate and apply them. In a blended learning environment, the learner should be the center, and more flexible and diverse interactions should be carried out between teachers and students. Kang and Im (2013) pointed out that the interaction between teachers and students has an important impact on the learning outcomes in learning activities, such as giving students learning assistance, providing teaching support, building social intimacy, and answering questions. Hence, the researcher proposed the following hypothesis:
H9: Learner-instructor interaction has a significant impact on satisfaction.

2.8 Satisfaction

Subrahmanyam et al. (2001) defined student satisfaction as the degree to which students' subjective evaluations of various experiences and outcomes related to education are good or bad and repeated learning experiences constantly shape it. Satisfaction with the learning concept is defined as students' general positive evalu ation of their learning process and experience (Garcia et al., 2014). In online learning, satisfaction is the learner's satisfaction with the expected performance of the information technology system (Bhattacherjee, 2001). Satisfaction is considered one of the most significant elements in determining the quality of online learning and teaching (Allen & Seaman, 2010; Garrison & Cleveland-Innes, 2005; Moore & Kearsley, 2012) Satisfaction refers to learners' emotional expressions of satisfaction and enjoyment in different aspects of the learning process they have acquired in an online learning course. Therefore, satisfaction is a factor that affects the learning services component. According to DeLone and McLean (1992), students' satisfaction indicates their enjoyment and willingness to use the online learning system. Thus, satisfaction becomes one of the criteria to measure the success of the information system. Satisfaction is a main issue in examining whether students continue utilizing an online learning system (Arbaugh & Duray, 2001; Min et al., 2022). Al-hawari and Mouakket (2010) suggested that satisfaction is a necessary condition for gaining a competitive advantage and the key to success in the learning process. Learner satisfaction is a main factor affecting the failure to use new approaches in blended learning (Chang & Fisher, 2003).

3. Research Methods and Materials

3.1 Research Framework

The research framework was composed of three main theatrical frameworks. The first previous research framework was conducted by Cheng (2019), studying the relationship among these constructs: task characteristics, technology characteristics, task technology fit, confirmation, perceived usefulness, satisfaction, continuance intention, and perceived impact.

The second previous framework previous research framework was conducted by Mirabolghasemi et al. (2021). This study comprehensively analyses these constructs in blended learning: information quality, system quality, teaching presence, cognitive presence, social presence, and satisfaction. These researchers also discussed the learning management systems (LMS) and community of inquiry (CoI). The third previous framework was conducted by Leong et al. (2021), who studied the relationship among these constructs: learner–instructor interaction, learner-learner interaction, learner–content interaction, self-regulated learning, Internet self-efficacy, and online learning satisfaction. The research framework was built with seven variables illustrated in Figure 1.

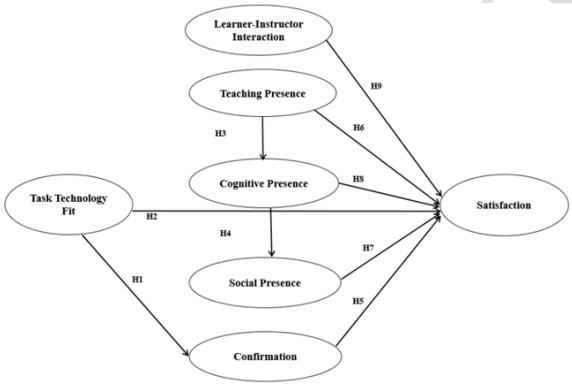

Figure 1: Conceptual Framework

H1: Task technology fit has a significant impact on confirmation.
H2: Task technology fit has a significant impact on satisfaction.
H3: Teaching presence has a significant impact on cognitive presence.
H4: Cognitive presence has a significant impact on social presence.
H5: Confirmation has a significant impact on satisfaction.
H6: Teaching presence has a significant impact on satisfaction.
H7: Social presence has a significant impact on satisfaction.
H8: Cognitive presence has a significant impact on satisfaction.
H9: Learner-instructor interaction has a significant impact on satisfaction.

3.2 Research Methodology

The study was conducted using a quantitative method to collect data from undergraduate students with at least one year of experience with blended learning in private higher education institutions. The data collection was examined by executing factor and correlation regression analyses through CFA and SEM for research outcomes. 500 valid questionnaires were gathered from target respondents in the two colleges. The questionnaire comprises three sections: 1) screening questions for filtering respondents to the target population, 2) variable measurement using the Five-Point Likert scale, and 3) the target respondents' demographic information. A content validity test was conducted using the IOC tool with three experts before the questionnaires were

delivered. Moreover, a pilot test of Cronbach's Alpha with 30 respondents was applied. The pilot test results show that the constructs have a coefficient of internal consistency under the rule of thumb that Cronbach's Alpha (CA) value that should be 0.70 or above (Dikko, 2016). The researcher conducted the construct and discriminant validity based on CFA using SPSS 24.0 and AMOS 18.0. SEM was utilized to investigate the nine hypotheses, identify the critical influences that affected satisfaction with blended learning, and generate conclusive implications for this research.

