A Development Technology Acceptance Model Towards Blended Learning Motivation: Social Presence as A Mediator

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Abstracts

Blended learning motivation (BLM) is crucial for the success of blended learning, especially for students in higher vocational education and training institutions (HVETIs). This study investigates the impact of perceived usefulness (PU), perceived ease of use (PEU), and social presence (SP) on blended learning motivation. An online survey collected data from 714 students across 36 HVETIs in Chongqing City, China. The data were analyzed using structural equation modeling to examine the relationships among the study variables. The findings indicate social presence, perceived ease of use, and perceived usefulness positively influence blended learning motivation. Perceived usefulness and perceived ease of use enhance blended learning motivation through social presence, even though the direct effect of perceived ease of use on social presence was unsupported, with perceived ease of use indirectly influencing social presence through perceived usefulness. This study highlights the social presence's pivotal role in promoting blended learning motivation and offering insights for developing a motivational, trust-based blended learning community for students, educators, and policymakers within blended learning environments.

Keywords: Blended Learning Motivation, Social Presence, Technology Acceptance, Higher Vocational Education and Training Institutions, Socio-Constructivism.

Introduction

Blended learning, which merges traditional face-to-face instruction with online platforms, marking a shift towards flexible, technology-enhanced education, has considerably expanded since the 2010s (Zagouras et al., 2022). It caused it to become more widespread and gave rise to new players, like conventional on-campus universities and HVETIs (Li et al., 2022; Mazhar Hussain, 2023).

However, this growth has not been without challenges. Social feelings of isolation and loneliness, technical issues, learner procrastination, digital distraction, self-discipline, time management challenges, variability in learning outcomes, and didactic pedagogy are the negative factors affecting student engagement in blended learning (Hwang et al., 2020; Rasheed et al., 2020; De Montreuil Carmona & Irgang Dos Santos, 2020; Xu et al., 2021; Pattermann et al., 2022; Alam et al., 2022). These problems contribute to increased learner dissatisfaction, diminishing learning motivation, and the emergence of various avoidant behaviors in the classroom, such as daydreaming, chatting, playing on phones, and even sleeping, particularly among students in HVETIs in Chongqing, China. The symptoms brought new evidence of the need to re-think the strategies and affecting factors for motivating students in a blended learning environment.

Chongqing, the only direct-controlled municipality in western China, has received significant governmental support for vocational education, hosting 44 HVETIs (Yang & Huang, 2023). In 2023, these institutions ranked 14th nationwide and second in quality and scale among the 11 western provinces and municipalities (Lin Tang, 2023).

Given the strategic relevance of these institutions, motivation is a critical aspect in the long achievement of hybrid learning. BLM drives engagement, enhances learning experiences, and improves educational outcomes (Heilporn et al., 2021). Understanding the factors that influence BLM is crucial, especially in the post-pandemic context where blended learning has become essential (Tonbuloğlu & Tonbuloğlu, 2023). For first-year students in HVETIs in Chongqing, China, BLM is particularly significant as they face barriers such as social isolation, technical issues, and a lack of self-discipline (Beyoglu et al., 2020; Chaloupský et al., 2021). However, most existing research on blended learning motivation focuses on other forms of education, not on HVETI students in Chongqing, who face unique challenges and have been largely overlooked in scholarly investigations.

To address these gaps and extend existing knowledge, research on blended learning has identified numerous aspects that may influence students' BLM (Luaces et al., 2018; Barrett et al., 2022; Han & Ellis, 2023; Luling Duan, 2024), which can be addressed using six theoretical frameworks. In the context of CoI, Law et al.(2019) found that teaching presence (TP), cognitive presence (CP), and learning presence (LP) significantly enhance BLM, but their study did not account for the interplay between these presences. Using Self-Determination Theory (SDT), Fryer & Bovee (2018) demonstrated that autonomy-supportive environments boost intrinsic motivation in blended settings, yet they did not explore the long-term effects on student performance. Huang (2021) applied TAM to show that perceived usefulness increases BLM, though the study lacked a focus on perceived ease of use. Barrett et al. (2022) and Duan & Jiang (2024) utilized the Expectancy-Value Theory (EVT) to explain that positive expectations drive BLM, but the relationship between expectancy and value was not fully examined. Broadbent et al. (2021) employed Self-Regulated Learning (SRL) to highlight the importance of self-regulation in blended learning, although their research did not address the variability in self-regulatory skills among students. Finally, Makovec Radovan & Radovan (2023) applied Cognitive Load Theory (CLT) to blended learning, indicating that reducing cognitive load can

maintain student motivation, but they did not consider the diverse cognitive loads experienced by different learners.

