

Collaborative Writing Factors Affecting English as a Foreign Language Student Writing Performance

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ABSTRACT

This study determines collaborative writing factors affecting English as a foreign language (EFL) students' writing performance (WP). The model draws on Bandura's social cognitive learning theory, focusing on environmental factors, individual beliefs, and behavioral factors. The questionnaires were delivered to 85 EFL students at a university in Vietnam. The statistics show that the standardized root mean squared residual index is .060, meaning a good model fit. In particular, the path regressions indicate that WP is affected directly by behavioral factors (63.7%) and indirectly by environmental factors (61.4%) and individual beliefs (24.1%). Regarding the collaborative writing environment, WP is indirectly affected by interaction with peers (37.3%), interaction with teachers (16.6%), and attitude toward the course (12.3%); however, the indirect effect of the use of technology on WP is not statistically significant. Finally, the author discusses some major administrative measures to stimulate causative factors, which will improve EFL students' WP.

KEYWORDS

Collaborative Learning, Collaborative Writing, Writing Performance, Writing Competence, Social Cognitive Learning Theory

INTRODUCTION

Collaborative writing (CW) has its roots in collaborative learning in which students work methodically in teams or groups to complete their assigned tasks (Lin & Maarof, 2013). Storch (2011) defined CW as "the joint production of a text by two or more writers" (p. 275). In this sense, it can be inferred that two or more students collaborate to write a single text, and the written production in collaborative learning is truly a team effort.

Earlier studies mainly targeted the effects of CW on students' learning results, and the publicized CW findings came mostly from quasi-experimental research, in which students were divided into two groups. Comparing pre-test and post-test results, researchers found that experimental group students outperformed the control group (Anshu & Yesuf, 2022). Specifically, CW was found to enhance students' scores (Huynh, 2022), overall performance (Li, 2023; Phuong & Nguyen, 2021), writing skills (Alawaji, 2020; Helaluddin et al., 2023), accuracy (Huong & Phung, 2023), and fluency (Lin & Maarof, 2013; Pham, 2021). In terms of text quality, CW was reported to improve students' content, organization, grammar, vocabulary, and mechanics (Khatib & Meihami, 2015), and collaboratively

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written texts were shorter but more grammatically and lexically complex than individually written ones (Pham, 2021).

Previous CW findings additionally showed that students preferred CW to individual writing. Particularly, CW offers a motivating learning experience to learners and helps promote the student-centered approach (Pham, 2021). Concerning students' engagement with CW, Martin et al. (2020) explained that CW is effective in writing learning in the dimensions of rich feedback, motivation, collaboration, satisfaction, and writing. Furthermore, CW is an opportunity to generate ideas, plan what to write, and provide peer feedback, which helps improve students' writing performance (WP; Pham, 2021), and it can be incorporated into a range of learning forms as an active process for learners (Helaluddin et al., 2023). Empirical evidence demonstrates that students hold positive attitudes towards CW (Huynh, 2022; Phuong & Nguyen, 2021) and actively respond to it whenever it is administered in class (Helaluddin et al., 2023).

Most CW research in the literature praised the efficacy of CW and pointed out its advantages on students' learning results, but little was done to determine how CW factors work in concert to generate those advantages. Moreover, among a few survey-based studies conducted to understand the factors affecting students' results, earlier researchers normally treated environmental factors (EF), individual beliefs (BL), and/or behavioral factors (BF) as the direct determinants of students' results (Nguyen & Le, 2018; Qureshi et al., 2021). As those previous studies focused on the direct effects of influencing factors on learners' WP, the indirect effects tended to be ignored.

Because a thorough understanding of the complex causality between CW and WP is limited, the author used an exploratory mixed methods research design based on Bandura's (1989) social cognitive learning theory (SCLT) as the framework to examine the CW factors that hierarchically influence English as a foreign language (EFL) students' WP. Comprehensively encompassing the multi-layer nuances of the CW environment, the present study aims to provide systems information on how and how much CW factors affect students' WP. Ultimately, the findings answer the following research questions:

1. What CW factors affect EFL students' WP?
2. How large are the effects of CW factors on EFL students' WP?

The answers to the questions above provide a new understanding of how EFL students' writing outcomes are mediated; thus, teachers of English writing and administrators can take advantage of empirically grounded claims to personalize learning environments to boost their WP in the EFL writing context.

LITERATURE REVIEW

A cohort of studies have explored the effects of CW on students' learning results. Besides reporting improved writing, attitudes, motivation, satisfaction, and/or interest, some earlier researchers (Huong & Phung, 2023; Lin & Maarof, 2013), either explicitly or implicitly mentioned causative factors that were likely to influence students' writing results and the efficacy of CW.