3.3 Population and Sample Size

The target population includes people, events, and records, which are study elements (Cooper & Schindler, 2011). In this research, the population focused on private college students in Chengdu, the Capital city of Sichuan. The target population was undergraduate students who majored in art and design disciplines with at least one year of blended learning experience. In TFC and JJC, the chosen students majored in environmental design, visual communication design, and product design. The three majors have similar teaching and learning characteristics based on the blended learning method.

MacCallum et al. (1996) suggested that the ideal sample size may depend on many other issues. The required efficiency of the study, the complexity of the overall model, and the tested null hypothesis determine the sample size requirements. This research had seven latent factors: TTF, CF, SP, TP, CP, LII, and ST. The variables contained forty observed measurement items. Hair et al. (2007) stated that an adequate sample size is 30 to 500 for most studies. The researcher selected 500 samples from two colleges to ensure a reliable statistical outcome.

3.4 Sampling Technique

The sampling procedures were employed. First, purposive sampling was used to ensure that target respondents are from the selected private colleges. Secondly, stratified sampling was used to allocate the sample size to the target population on the number of students proportionately. Thirdly, purposive and convenience sampling were conducted to select students with experience using online platforms for academic learning for over one year. The samples consisted of 4,682 students from two Chengdu College of Arts and Sciences in China. Then, 500 respondents from each of the four majors were picked, and the samples for the final stage were selected based on a quota system.

Table 1: Sample Units and Sample Size

College Name	Population Size	Proportional Size
TFC	3236	345
JJC	1446	155
Total	**4682**	**500**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

From Table 2, the respondents in TFC and JJC consist of 120 males and 380 females, representing 24% and 76%, separately. Second-year student accounts for 37.6%, third-year student account for 46%, and fourth-year student account for 16.4%. Most students have been using blended learning more than two years, accounted 32.6%.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	120	24%
	Female	380	76%
Grade	Second Year	188	37.6%
	Third Year	230	46%
	Fourth Year	82	16.4%
Duration of using blended learning	Less one year	106	21.2%
	One year	136	27.2%
	Two years	95	19%
	More than two years	163	32.6%

Source: Constructed by author

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was applied before analyzing the measurement model with a structural equation model (SEM). According to Hair et al. (2006), the CFA results show that all items in each variable are important, as factor loading is to prove the validity of discrimination. In Table 3, the empirical data shows that the constructs have a coefficient of internal consistency under the rule of thumb that Cronbach's Alpha (CA) value should be 0.70 or above (Dikko, 2016). Factor loading of each variable was also above 0.5 at a t-value >1.98 and p-value<0.5 (Hair et al., 2010). According to Fornell and Larcker (1981), composite reliability (CR) was greater than 0.7, and the average variance extracted (AVE) was greater than 0.5 for all constructs. Summarily, the statistical estimates were significant.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Task technology fit (TTF)	Cheng (2019)	4	0.890	0.702-0.867	0.892	0.675
Confirmation (CF)	Cheng (2019)	3	0.895	0.842-0.874	0.896	0.741
Teaching Presence (TP)	Mirabolghasemi et al. (2019)	9	0.924	0.662-0.844	0.920	0.564
Cognitive Presence (CP)	Mirabolghasemi et al. (2021)	9	0.920	0.639-0.789	0.920	0.562
Social Presence (SP)	Mirabolghasemi et al. (2021)	7	0.901	0.718-0.815	0.903	0.570
Learner-instructor interaction (LLI)	Leong et al. (2021)	4	0.816	0.676-0.781	0.817	0.527
Satisfaction (ST)	Cheng (2019)	4	0.892	0.794-0.844	0.892	0.674

An acceptable value is to determine the goodness of fit. CFA was used to examine the acceptability of all items constructed in this conceptual framework model (Bollen, 1989). CFA was analyzed before modification. According to Hair et al. (2010) and Gefen et al. (2003), all results are required to consistently meet the acceptable threshold levels. The statistical values of indices were shown in Table 4 for TFC and JJC, which illustrated the model's fitness as the statistical values from CFA are compared with the acceptance criteria. The statistical values of indices were shown as CMIN/dF = 2.873, GFI = 0.825, AGFI = 0.800, NFI=0.866, CFI = 0.908, TLI = 0.900, RMSEA = 0.061. All indices satisfied the acceptance criteria and led to an affirmed fitness of the model.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/df	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	2057.356/ 2.873
GFI	≥ 0.80 (Doll et al., 1994)	0.825
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.800
NFI	≥ 0.80 (Wu & Wang, 2006)	0.866
CFI	≥ 0.80 (Bentler, 1990)	0.908
TLI	≥ 0.80 (Sharma et al., 2005)	0.900
RMSEA	< 0.08 (Pedroso et al., 2016)	0.061
Model Summary		**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker–Lewis index, and RMSEA = Root mean square error of approximation.

Table 4 displays the results of the square root of AVEs. Discriminant validity was calculated by computing the square root of each AVE and compared with the factor correlations (Fornell & Larcker, 1981). In this study, the values of discriminant validity were all larger than inter-construct correlations, and the inner data were all less than 0.8. Hence, the discriminant validity was acceptable and valid. The evidence is sufficient for building construct validity, while the convergent and discriminant were supportive.