Building on these findings, some intertwined structures exist between Community of Inquiry, Self-Determination Theory, Technology Acceptance Model, Expectancy-Value Theory, Self-Regulated Learning, and Cognitive Load Theory in exploring blended learning motivation (Fryer & Bovee, 2018; Jing Fu, 2023; Han & Ellis, 2023; Huang, 2021). For instance, Martin et al. (2022a) combined the Community of Inquiry and Technology Acceptance Model to highlight how teaching presence, cognitive presence, and perceived ease of use affect blended learning motivation.

Using Self-Determination Theory and Self-Regulated Learning frameworks can improve blended learning motivation through intrinsic incentives and successful learning methods (Luo et al., 2021; Tørris et al., 2022). However, despite these integrated models, previous research often overlooks the socio-constructivist perspective, particularly the role of social presence (SP) as a mediator between perceived usefulness and perceived ease of use in influencing blended learning motivation. There remains a significant gap in understanding how social presence, perceived ease of use, and perceived usefulness, directly and indirectly, impact blended learning motivation within these theoretical frameworks.

To reduce or eliminate various classroom avoidance behaviors among HVETI students in blended learning environments in Chongqing, China, this study employs a combined model of the TAM and the CoI. The study's goal is to identify potential elements impacting HVETI students' blended learning motivation Explain how these aspects, and their interactions, influence the incentives for blended learning from both a social constructivist and technology standpoint.

After introducing the rationale of the study, we will conduct a literature review of all the variables in the research model and propose corresponding hypotheses. Subsequently, we will outline the research methods based on the model and hypotheses, present the research results, and discuss the findings to conclude. Finally, we will evaluate the research's limitations and make ideas for further investigations.

Literature review

2.1 Blended Learning Motivation

BLM is defined as the drive that initiates and sustains learners' engagement in blended learning environments, encompassing intrinsic and extrinsic motivational factors. The CoI framework explains BLM by integrating teaching, social, cognitive, and learning presences, while SDT emphasizes the importance of autonomy, competence, and relatedness in motivating learners (Ryan & Deci, 2020; Garrison, 2022a). BLM is essential for reducing classroom avoidance behaviors and enhancing student engagement (Ifinedo, 2017; Law et al., 2019; Urhahne & Wijnia, 2023). It captures learner attention and fosters active participation in blended environments. (El-Mowafy & Hassan (2023) show that high BLM significantly boosts students' interest and performance. Additionally, Kurt (2023) confirms that BLM enhances students' engagement and achievement in blended learning contexts. This study aims to investigate factors

impacting BLM to reduce or eliminate various classroom avoidance behaviors among students in Chongqing's HVETIs.

2.2 Technology Acceptance Model

TAM is derived from the theories of Rational Action and Planned Behavior. It focuses on predicting and comprehending user interactions with technology through perceived usefulness and ease of use. (Vallade et al., 2021). TAM emphasizes the behavioral and psychological components that drive technology acquisition and is therefore widely applicable to a variety of domains such as e-commerce, blockchain, and e-learning (Shahid et al., 2023).

2.2.1 Perceived ease of use

PEU reflects the time and effort required by students to use tools for online learning. Which plays a crucial role in determining the platform's usability and accessibility (Dhingra & Mudgal, 2019). Ease of use has a substantial impact on perceived usefulness because when students find e-learning systems simple to use, they are more likely to see them as beneficial, increasing their perceived usefulness (Tick, 2019; Park & Park, 2020). Na et al. (2023) confirm the good influence of AI technology in building. Furthermore, user-friendly e-learning systems improve social presence by eliminating technological obstacles, allowing for more effective online interactions. Zuo et al. (2022)proved that user-friendly e-learning systems improve social presence by smoothing interactions and lowering frustration. Furthermore, ease of use has a direct impact on blended learning motivation since it reduces cognitive load and discomfort, keeping students motivated to participate in learning activities (Li, 2023). On the other hand, technical concerns can inhibit students from studying efficiently, lowering their motivation (Tick, 2019). Thus, simplicity of use not only enhances social presence and perceived usefulness but also sustains blended learning motivation, resulting in a more effective and engaging learning environment. As a result, we offer the theory listed below.

H1a: Perceived ease of use positively affects social presence.

H1b: Perceived ease of use positively affects perceived usefulness.

H1c: Perceived ease of use positively impacts blended learning motivation.

2.2.2 Perceived usefulness

Perceived usefulness relates to students' perceptions of a blended learning platform's potential worth in enhancing student engagement and efficiency, which aligns with a crucial component of blended learning motivation (Clark & Post, 2021). When students discover a platform that matches their educational needs, they are more likely to be actively engaged and consider it as an essential component of the learning process. This engagement is crucial because it has a direct impact on student's motivation to learn and a sense of community belonging in a blended learning setting. Research in higher education has frequently shown that perceived usefulness boosts students' willingness to learn and sense of belonging (Lazar et al., 2020; Ustun et al., 2021).