The first set of factors was related to students' individual characteristics. According to Mohamad et al. (2022), students' attitudes and confidence were likely to shape their writing behavior. Putzeys et al. (2024) also noted that students' writing abilities and their approach to tasks influenced CW quality. Additionally, earlier studies linked students' writing outcomes to various personal traits such as age, social background, active participation, and their perceptions of the task (Huong & Phung, 2023), as well as early exposure to English and early first language acquisition (Alsayed, 2003). Martin et al. (2020) and So and Brush (2007) suggested that student satisfaction with CW could lead to improved WP. In a broader perspective, Abrantes et al. (2007) indicated that factors like interest, psychological well-being, and learning performance directly impacted students' overall success in learning.

The second group of factors pertained to peers. Particularly, Lin and Maarof (2013) found that students' CW was hindered by limited language proficiency and peers' reluctance to share ideas. Similarly, Alawaji (2020) noted that variations in individual contributions, “uniform” group evaluations, and types of group members significantly impacted students' scores.

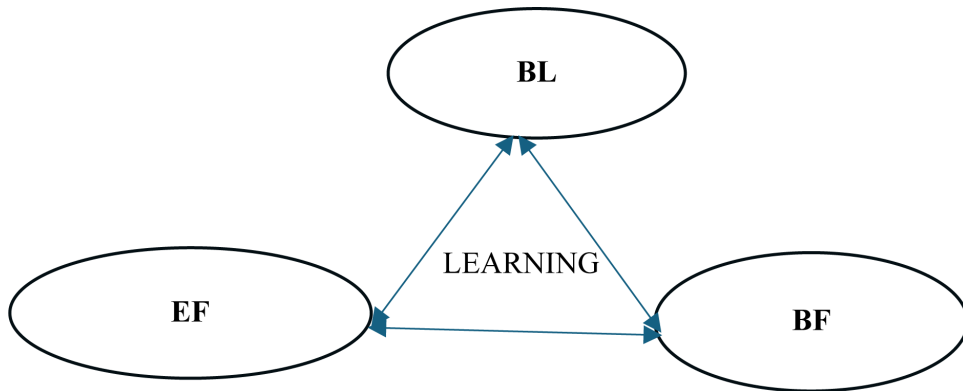
Putzeys et al. (2024) explained that familiarity and prior collaboration within a group influenced both the CW process and its efficacy. Conversely, active participation was a factor that enhanced WP (Anshu & Yesuf, 2022; Martin et al., 2020). Molinillo et al. (2018) also reported that interactions between students and social presence affected their active learning and, subsequently, their achievements. Regarding task types, Huong and Phung (2023) concluded that genre features and task requirements influenced students' engagement and writing outcomes, while Chu (2023) and Martin et al. (2020) also asserted that peer feedback positively impacted text features.

The final set of factors was associated with the teacher. Specifically, the teacher's approach, assessment methods, and instruction were said to positively influence students' writing skills (Mai, 2022). Chu (2023) and Martin et al. (2020) further emphasized that teacher feedback played a crucial role in enhancing the quality of students' writing. Khatib and Meihami (2015) argued that the collaborative techniques and activities provided by the teacher facilitated student engagement, leading to improved achievements. From a broader perspective, Abrantes et al. (2007) suggested that teacher concern, interaction, responsiveness, and course organization indirectly impacted students' learning outcomes. Additionally, Chan et al. (2019) noted that interactivity, fostered through active collaboration and enjoyable experiences, affected students' performance and subsequent achievements. Finally, Molinillo et al. (2018) reported that interactions between teachers and students, along with a strong social presence, could enhance CW and its efficacy.

Most researchers mentioned far more advantages of CW than pitfalls and spurred its incorporation in English writing courses. Pham (2021) favored the process approach and suggested a CW process; however, it failed to describe the factors that could enhance students' WP. Earlier researchers deployed Vygotsky's social-cultural theory (1978) as the foundational theory and investigated different aspects of CW. The common feature was that they focused on the interactivity between the individual and the environment; as a result, previous models' attempts to understand the CW factors that affected students' WP were not inclusive and systematic enough to cover the nuanced CW environment. In addition, the technological aspect, except for a few online CW studies, was ignored in most CW research, and this might have affected the quality of estimation in earlier CW findings.