Table 5: Discriminant Validity

	TTF	CF	TP	SP	CP	LII	ST
TTF	**0.821**						
CF	0.796	**0.860**					
TP	0.509	0.620	**0.750**				
SP	0.477	0.505	0.620	**0.754**			
CP	0.465	0.479	0.600	0.720	**0.749**		
LII	0.373	0.384	0.520	0.624	0.702	**0.725**	
ST	0.554	0.572	0.562	0.663	0.702	0.706	**0.820**

Note: The diagonally listed value is the AVE square roots of the variables

Source: Created by the author.

4.3 Structural Equation Model (SEM)

SEM analysis tests the fit between a model proposed by researchers and the sample data, that is, the degree of fit of the overall model. (Bentler & Bonett, 1980). The factor analysis and estimation of weight with the goodness of fit indices examination were carried out in this research. For TFC and JJC, the statistical values of indices were shown in Table 6, which illustrated the model's fitness as the statistical values from SEM are compared with the acceptance criteria. The statistical values of indices were shown as CMIN/dF = 3.240, GFI = 0.827, AGFI = 0.800, NFI= 0.851, CFI = 0.891, TLI = 0.881, RMSEA = 0.067. All indices satisfied the acceptance criteria and led to an affirmed fitness of the model.

Table 6: Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/df	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	2296.921/ 3.240
GFI	≥ 0.80 (Doll et al., 1994)	0.827
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.800
NFI	≥ 0.80 (Wu & Wang, 2006)	0.851
CFI	≥ 0.80 (Bentler, 1990)	0.891
TLI	≥ 0.80 (Sharma et al., 2005)	0.881
RMSEA	< 0.08 (Pedroso et al., 2016)	0.067
Model Summary		**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker–Lewis index, and RMSEA = Root mean square error of approximation.

4.4 Research Hypothesis Testing Result

Regression coefficients or standardized path coefficients measured the coherence between the independent and dependent variables proposed in the hypotheses. The regression weight and R2 variance structure model determine the importance of the relationship between variables. The research results from TFC and JJC, as shown in Table 6, seven out of nine proposed hypotheses were supported. Confirmation was strongly impacted by task technology fit. Satisfaction was strongly affected by learner-instructor interaction. Social presence was deeply affected by the cognitive presence, which was significantly driven by teaching presence. Meanwhile, two out of nine proposed hypotheses were not supported. Teaching presence has no significant impact on satisfaction. The task technology fit has no significant impact on satisfaction.

Table 6: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-Value	Result
H1: TTF→ CF	0.897	15.145***	Supported
H2: TTF→ ST	0.354	1.039	Not Supported
H3: TP → CP	0.706	11.337***	Supported
H4: CP→ SP	0.822	13.882***	Supported
H5: CF→ ST	0.262	2.295*	Supported
H6: TP→ ST	0.299	-0.556	Not Supported
H7: SP→ST	0.179	2.295*	Supported
H8: CP→ ST	0.469	3.411***	Supported
H9: LII→ ST	0.544	10.295***	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05
Source: Created by the author

H1: The most substantial impact on confirmation is task technology fit. The confirmation and task technology fit path has a standardized coefficient of 0.897 and a T-Value of 15.145, consistent with the early studies (Janson et al., 2017; Khan et al., 2017; Lin & Wang, 2012).

H2: The statistical value postulated no positive impact between task technology fit and satisfaction as the standardized coefficient value is 0.354 and the t-value is 1.039. This is supported by the previous studies of Cheng (2019), who pointed out that characteristics of tasks and technology influence students' perception of TTF as the factor directly or indirectly that causes continued intention to the learning system.

H3: Another significant impact on cognitive presence is teaching presence, with a standardized coefficient of 0.706 and a t-value of 11.337.

H4: The second-high impact on social presence is a cognitive presence, with a standardized coefficient of 0.303 and a t-value of 13.882, which were consistent with the studies from Gurley (2018), Law et al. (2019), and Mirabolghasemi et al. (2021).

H5: Confirmation impacts satisfaction at the standardized coefficient of 0.262 and the t-value of 2.295, which relates to the studies of Rabaai (2021) and Lee (2010).

H6: The statistical value postulated no positive impact between teaching presence and satisfaction as the standardized coefficient value is 0.299 and the t-value is -0.556. This is supported by Law et al. (2019), who claimed that teaching presence has no direct positive impact on learning performance.

H7: Social presence impacts satisfaction with a standardized coefficient of 0.179 and a t-value of 2.295, which is consistent with the studies from Law et al. (2019).

H8: Cognitive presence affects satisfaction with a standardized coefficient of 0.469 and a t-value of 3.411. This correlated with the studies from Mirabolghasemi et al. (2021).

H9: The direct impact of learner-instructor interaction on satisfaction is critical as the standardized coefficient of 0.544 and the t-value of 10.295 were shown from H9, which is consistent with the studies from Leong et al. (2021).

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

This research has determined the essential factors which impacted satisfaction in blended learning by art and design students in two private colleges in Chengdu, Sichuan province. 500 valid questionnaires were gathered from undergraduates with at least one year of experience in blended learning. The research sample size of data collection was 500 samples, referenced from the minimum sample required of 440 samples. A questionnaire was used as a tool to obtain quantitative data from 500 samples.