Huang (2020)found that perceived usefulness improved students' motivation, attitudes, and happiness in an interactive game design course for freshmen at a technical college. Yu et al. (2023) discovered that perceived usefulness promoted blended learning among Chinese college

students. These findings highlight the critical role of perceived utility in boosting learning motivation in a mixed-learning setting.

Furthermore, the usability of a learning management system, particularly in terms of access and engagement, facilitates continuing discussions and connections that foster a sense of belonging and trust among students and teachers (Holmes et al., 2018). A stronger sense of community in the learning environment is beneficial because it bridges the gap between physical and digital interactions. As a result, social presence improves learning motivation by creating an involved and supportive environment. Çoban (2022) discovered a positive link between social presence and motivation in online learning environments. This increased social presence is more noticeable in highly blended (50% online) classes vs moderately blended (33% online) classes (Hilliard & Stewart, 2019). This engagement creates a community of inquiry in which shared metacognition supports task resolution, hence significantly increasing blended learning motivation (Garrison, 2022).

Martin et al. (2022) pointed out in their meta-analysis that PU serves as both a mediator and moderator in the relationship between PEU and SP, thereby influencing learning satisfaction and outcomes. Furthermore, Huang et al. (2021) found that perceived ease of use improves perceived usefulness, which increases learning motivation and pleasure. Therefore, we suggest the following hypothesis:

H2a: Perceived usefulness promotes social presence.

H2b: Perceived usefulness promotes blended learning motivation.

H3: Social presence promotes blended learning motivation.

H4a: Perceived usefulness acts as a medium between perceived ease of use and social presence.

H4b: Perceived usefulness serves as an intermediary between perceived ease of use and motivation for blended learning.

2.3 Community of Inquiry

The CoI framework uses a collaborative constructivist approach to enhance online learning, flipped classrooms, and blended learning experiences (Soon Tan et al., 2022). It takes a social constructivist approach to understanding how communities and learning processes arise in digital settings (Swan, 2021), focusing on three crucial elements: pedagogical proximity, cognitive proximity, and social closeness.

2.3.1 Social presence

Social presence shows a sense of intimacy and participation within an online or blended learning group, which is essential for generating a pleasant educational environment (Lowenthal & Dunlap, 2020).

When students find a blended learning platform or mobile app simple to use, they are more likely to participate in conversations and problem-solving. This routine interaction fosters trust and continuous communication, resulting in a rewarding learning environment (Ge, 2021). As a

result, this stimulating setting provides the groundwork for stronger social ties and teamwork. Furthermore, Chapman (2019) discovered that social presence improves the relationship between ease of use of digital tools and motivation to study, hence boosting the utility of these tools in educational environments.

When students have convenient access to learning platforms or mobile apps in blended learning environments, they are more likely to use them to solve academic problems. This frequent use fosters reliance on the platform and an understanding of its value. As a result, learners are more likely to engage in web-based forums to discuss academic difficulties, enhancing their interest in blended learning (Huang, 2020). Based on these observations, we proposed the following hypothesis:

H5a: Perceived ease of use and motivation for blended learning are mediated by social presence.

H5b: Perceived usefulness and motivation for blended learning are mediated by social presence.

2.4 Proposed Model

We developed a theoretical model for this investigation based on past literature reviews and presented hypotheses. To effectively forecast motivation in a blended learning environment, the basic principles of the Technology Acceptance Model (TAM) and the CoI framework must be integrated into a single theoretical structure.

This study presents a model using the CoI framework and TAM to investigate blended learning motivation among students in HVETIs (see Figure 1). To validate this model, we employ Structural Equation Modeling (SEM) for empirical analysis. This model employs perceived usefulness and social presence as mediating variables, perceived ease of use as the independent variable, and blended learning motivation as the dependent variable.