In response, the author of this study deployed Bandura's SCLT as the framework to build up the hypothesized research model. In fact, the independent variables were constructed upon the conceptual framework of the triadic reciprocal determinism (Figure 1), a major component of Bandura's SCLT. In Bandura's (2003; 2009) triadic reciprocal determinism, he took an agentic perspective to explain the framework for human development, adaptation, and change, and affirmed that learning is vicarious, cognitive, self-reflective, and self-regulatory. Moreover, learning is not shaped or mediated linearly by individuals' interactions, cognition, or the learning setting, either separately or collectively as earlier researchers had proposed, but is subject to the reciprocal influences of BL, BF, and EF in the learning process.

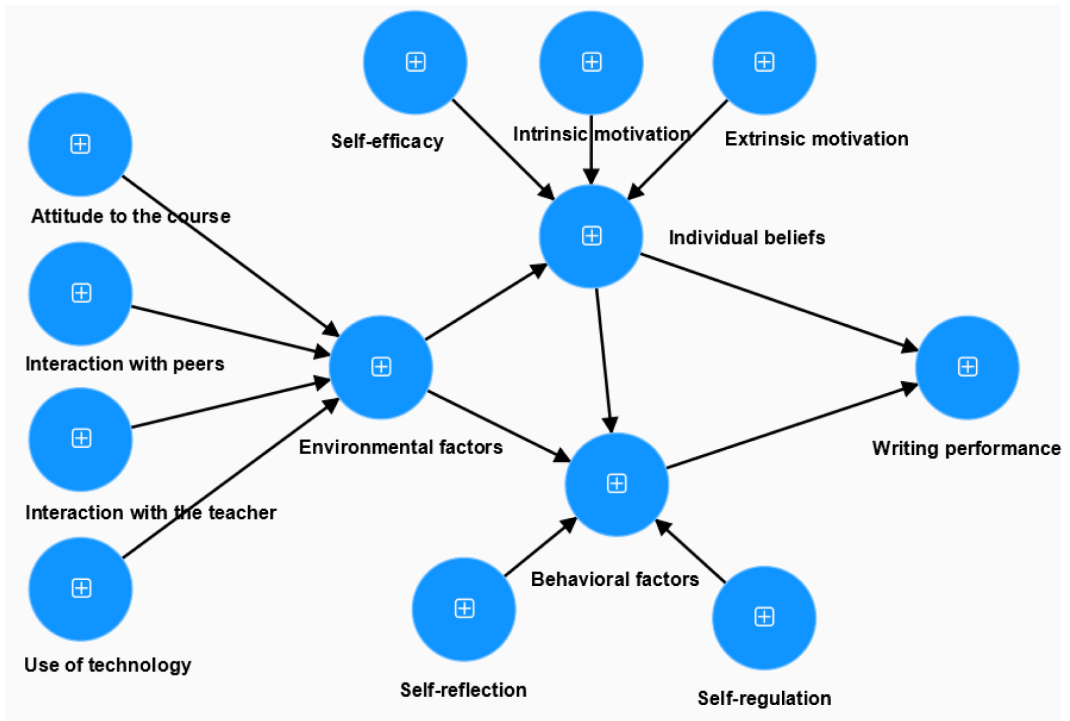
Figure 1. Bandura's triadic reciprocal determinism



Note. *BL* = individual beliefs; *EF* = environmental factors; *BF* = behavioral factors.

Bandura's (2003) triadic reciprocal determinism was one of the most cited theories in explaining the nature of knowing and learning (Nabavi, 2012), and it was a comprehensive framework to take into account the bidirectional influences of BL, BF, and EF on humans' learning (Pajares et al., 2009). Figure 2 shows how this study adapted Bandura's theory to examine the causal relationship between CW factors and EFL students' WP in a way that students' BF are believed to directly affect their WP, while it is affected directly by their BL and indirectly by the EF.

Figure 2. Theorized research model



Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; EM = extrinsic motivation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

Bandura's (1989) triadic reciprocal determinism, though quite abstract in its assumptions, was powerful in explaining the hierarchical influences of people's learning and development (Nabavi, 2012). This study adopted Bandura's theory in combination with a new understanding of CW factors and WP to build a research model in the EFL writing context. The new features of the hypothesized model were that the multiple-order constructs were mainly grounded on empirical evidence in the qualitative phase and comprehensively arranged by Bandura's (1989; 2009) theory. Simultaneously, the calculation of the lower-order and higher-order constructs empowered by SmartPLS software (Hair et al., 2017) helped reveal the direct and indirect effects of the CW factors on EFL students' writing. This research model and its calculation were then pioneered to supply a new understanding of a multi-layer CW writing environment for EFL students.