The proposed conceptual matrix was developed from the theories of ECM, LMS, TTF, and CoI, followed by a literature study. The variable factors referred to TTF, CF, SP, TP, CP, LII, and ST, which contained forty observed measurement items. The research conducted the CFA on construct and discriminant validity using software SPSS 24.0 and AMOS 18.0. SEM was utilized to investigate the nine hypotheses and identify the critical influences affecting blended learning satisfaction. According to the research findings, seven hypotheses were supported, as two did not support the initial research hypotheses. The research findings proved the proposed hypotheses and generated conclusive implications for the two colleges. The findings revealed that

certain factors in the conceptual model significantly impacted students' satisfaction, apart from TTF and TP. TTF had the strongest impact on CF, as TP had a critical influence on SP.

Hence, recommendations for the two colleges had been drawn for their administrative staff and lecturers that hope to improve students' positive engagement and satisfaction in the digital age as hybrid learning and teaching have become necessary and critical. In other words, educational policymakers and practitioners were suggested to consider significant factors to ensure better performance by creating a friendly and effective blended learning environment. Moreover, this research also addressed that college students need more training and motivation to overcome learning barriers, which helps establish confidence. These suggestions help learners to continue online learning in the lifetime learning age. In general, the objectives of this research had achieved and verified.

With the rapid development of the internet and the fast speed of data iteration and updates, the researcher hopes to improve the related research of blended learning based on the study and analysis. Furthermore, digitizing higher education is a breakthrough and innovative path to promote the learning revolution and high-quality development. In China, the National Higher Education Smart Education Platform was launched in August 2022 and accessed to users covering 146 countries on five continents. This platform reinforces the effectiveness and efficiency of learning and teaching, which make learning can be everywhere and at any time. Massive survey data shows that they are more receptive and adaptable to the learning of "Internet +" and "Intelligence +" by using online classrooms. Students learning autonomy and teacher-student interaction surpass traditional face-to-face classroom teaching, according to an interview with Wuyan, Deputy Minister of Education (Wuyan, 2022).

Therefore, colleges must utilize Internet technology to develop hybrid teaching advantages further. Teachers' teaching informationization literacy should be greatly improved. Based on the data from online platforms, college managers should mine data related to learning satisfaction, improve the quality of teaching, and promote the diversification of teaching models for hybrid teaching, especially in private colleges in Chengdu.

5.2 Recommendation

Seven latent factors in this research were used to examine the impacts of blended learning for the two chosen private colleges in the target areas. The research results displayed that these factors significantly or insignificantly impacted students' satisfaction.

In TFC and JJC, task technology fit was the strongest predictor of confirmation. Task technology fit, and teaching presence was also significant but indirectly impacted satisfaction. Task technology fit had the most striking effect on confirmation which worked as a mediator to influence satisfaction. The direct impact of cognitive presence on satisfaction was proven in this group. Cognitive presence can also help to build a positive impact on social presence in blended learning. Social presence worked as a significant predictor of satisfaction.

The empirical data demonstrated that TFC and JJC students were more inclined to obtain satisfaction with blended learning by confirming the matching degree between learning tasks and internet technology. Therefore, school administrators and teachers should attach great importance to matching internet devices and technologies required in the blended learning process, such as the network speed and voice devices required for teachers and students who learn at home or in non-classroom settings. Only when students can confirm that the internetworking technology is smooth and accessible to support their learning and completing homework can their satisfaction with learning be improved.

This data set also shows that the teacher's teaching presence in blended learning does not directly lead to high student satisfaction but improves students' knowledge and cognitive level. Cognitive presence means to students' ability which help them to build a knowledge framework and construct meaning by discussing and reflecting as working in a group or class. The cognitive presence level significantly impacted students' social presence, including online and offline group discussions and assignments.

The influence of peer learning in the two private colleges was important in achieving learning satisfaction. The positive impact of learners-instructors interaction on satisfaction also evidences this. In other words, communication and interaction between teachers and students, as well as among peer students, significantly impacted the satisfaction of blended learning in the two colleges, especially those who majored in designing subjects. In practice, this ability of cognitive presence needs to be developed online and offline as they were in or after the COVID-19 pandemic for TFC and JJC.

The same measurements and questionnaires were conducted in two schools in the city of Chengdu, and some interesting results were obtained for students with the same majors and levels. To analyze empirical data from all respondents in this research, one common point is that cognitive presence and learner-instructors interaction significantly impacted satisfaction. Another common point is that teaching presence did not significantly impact

students' satisfaction in the four schools for art and design subjects. These two points indicate that private school students majoring in art and design have a lively and communicative personality. That is to say, students prefer to enhance their cognitive level with a blended learning model through various social activities in and after class, thereby improving their learning satisfaction. Meanwhile, school administrators need to pay more attention to consider how to enhance teachers' lecturing design ability.