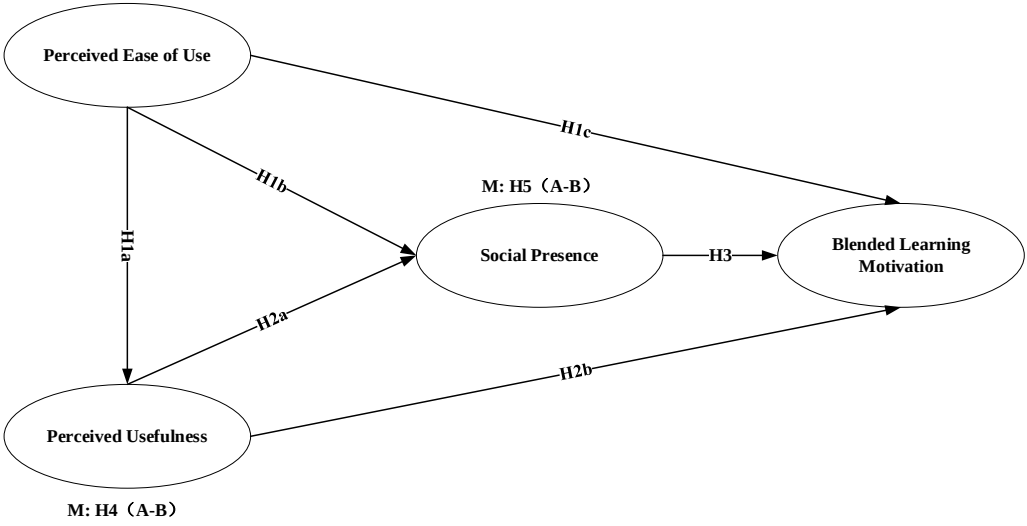


Fig.1 Research model

Methods

3.1 Participants and Context

The survey population for this research included freshmen across 36 Higher Vocational Education and Training Institutions in Chongqing, China. These students were chosen due to their high enthusiasm for learning and clear study plans, making them more adaptable to blended classroom teaching and more willing to participate.

China has the world's largest vocational education system, with Chongqing being one of the four centrally administered municipalities. Vocational education in Chongqing ranks 13th among China's 31 provinces and 2nd among the 11 provinces or autonomous regions in the Western region, supported by substantial funding for developing blended learning environments (Yang & Huang, 2023). Selecting HVETIs in Chongqing facilitates the region's efforts to learn from advanced practices in coastal provinces and serves as a reference model for other vocational institutions in the Western region, promoting innovative teaching models across China's vocational education system.

The questionnaire examined factors influencing blended learning motivation, including family financial status, current family residence, and previous blended learning experience. Family financial status and current residence reflect opportunities to engage with blended learning tools before entering HVETIs, while previous blended learning experience predicts the sustainability of students' integration into blended learning environments. The former factors influence BLM through external conditions, while the latter affects it through subjective initiative (Vo et al., 2020; Acosta-Gonzaga & Ramirez-Arellano, 2021).

To ensure data credibility, we excluded responses submitted in less than 4 minutes or with identical ratings for all items, as they indicated a lack of serious consideration. Out of 1,200 distributed questionnaires, 714 valid samples were collected, resulting in a 59.5% validity rate. The demographic information for these samples is shown in Table 1.

Table 1: descriptive data for demographic characteristics

Construct	Response Options	Frequency	% of respondents (N = 714)
Gender	male	302	42.3
	female	412	57.7
Previous blended learning experience	Seldom	136	19
	Sometimes	364	51.0
	Often	214	30
Family's financial status	Poor	33	4.6
	Average	593	83.1
	Rich	88	12.3
Current family residence	Urban	264	37
	Rural	450	63

3.2 Instrument

In this study, a questionnaire was utilized as the primary research instrument. The questionnaire, composed in Chinese, was electronically distributed via a web link throughout June 2024. Participation was both anonymous and voluntary, with only willing students completing and submitting their responses. Teachers and researchers retained the ability to monitor individual completion statuses while maintaining confidentiality. The content of the questionnaire was rigorously reviewed and approved by the teaching management departments of 36 Higher Vocational Education and Training Institutions (HVETIs) and regional educational institutions.

The questionnaire has two parts (see Appendix A). The first asked six single-answer questions regarding the learners' demographics. The following component consists of 23 items on a 5-point Likert scale that measure blended learning motivation, perceived usefulness, social presence, perceived ease of use, and motivation for blended learning. The items measuring social presence were adapted from the validated ElSayad (2023) instrument, Zuo et al. (2022) updated the questions evaluating students' blended learning motivation, whereas Chuttur (2009) guided the items used to assess students' perceived usefulness and ease of use. All items on the scale have been contextually modified, meaning they have all been developed within a blended learning environment or classroom setting, to better align with the research context and objectives.

3.3 Data collection

In this study, we employed a questionnaire survey method to investigate key variables: Perceived Ease of Use (PEU), Perceived Usefulness (PU), Social Presence (SP), and Blended Learning Motivation (BLM). Initially, we created a preliminary questionnaire that was repeatedly revised to guarantee clarity and relevancy. A pilot test of 30 freshmen from various HVETIs in Chongqing confirmed the questionnaire's reliability and validity (Tate et al., 2023). Their feedback was used to improve the questionnaire.

We employed the Item-Objective Consistency Index (IOC) test to confirm the questionnaire items were consistent with the study objectives. Five educational technologists and psychologists from Chongqing's higher education institutions scored each question according to its consistency with the desired measurement purpose (1 = perfect consistency, 0 = dubious, -1 = inconsistent). Items with positive IOC values were preserved, indicating the final questionnaire's usefulness and accuracy.