According to respondents from TFC and JJC, satisfaction with blended learning has mainly depended on CP, SP, CF, and LII. TTF and TP had no important influence on the two college students. TTF impacted their confirmation of hybrid learning and, in turn, influenced to increase the degree of satisfaction. Students deemed that teaching presence had no significant effect on their satisfaction. The two colleges should enhance the teaching approaches, such as changing the traditional teacher-centered one-way "knowledge output" into student-centered "flipped classroom" teaching methods. Teachers should consider the balance of online teaching and offline supervising. Teachers should deliver the teaching and learning processes effectively through online learning platforms with sufficient student engagement to provide no disruption to their academic development and skill improvement. Meanwhile, the college administrators are suggested to improve the task technology fit to ensure complete and effective utilization of tools and platforms for e-learning.

5.3 Limitation and Further Study

Some limitations to this research need to be identified. Firstly, this research only focused on private colleges and gathered data from four chosen institutions in two cities. Therefore, the research scope and sample size were limited. Secondly, the theme of this research only examined students' satisfaction with blended learning. Moreover, satisfaction was just one dimension to evaluate the effectiveness and efficiency of hybrid learning. Thirdly, participants in the research targeted underground students who major in art and design subjects.

Meanwhile, the research had yet to choose teachers as respondents. This research focused on private college students with experience in blended learning. However, the questionnaire and data collection period in this research was in strict epidemic prevention and control policy in the two colleges. Students had long-term pure online learning rather than blended learning. Some had inevitable boredom and dissatisfaction, leading to partly unrealistic reflection and feedback for the questionnaire survey.

To summarize, this research only focused on undergraduate students majoring in art and design from private colleges in the city of Chengdu, Sichuan, as a sample to investigate their satisfaction with hybrid teaching. Due to the diversity of teaching resources in different regions of China, and the varying degrees of mixed teaching in different higher educational institutions, the conclusions of this research would be more representative if the sample selection was broader. Therefore, it is necessary to collect other samples from different colleges and universities in different regions for research.

Further study might suggest considering teachers as participants to obtain their opinions about how to view students' satisfaction with hybrid learning from a teaching angle. In future studies, researchers should consider more factors such as perceived usefulness, performance expectancy, attitude to use, learning motivation, quality of information, service quality, etc. Additionally, qualitative research might be suggested to apply a better understanding of college student perspective on hybrid learning. Other research methods, such as focus group interviews with students, teachers, and other college staff, might be added to expand the sample and data collection.

References

Al-hawari, M. A., & Mouakket, S. (2010). The influence of technology acceptance model (TAM) factors on students' e-satisfaction and e-retention within the context of UAE e-learning. Education, *Business and Society: Contemporary Middle Eastern Issues*, *3*(4), 299-314.

Allen, I. E., & Seaman, J. (2010). *Learning on demand: Online education in the United States.* http://sloanconsortium.org/publications/survey/pdf/learningondemand.pdf

Al-Mamary, Y. H., & Shamsuddin, A. (2015). Testing of the technology acceptance model in context of Yemen. *Mediterranean Journal of Social Sciences*, *6*(4), 268-273. https://doi.org/10.5901/mjss.2015.v6n4s1p268

Alsadoon, E. (2018). The impact of social presence on learners' satisfaction in mobile learning. *Turkish Online Journal of Educational Technology-TOJET, 17*(1), 226-233.

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2), 117. https://doi.org/10.24059/olj.v5i2.1875

Andronie, M. (2014). Distance learning management based on information technology. *Contemporary Readings in Law and Social Justice*, *6*(1), 350-361.

Arbaugh, J. B., & Duray, R. (2001). Technological and structural characteristics, student learning and satisfaction with web-based courses an exploratory study of two on-line MBA programs. *Manage. Learn. 33*(3), 331-347. https://doi.org/10.5465/apbpp.2001.6133570

Awang, Z. (2012). *Structural equation modeling using AMOS graphic* (5th ed.). Penerbit Universiti Teknologi MARA.

Battalio, J. (2007). Interaction online: A reevaluation. *Quarterly Review of Distance Education*, *8*(4), 339-352.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246. https://doi.org/10.1037/0033-2909.107.2.238

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological bulletin, 88*(3), 588-606. https://doi.org/10.1037/0033-2909.88.3.588

Bhattacherjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decis Support Syst, 32*(2), 201-214. https://doi.org/10.1016/s0167-9236(01)00111-7

Bhattacherjee, A. (2001a). Understanding information systems continuance: An expectation confirmation model. *MIS Quarterly*, *25*(3), 351. https://doi.org/10.2307/3250921

Bollen, K. A. (1989). A New Incremental Fit Index for General Structural Equation Models. *Sociological Methods & Research, 17*(3), 303-316. https://doi.org/10.1177/0049124189017003004

Bolliger, D. U., & Martindale, T. (2004). Key factors for determining student satisfaction in online courses. *International Journal of E-Learning, 3*(1), 61-67.

Bordoloi, R., Das, P., & Das, K. (2021). Perception towards online/blended learning at the time of Covid-19 pandemic: an academic analysis in the Indian context. *Asian Association of Open Universities Journal, 16*(1), 41-60. https://doi.org/10.1108/aaouj-09-2020-0079

Chang, V., & Fisher, D. L. (2003). The validation and application of a new learning environment instrument for online learning in higher education. *Technology-Rich Learning Environments, 1,* 1-20. https://doi.org/10.1142/9789812564412_0001

Cheng, Y. M. (2013). Exploring the roles of interaction and flow in explaining nurses' e-learning acceptance. *Nurse Education Today, 33*(1), 73-80. https://doi.org/10.1016/j.nedt.2012.02.005

Cheng, Y. M. (2014). Extending the expectation-confirmation model with quality and flow to explore nurses continued blended e-learning intention, *Information Technology and People, 27*(3), 230-258. https://doi.org/10.1108/itp-01-2013-0024

Cheng, Y. M. (2019). How does task-technology fit influence cloud-based e-learning continuance and impact?. *Education + Training, 61*(4), 480-499. https://doi.org/10.1108/et-09-2018-0203

Cheung, W., Lam, V., Sarmiento, J. L., & Kearney, K. (2010). Large-scale Redistribution of Maximum Fisheries Catch Potential in the Global Ocean under Climate Change. *Global Change Biology, 16*(1), 24-35.

Cooper, D. R., & Schindler, P. (2011). *Business Research Methods* (11th ed.). McGraw Hill/Irwin.

DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Journal of Management Information Systems, 3*(1), 60-95. https://doi.org/10.1287/isre.3.1.60

Dempsey, P. R., & Zhang, J. (2019). Re-Examining the Construct Validity and Causal Relationships of Teaching, Cognitive, and Social Presence in Community of Inquiry Framework. *Online Learning Journal, 23*(1), 1-10. https://doi.org/10.24059/olj.v23i1.1419

Dikko, M. (2016). Establishing Construct Validity and Reliability: Pilot Testing of a Qualitative Interview for Research in Takaful (Islamic Insurance). *Qualitative Report*, *21*(3), 1-10. https://doi.org/10.46743/2160-3715/2016.2243

Doll, W., Xia, W., & Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly, 18*(4), 453-461. https://doi.org/10.2307/249524

Evans, C., & Gibbons, N. J. (2007). The interactivity effect in multimedia learning. *Computers & Education, 49*(4), 1147-1160. https://doi.org/10.1016/j.compedu.2006.01.008

Fornell, C. G., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 50. https://doi.org/10.2307/3150979

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

Friesen, N. (2012). *Report: defining blended learning*. https://www.normfriesen.info/papers/Defining_Blended_Learning_NF.pdf

Garcia, J., Euclides, V. P. B., Alcalde, C. R., Difante, G. S., & Medeiros, S. R. (2014). Intake, grazing time, and performance of steers supplemented in Brachiaria decumbens pastures during the dry season. *Semina: Ciencias Agrarias, 35*(4), 2094-2104.

Garrison, D. R. (2003). Self-Directed Learning and Distance Education. In M. G. Moore, & W. Anderson (Eds.), *Handbook of Distance Education* (pp. 161-168). Mahwah, Lawrence Erlbaum.

Garrison, D. R. (2011). *E-Learning in the 21st century: A framework for research and practice* (2nd ed.). Routledge.

Garrison, D. R. M., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education, 13*, 31-36. https://doi.org/10.1016/j.iheduc.2009.10.002

Garrison, D. R., & Akyol, Z. (2013). Toward the development of a metacognition construct for communities of inquiry. *The Internet and Higher Education, 17,* 84-89. https://doi.org/10.1016/j.iheduc.2012.11.005

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education, 19*(3), 133-148. https://doi.org/10.1207/s15389286ajde1903_2

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education, 2*(1), 87-105. https://doi.org/10.1016/s1096-7516(00)00016-6

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text–based environment: Computer conferencing in higher education. *Internet and Higher Education, 11*(2), 1-14. http://doi:10.1016/S1096-7516 (00)00016-6

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23. https://doi.org/10.1080/08923640109527071

Gasevic, D., Tsai, Y., Dawson, S., & Pardo, A. (2019). How do we start? An approach to learning analytics adoption in higher education. *The International Journal of Information and Learning Technology, 36*(4), 342-353. https://doi.org/10.1108/ijilt-02-2019-0024

Gefen, D., Karahanna, E., & Straub, D. (2003). Trust and TAM in online shopping: an integrated model. MIS Quarterly, *27*(1), 51-90. https://doi.org/10.2307/30036519

Goodhue, D. L. (1995). Understanding User Evaluations of Information Systems. *Management Science, 41*(12), 1827-1844. https://doi.org/10.1287/mnsc.41.12.1827

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly, 19*(2), 213-236. https://doi.org/10.2307/249689

Gu, L., & Wang, J. (2015). A Task Technology Fit Model on E-learning. *Issues in Information Systems, 16*(1), 163-69. https://doi.org/10.48009/1_iis_2015_163-169

Gurley, L. E. (2018). Educators' preparation to teach, perceived teaching presence, and perceived teaching presence behaviors in blended and online learning environments. *Online Learning Journal, 22*(2), 197-220. https://doi.org/10.24059/olj.v22i2.1255

Hadad, W. (2007). *ICT-in-education toolkit reference handbook. Info Dev.* http://www.infodev.org/en/Publication.301.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed). Pearson Prentice Hall.