The final questionnaire was delivered to first-year students from 36 higher education institutions in Chongqing over four weeks in May 2024. To guarantee the largest possible response and coverage, the questionnaire was distributed both online (https://www.wjx.cn/) and in the classroom. We obtained a total of 1200 questionnaires. We collected 714 valid responses after cleaning the data, which included eliminating incomplete or incomplete responses in less than 4 minutes, for an effective response rate of 59.5%. The Institutional Review Board (IRB) examined and approved the questionnaire items to guarantee conformity with academic ethical norms (Oermann et al., 2021). This process underscores the rigor and scientific approach of our data collection, ensuring that the survey was methodologically sound and ethically conducted.

3.4 Data Analysis

The collected data were analyzed using data analysis and modeling software. Initially, data analysis software was utilized to conduct descriptive statistics and perform reliability and validity analysis. Following this, Data Modeling Software was employed for confirmatory factor analysis (CFA) and structural equation modeling (SEM) to test the measurement and structural models. During these studies, unsuitable items about SP, PEU, and PU were corrected or removed. Finally, the revised model was applied to investigate factors of influence using mediation analysis.

Table 2 shows each variable has a Cronbach's Alpha coefficient greater than 0.8, the overall Cronbach's Alpha coefficient is 0.888, indicating the scale has good reliability (Kalkbrenner, 2023). Factor loadings for all variables vary between 0.410 to 0.911, showing significant validity of the content (Günal et al., 2020). Furthermore, all variables in this study had KMO values greater than 0.800, while the significance thresholds for Bartlett's Test of Sphericity are all less than 0.001. Notably, the total KMO value for all variables is 0.891, and Bartlett's Test of Sphericity yields an Approx. Chi-Square of 6834.228 with 190 degrees of freedom and a significance level of less than 0.001. The cumulative variance explained by all variables, based on the total variance explained by the principal component analysis extraction method, is 63.369%. Therefore, based on the above analysis, the validity test indicators of the data collected by the scale in this study indicate that it is suitable for factor analysis (Mavili et al., 2023).

Table 2 Reliability, Validity, Convergent Validity, and Composite Reliability Analysis

Variables	No. of items	Mean	Cronbach's alpha	KMO	Factor Loadings	AVE	CR
BLM	6	3.875	0.841	0.835	0.528—0.788	0.4806	0.8440
PEU	4	3.727	0.866	0.826	0.750—0.857	0.6203	0.8670
PU	4	3.670	0.843	0.820	0.749—0.773	0.5735	0.8432
SP	6	3.820	0.866	0.848	0.410—0.911	0.5434	0.8723
All Variables	20	3.788	0.888	0.891	0.410—0.911		

Abbreviations: PEU, Perceived Ease of Use; PU, Perceived Usefulness; SP, Social Presence; BLM, Blended Learning Motivation; CR, Composite Reliability; AVE, Average Variance Extracted; KMO, Kaiser-Meyer-Olkin Measure of Sampling Adequacy.

During the initial CFA with data modeling software, item SP7 had a factor loading of 0.248, and model fit indices were inadequate: PCMIN/DF was 3.771, while GFI, AGFI, NFI, and RFI were all below 0.9, with RMSEA at 0.062. Given that SP7 and SP6 both reflected peer interactions with redundant meanings, SP7 was deleted. Modification indices indicated the highest residual covariance between e21 and e22 at 77.683, leading to the removal of BLM5. After removing SP7 and BLM5, PCMIN/DF decreased to 3.45; however, significant covariances between e21 and e23 (100.031) and e20 and e23 (100.173) necessitated the deletion of BLM6. The final CFA showed a PCMIN/DF of 2.708, with all fit indices meeting acceptable standards. BLM5 and BLM6 indicated confidence in handling unexpected issues, while BLM7 and BLM8 focused on calm problem-solving, justifying their removal due to conceptual redundancy.

Table 2 shows a few factor loadings in SP and BLM that are below 0.7 but above 0.4, which are considered barely acceptable (Zhong et al., 2022). All other latent variables have factor loadings

greater than 0.7. Except for BLM, which has an Average Variance Extracted (AVE) slightly below 0.5 but above 0.4 (barely acceptable), all constructs have AVE values above 0.5 and Composite Reliability (CR) values exceeding 0.8. This indicates good convergent validity and composite reliability for the model (Yalın-Uçar et al., 2024).

Table 3 Discriminant Validity Using Fornell-Larcker Criterion

Constructs	BLM	SP	PU	PEU
BLM	0.69			
SP	0.36	0.74		
PU	0.37	0.48	0.76	
PEU	0.47	0.26	0.40	0.79

Notes: Diagonal (italic) values are the square root of the AVE values for each construct.