Hair, J. F., Celsi, M., Ortinau, D. J., & Bush, R. P. (2010). *Essentials of marketing research* (5th ed.). McGraw-Hill/Irwin

Hair, J. F., Money, A. H., Samouel, P., & Page, M. (2007). Research Methods for Business. *Journal of Education Training, 49*(4), 336-337. https://doi.org/10.1108/et.2007.49.4.336.2

Handover, M. D. (2015). *American College Health Association. American College Health Association-National College* (1st ed.). Spring.

Hilliard, L. P., & Stewart, M. K. (2019). Time well spent: Creating a community of inquiry in blended first-year writing courses. *The Internet and Higher Education, 41,* 11-24.

Huang, Y. M. (2016). The factors that predispose students to continuously use cloud services: Social and technological perspectives. *Computers & Education, 97*, 86-96. https://doi.org/10.1016/j.compedu.2016.02.016

Janson, A., Söllner, M., & Leimeister, J. M. (2017). Individual Appropriation of Learning Management Systems-Antecedents and Consequences. *AIS Transactions on Human-Computer Interaction, 9*(3), 173-201. https://doi.org/10.17705/1thci.00094

Joseph, A., & Gliem, R. R. G. (2003). *Calculating, interpreting, and reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales Midwest Research to Practice Conference in Adult* (1st ed.). Continuing, and Community Education

Juwah, C. (2006). *Interactions in Online Education* (1st ed.). Routledge.

Kang, M., & Im, T. (2013). Factors of learner–instructor interaction which predict perceived learning outcomes in online learning environment. *Computer Assisted Learning, 29*(3), 292-301. https://doi.org/10.1111/jcal.12005

Khan, I. U., Hameed, Z., Yu, Y., Islam, T., & Sheikh, Z. (2017). Predicting the acceptance of MOOCs in a developing country: Application of Task-Technology Fit Model, Social Motivation, and Self-determination Theory. *Telematics and Informatics, 35*(4), 964-978. https://doi.org/10.1016/j.tele.2017.09.009

Kozan, K., & Richardson, J. C. (2014). Interrelationships between and among social, teaching, and cognitive presence. *The Internet and Higher Education, 21*, 68-73. https://doi.org/10.1016/j.iheduc.2013.10.007

Larsen, T. J., & Sreb, A. M. (2009). The Role of Task-technology Fit as Users' Motivation to Continue Information System Use. *Computers in Human Behavior, 25*(3), 778-84. https://doi.org/10.1016/j.chb.2009.02.006

Law, K. M. Y., Geng, S., & Li, T. (2019). Student enrollment, motivation and learning performance in a blended learning environment: The mediating effects of social, teaching, and cognitive presence. *Computers & Education, 136*, 1-12. https://doi.org/10.1016/j.compedu.2019.02.021

Lee, J. W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The Internet and Higher Education, 13*(4), 277-283. https://doi.org/10.1016/j.iheduc.2010.08.002

Leong, C. M., Goh, C. F., Ismail, F., Tan, O. K., & Ong, C. H. (2021). E-learning satisfaction: Investigating Gender Differences. *International Journal of Electronic Commerce Studies, 12*(1), 1-28.

Lin, T.-C., & Huang, C.-C. (2008). Understanding knowledge management system usage antecedents: An integration of social cognitive theory and task technology fit. *Information & Management, 45*(6), 410-417. https://doi.org/10.1016/j.im.2008.06.004

Lin, W. S., & Wang, C. H. (2012). Antecedence to Continued Intentions of Adopting E-learning System in Blended Learning Instruction: A Contingency Framework Based on Models of Information System Success and Task-technology Fit. *Computers & Education, 58*(1), 88-99. https://doi.org/10.1016/j.compedu.2011.07.008

Liu, W. (2021). Caveats for the use of Web of Science Core Collection in old literature retrieval and historical bibliometric analysis. *Technological Forecasting and Social Change, 172,* 121023. https://doi.org/10.1016/j.techfore.2021.121023

Lowenthal, P. R. (2010). The Evolution and Influence of Social Presence Theory on Online Learning. In T. T. Kidd (Ed.), *online education and adult learning: New frontiers for teaching practices* (1st ed.). IGI Global.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure models. *Psychological Methods, 1*, 130-149. https://doi.org/10.1037/1082-989x.1.2.130

McGill, J., & Klobas, J. E. (2009). A task-technology fit view of learning management system impact. *Computers & Education, 52*, 496508. http://dx.doi.org/10.1016/j.compedu.2008.10.002

Min, Y., Huang, J., Varghese, M. M., & Jaruwanakul, T. (2022). Analysis of Factors Affecting Art Major Students' Behavioral Intention of Online Education in Public Universities in Chengdu. *AU-GSB E-JOURNAL*, *15*(2), 150-158. https://doi.org/10.14456/augsbejr.2022.80

Mirabolghasemi, M., Choshaly, S. H., & Iahad, N. A. (2019). Using the HOT-fit model to predict the determinants of E-learning readiness in higher education: a developing country's perspective. *Education and Information Technologies, 24*(6), 3555-3576. https://doi.org/10.1007/s10639-019-09945-9

Mirabolghasemi, M., Reyhaneh, S., & Choshaly, H. (2021). An investigation into the determinants of blended leaning satisfaction from EFL learners' perspective Interactive. *Technology and Smart Education, 18*(1), 69-84. https://doi.org/10.1108/itse-07-2020-0117

Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education, 3*(2), 1-7. https://doi.org/10.1080/08923648909526659

Moore, M. G., & Kearsley, G. (2012). *Distance education: A systematic view of online learning* (1st ed.). Wadsworth Cengage Learning.