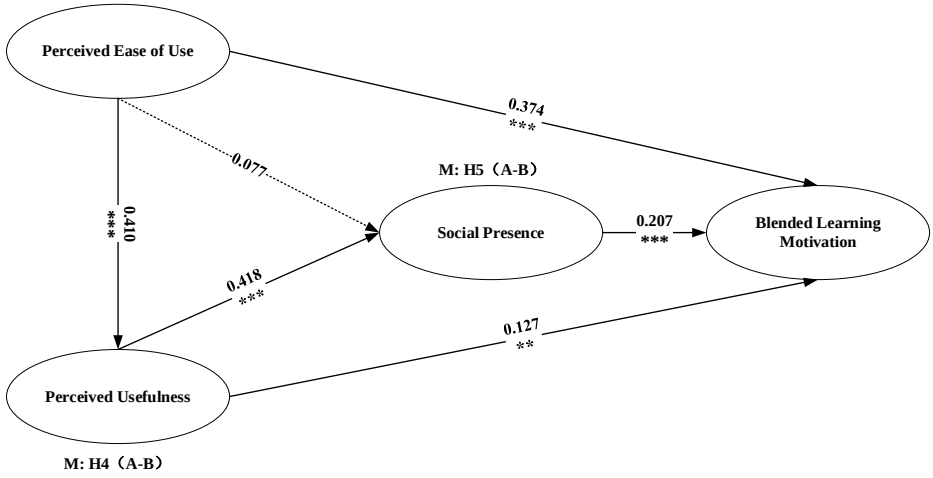
Abbreviations: PEU, Perceived Ease of Use; PU, Perceived Usefulness; SP, Social Presence; BLM, Blended Learning Motivation.

Discriminant validity necessitates that the square root of the Average Variance Extracted ($\sqrt{AVE}$)exceeds the correlation coefficients between constructs. In this research, Table 3 shows that all correlation coefficients are below the ($\sqrt{AVE}$)values. Thus, the measurement model demonstrates strong discriminant validity.

Research results

4.1 Assessing the Structural Model

To test the hypotheses, we looked at the significance level of coefficients of the path between variables with latent values (Fig. 2). The predicted model fit the data well, as evidenced by the following fit indices: x^2= 444.043, df = 164, PCMIN/DF = 2.708, RMSEA = 0.049, RFI = 0.926, SRMR = 0.0412, NFI = 0.936, IFI = 0.958, TLI = 0.952, CFI = 0.958, GFI = 0.943, and AGFI = 0.926. The study's results demonstrate that all assumptions were verified, except for H1b, which investigated the effects of PEU on SP. Figure 2 shows the outcomes of the hypothesis testing.



Note: Solid arrows indicate supported hypotheses, while dashed arrows indicate unsupported hypotheses.

Fig. 2 Results of hypothesis testing

4.2 Hypotheses testing

PEU had the highest impact on BLM, with a path coefficient of β = 0.374. This finding suggests that when students perceive blended learning tools such as mobile apps, platforms, or software as easy to use, their interest and motivation to engage in blended learning activities increases. PEU has a substantially bigger direct effect on BLM than PU (β = 0.127) and SP (β = 0.207). Conversely, the direct impact of PEU on SP is minimal (β = 0.077), indicating that ease of use does not significantly influence social presence.

PEU significantly impacts PU (β = 0.41), aligning with the TAM (Moti & Walia, 2020). This emphasizes the critical significance of perceived ease of use in increasing the perceived usefulness of educational tools, which indirectly promotes blended learning motivation.

SP is the second most significant element in BLM, with a path coefficient of β = 0.207. Additionally, SP has a substantial mediating impact between PU and BLM (β = 0.087). As a result, SP is important not only for directly increasing students' learning motivation but also for moderating the impacts of PU and PEU on BLM. Social Presence (SP) is the second most important factor in Blended Learning Motivation (BLM), with a path coefficient of β = 0.207. Furthermore, Social Presence has a significant mediating function between Perceived Usefulness (PU) and Blended Learning Motivation (BLM) (β = 0.087). As a result, social presence is critical not just for directly raising student motivation, but also for mitigating the impacts of perceived usefulness and perceived ease of use on blended learning motivation.

This emphasizes the need to promote social presence in blended learning environments to increase student engagement and motivation.

PU is the third most influential factor impacting BLM, with a path coefficient of β = 0.127. This implies that when students find the blended learning platform or software highly beneficial for their learning, they are more likely to actively engage in group activities organized by teachers or participate in online forum discussions about various learning issues. Furthermore, PU has the biggest direct influence on SP (β = 0.418) and acts as a substantial mediator between PEU and SP (β = 0.172). Therefore, PU is essential not only for establishing SP from a social constructivist perspective but also for enhancing BLM in blended learning environments.

Finally, several indirect impacts were identified in this investigation. Four indirect effects were identified: perceived usefulness on blended learning motivation through social presence (β = 0.087***), perceived ease of use on blended learning motivation through perceived usefulness (β = 0.052**), perceived ease of use on blended learning motivation through social presence (β = 0.016***), and perceived ease of use on social presence through perceived usefulness (β = 0.172***). The indirect effect of PEU on BLM through SP is the least significant. A possible explanation is that, according to SEM, the hypothesis regarding the direct effect of PEU on SP was not supported. Therefore, the indirect effect of PEU on BLM through SP, while present, is the least significant.

Discussion and conclusions

This study adds to the literature by confirming a theoretical model that establishes a link between Community of Inquiry social presence, technology adoption, and blended learning motivation. It extends the understanding of blended learning motivation, especially in Eastern cultures and vocational education. From a socio-constructivist perspective, the study highlights the importance of a learning community built on trust, belonging, idea exchange, and collaborative knowledge construction. Such a community generates long-term student motivation and pleasure, which is critical in the post-pandemic era.

5.1 Social presence has a strong impact on blended learning motivation

This study adds significantly to our understanding of social presence within the Community of Inquiry framework and its impact on blended learning motivation from a socio-constructivist standpoint. The study highlights the significance of social presence in enhancing blended learning motivation among students at higher vocational education and training institutes in Chongqing, China, by verifying a theoretical model that incorporates technological acceptance model components.

This study supports, in line with findings from Western contexts (Khodabandelou et al., 2023), the ubiquitous value of social presence in inspiring blended learners. Learning as a social process, assisted by discourse, is consistent with socio-constructivist concepts (Mishra, 2023). This study focuses on how social presence in blended learning environments lessens students' feelings of isolation and loneliness while providing them with a sense of community and belonging, which is critical for their motivation and willingness to learn (Mendoza & Venables, 2023).

This study also looked into the mediated impact of social presence within the context of the technological acceptance model, specifically the relationship between perceived ease of use, perceived usefulness, and blended learning motivation. According to the SEM model, perceived ease of use directly affects blended learning motivation ($\beta = 0.374$) and perceived usefulness ($\beta = 0.410$), promoting social presence ($\beta = 0.418$). This indirect effect emphasizes the need to create user-friendly e-learning platforms that promote good social interactions and communication, ultimately increasing student motivation.

Compared to previous research, this study broadens the application of social presence by concentrating on its relevance in a specific cultural and educational context—Chinese higher vocational education and training institutes. In such learning contexts, students encounter unique challenges such as digital distractions and a proclivity to escape the classroom, which can be overcome by actively boosting social presence. This research focuses on how social constructivist concepts can be applied in vocational education to create engaging and useful blended learning environments.

Finally, this study contributes to the theoretical understanding of social presence by demonstrating its direct and mediating function in blended learning motivation, all within the context of the technological acceptance paradigm. The findings underline the importance of social interaction in knowledge acquisition and offer practical recommendations for the creation of mixed learning environments in higher vocational education and training institutions, thereby validating social constructivist theory. This study underlines the significance of social presence for educators and policymakers seeking to increase student motivation and learning results across a range of educational contexts.

5.2 Perceived ease of use, rather than usefulness, significantly determines blended learning motivation.

This study uses a social constructivist approach to investigate how perceived ease of use and perceived utility affect blended learning motivation among students in higher education institutions. The study sought to investigate how perceived ease of use and perceived utility influence social presence, which in turn influences blended learning motivation, while also addressing challenges such as digital distractions and classroom avoidance behaviors.

The study discovered that perceived ease of use has an important direct effect on blended learning motivation ($\beta = 0.374$), exceeding perceived usefulness ($\beta = 0.127$). This aligns with existing literature that highlights that user-friendly systems enhance engagement and motivation by reducing cognitive load and frustrations (Darejeh et al., 2022). Moreover, the positive effect of perceived ease of use on perceived usefulness ($\beta = 0.410$) supports the technology acceptance model framework, showing that easy-to-use systems are more likely to be perceived as useful (Baby & Kannammal, 2020).

However, this study diverges from traditional technology acceptance model research by emphasizing the perceived ease of use's role in enhancing social presence, which in turn boosts blended learning motivation ($\beta = 0.207$). This suggests that user-friendly platforms improve

social interactions, creating a supportive learning community essential for motivation (Garrison, 2022). The significant direct effect of perceived usefulness on social presence ($\beta = 0.418$) underscores the socio-constructivist view that social interactions are foundational to learning.

Learning is inherently social, and discourse within a community is essential for knowledge construction (Zheng et al., 2023). This study's findings highlight that perceived ease of use significantly contributes to the social fabric of learning communities, enhancing blended learning motivation. This insight expands the theoretical understanding of socio-constructivist principles in blended learning, addressing learner disengagement and avoidance behaviors.