Ngan, L. (2011). Effective student project management with peer interaction. In V. Lee, F. L. Wang, S. Cheung & A. Hung (Eds.), *Blended learning: Maximization of teaching and learning effectiveness* (pp, 178-180). City University of Hong Kong.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research, 17*(4), 460-469. https://doi.org/10.2307/3150499

Paechter, M., & Maier, B. (2010). Online or face-to-face? Students' experiences and preferences in e-learning. *The Internet and Higher Education, 13*(4), 292-297. https://doi.org/10.1016/j.iheduc.2010.09.004

Pedroso, R., Zanetello, L., Guimaraes, L., Pettenon, M., Goncalves, V., Scherer, J., Kessler, F., & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the crack use relapse scale (CURS). *Archives of Clinical Psychiatry, 43*(3), 37-40. https://doi.org/10.1590/0101-60830000000081

Rabaai, A. (2021). Students' Continuance Intention to Use MOODLE: an Expectation- Confirmation Model Approach. *Interdisciplinary Journal of Information, Knowledge, and Management, 16*, 397-434.

Rahi, S., Abd Ghani, M., Alnaser, F. M., & Ngah, A. H. (2018). Investigating the role of unified theory of acceptance and use of technology (UTAUT) in internet banking adoption context. *Management Science Letters, 8*, 173-186. https://doi.org/10.5267/j.msl.2018.1.001

Rettie, R. (2006). *Connectedness, awareness, and social presence. 6th International Presence Workshop.* http://eprints.kingston.ac.uk/2106/1/Rettie.pdf.

Rubin, B., Fernandes, R., & Avgerinou, M. D. (2013). The effects of technology on the community of inquiry and satisfaction with online courses. *The Internet and Higher Education, 17*, 48-57. https://doi.org/10.1016/j.iheduc.2012.09.006

Schwartz, L., & Gutierrez, K. (2015). *Literacy Studies and Situated Methods: Exploring the social organization of household activity and family media use* (1st ed.). Routledge.

Sharma, G. P., Verma, R. C., & Pathare, P. (2005). Mathematical modeling of infrared radiation thin layer drying of onion slices. *Journal of Food Engineering, 71*(3), 282-286. https://doi.org/10.1016/j.jfoodeng.2005.02.010

Shea, P., Pickett, J. A. M., & Pelz, W. E. (2003). A follow-up investigation of teaching presence in the SUNY Learning Network. *Journal of Asynchronous Learning Networks, 7*(2), 61-80. https://doi.org/10.24059/olj.v7i2.1856

Short, J., William, E., & Christie, B. (1976). *The social psychology of telecommunications*. *John Wiley and Sons Ltd, 2*(14), 1-10.

Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M.A. Lange (Ed.), *Leading - Edge psychological tests and testing research* (pp. 27-50). Nova.

Subrahmanyam, K., Greenfield, P., Kraut, R. E., & Gross, E. (2001). The Impact of Computer Use on Children's and Adolescents' Development. *Journal of Applied Developmental Psychology, 22*(1), 7-30.

Szeto, E. (2015). Community of inquiry as an instructional approach: what effects of teaching, social and cognitive presences are there in blended synchronous learning and teaching? *Computers and Education, 81*, 191-201. https://doi.org/10.1016/j.compedu.2014.10.015

Tammelin, M. (1998). *From telepresence to social presence: The role of presence in a network-based learning environment. In Tella, S. (Ed.), Aspects of Media Education: Strategic Imperatives in the Information Age* (1st ed.). University of Helsinki. Media Education Publications.

Thurmond, V. A. (2003). *Examination of interaction variables as predictors of students' satisfaction and willingness to enroll in future web-based courses while controlling for student characteristics* [Unpublished Doctoral Dissertation]. University of Kansas.

Vaughan, N. D. (2004). Technology in support of faculty learning communities. In M. D. Cox, & L. Richlin (Eds.), *Building faculty learning communities: new directions for teaching and learning* (pp. 101-109). Wiley.

Wei, C., & Liang, T. (2004). Introduction to the Special Issue: Mobile Commerce Applications. *International Journal of Electronic Commerce, 8*(3), 7-17.

Whiteside, A. L., & Garrett Dikkers, A. (2008). *Social presence in online learning*. Paper presented at the New Media Research Conference. *Journal of Asynchronous Learning Network, 19*(2), 1-10.

Wickersham, L. E., & McGee, P. (2008). Perceptions of satisfaction and deeper learning in an online course. *Quarterly Review of Distance Education, 9*(1), 73-83.

Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior, 67*, 221-232. https://doi.org/10.1016/j.chb.2016.10.028

Wu, J. H., & Wang, Y. M. (2006). Measuring KMS success: A respecification of the DeLone and McLean's model. *Information and Management, 43*(6), 728-739. https://doi.org/10.1016/j.im.2006.05.002

Wuyan, Y. (2022). Constructing a New Form of Higher Education through Digitization. *Outlook, 31,* 1-10.