In summary, this study validates that perceived ease of use, rather than perceived usefulness, has a greater influence on blended learning motivation within the community of inquiry framework. By emphasizing the indirect effects of perceived ease of use on blended learning motivation through social presence, it provides a nuanced understanding of how user-friendly e-learning systems foster social interactions and motivation, aligning with socio-constructivist principles and offering insights for designing effective blended learning environments in higher vocational education and training institutions.

5.3 Managerial implications

This study offers key implications for blended classroom instructors, higher vocational education and training institutions students, blended learning platform developers, and educational management authorities, focusing on enhancing social presence, leveraging technology, and promoting educational equity.

Instructors should adopt a student-centered, socio-constructivist teaching philosophy that emphasizes social presence in blended learning. Implementing flipped classroom models and group-based, problem-driven, and project-oriented methods can facilitate co-regulated learning. Utilizing assessment for learning (AfL) and assessment as learning (AaL) strategies can enhance blended learning motivation by fostering continuous engagement and feedback, Creating an Interactive and Supporting Learning Environment.

In higher vocational education and training institutions students can benefit from constructing knowledge through online forums and blended learning platforms, which foster trust, belonging, and shared understanding. This shared monitoring and motivation promotes educational equity and offers the necessary support to all learners.

Blended learning platform developers can alleviate technological discomfort by improving interfaces, addressing negative attitudes toward technology, and introducing engaging components. Personalized support that fosters a sense of belonging and presence is essential. Ongoing needs assessments with instructional staff and students can boost blended learning motivation by ensuring that the software matches their preferences.

Educational authorities should train and reward instructors for using new teaching methods, while also giving policy and financial assistance to higher vocational schools that lack the necessary infrastructure. Strengthening fundamental software and hardware facilities is critical for boosting blended learning in Chongqing's higher vocational schools. Meeting these requirements assures educational equity while making the most of blended learning tools. These

implications aim to make blended learning more enjoyable, inspiring, and successful, while also fostering continual development and educational equity through the deliberate integration of social presence and technology.

5.4 Conclusion

To address students' classroom avoidance behaviors in Chongqing higher vocational education institutions, this study used the CoI-TAM framework to analyze factors influencing student engagement and blended learning motivation. The data indicate a few crucial insights: First, social presence significantly influences blended learning motivation, underlining the need to develop a feeling of community and involvement. Second, perceived ease of use (PEU) had a greater influence on blended learning motivation than perceived usefulness (PU), highlighting the importance of user-friendly technologies in learning environments. Third, social presence mediators the association between perceived utility, perceived ease of use, and motivation for blended learning, showing that social interactions in the learning setting mitigate the impact of technology adoption.

These findings emphasize the significance of a teacher-led flipped classroom approach for children who lack fundamental knowledge and capacity for self-regulation. Problem-based or project-based group instructional approaches are highly effective in encouraging co-regulatory and social sharing of knowledge (Hai Pham et al., 2023). Cultivating a sense of trust and belonging within the blended learning environment significantly enhances student engagement and interest (Mendoza & Venables, 2023). Moreover, the continuous use of assessment as learning and assessment for learning strategies motivates students to engage more deeply with blended learning (Lu & Mustapha, 2020). The demonstrative use of learning platforms, mobile apps, and instructional videos promotes frequent and effective use of these tools, thereby enhancing the learning experience and motivation.

Despite previous research combining CoI and TAM (Kumar & Ahmad, 2022), there has been limited examination of social presence's role in technology acceptance and blended learning motivation from a socio-constructivist perspective, especially within Chongqing's HVETIs. This study bridges this gap, promoting innovative teaching design and evaluation practices among educators. It also encourages students to view learning as an active, socially constructed process, thereby enhancing their engagement and overall educational outcomes.

Limitations and future directions

This study has several limitations that need to be addressed. First, the sample was restricted to HVETIs in Chongqing, China, limiting the findings' generalizability. To increase external validity, future studies should involve a broader range of educational contexts. Second, using self-reported data for PEU, PU, SP, and BLM introduces potential biases such as social desirability. Longitudinal studies that use objective metrics such as learning analytics should reduce these biases and provide a more realistic picture of learning outcomes over time (Han & Ellis, 2023). Third, the study's excessive dependence on quantitative approaches may not adequately represent the complexities of blended learning experiences. Mixed-methods

approaches, along with qualitative insights from in-depth interviews and focus groups, can provide a more comprehensive, nuanced understanding (Fryer & Bovee, 2018; Lee et al., 2024). Addressing these constraints by diverse sampling, longitudinal designs, and mixed-methods approaches will make the findings more comprehensive and applicable (Denny & Weckesser, 2022).

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