THEORETICAL MODEL

Dependent Variables

Earlier researchers took various approaches to defining students' WP, and in most cases, they mainly used the score. It was claimed that the higher the score was, the better WP was. Such a claim came with low validity and reliability because the relation between WP and its determinants was not calculated and validated through correlative analysis.

Other than the score, some researchers employed perceived performance. McCoach and Siegle (2003) used the single-item construct of perceived academic

performance to gauge high school students' English learning results via their grasping of complex concepts at school. Subsequent researchers adopted and developed it into a multi-indicator construct to capture the complexity of students' learning performance. For instance, Abrantes et al. (2007) defined learning performance in terms of gained knowledge, developed skills, ability to apply materials, desire to learn, and understanding of the subject. Most recently, Qureshi et al. (2021) redefined Abrantes et al.'s (2007) learning performance and succeeded in locating the effects of collaborative learning on students' learning performance.

However, learning performance is too general to be adopted in a CW context. Because WP refers to actual production (Brown, 2000), it should be measured by certain features of a written product. In this research context, the teachers of writing deployed the Vietnam Standardized Test of English Proficiency or VSTEP writing scale (Ministry of Education and Training of Vietnam, 2015) to examine EFL students' WP via task fulfillment, organization, grammar, and vocabulary; accordingly, WP was examined through these features, each of which served as an indicator variable and was coded as WP1-4.

Independent Variables

EF

EF form a social and physical environment where individuals experience their learning with others. Bandura (2003, 2009) emphasized that aspects of the environment such as the classroom condition, the teacher, and peers can influence one's learning. In this study, the author examined EF manifested in students' attitude toward the course (ATC), interaction with the teacher (IWT), interaction with peers (IWP), and use of technology (UT).

ATC

Ajzen (1991) defined attitude as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (p. 188). Davis (1989) also referred to attitude as the negative or positive feelings of performing a behavior and claimed that attitude results in behavioral intention of performing an actual behavior. In this sense, attitude can work as a predictor of BL or BF. It has been evidenced that attitudes positively influence BF (Callum, 2011; Davis, 1989) or increase students' learning performance (McCoach & Siegle, 2003).

Besides that, So and Brush (2007) reported that attitudes to collaborative learning can lead to improved outcomes. They developed a scale of eight indicators capturing attitude, self-efficacy (SE), and behavioral engagement. Later, Qureshi et al. (2021) refined So and Brush's (2007) scale and formed active collaborative learning to gauge students' attitudes toward the efficacy of this form of learning. In this study, the author adopted Qureshi et al.'s (2021) scale and made it fit in the study context of CW. Accordingly, ATC was gauged via EFL students' preference for the CW-based course, the appropriateness and fruitfulness of CW activities, and the interest of the content.

IWT

IWT is the degree to which students interact with their teachers for learning purposes (Qureshi et al., 2021). It was proven that students are impressed or inspired by their teachers, which may lead to changes in their learning attitudes and results (Chan et al., 2019; Mushtaq & Khan, 2012; Nguyen & Le, 2018). Engin and Seven (2007) and Rahman et al. (2017) affirmed that teacher attributes are important factors impacting the quality of the teaching and learning process, and Mushtaq and Khan (2012) stated that performance would increase when the teacher provided proper guidance to students.

Qureshi et al. (2021) approached student-teacher interaction from the perspective of what a teacher does for their students or encourages them to do in a collaborative learning environment. With the CW context evidence, the author modified Qureshi et al.'s IWT (2021) to measure EFL students'

perception of how their teacher influences EFL students' writing in terms of their teaching methods, care for students, encouragement, and relations with students.

IWP

IWP refers to the degree to which students collaborate or cooperate with their peers to complete a learning task (Molinillo et al., 2018). IWP enhances collaborative learning and learning performance among students because a lot of information is shared and exchanged within the learning community (Chan et al., 2019). IWP motivates learners to discuss and share ideas and information; thus, it is significantly associated with active collaborative learning (Qureshi et al., 2021).

In the collaborative learning context, Molinillo et al. (2018) and Qureshi et al. (2021) observed the benefits that students got from interactions with their classmates. This is largely in the vein of the agentic view of Bandura (2009); as a consequence, the author adopted and adapted Qureshi et al.'s (2021) scale a little to observe EFL students' IWP in the light of exchanging ideas, improving language use, giving feedback, and developing new skills and learning ability.

UT

UT refers to the degree to which students use or do not use technology for a purpose (Venkatesh et al., 2003). Moreover, Chu (2023) claimed that information and communication technology acts as a dynamic tool to accelerate the development of a learning environment by encouraging communication and cooperation among students, which strengthens their learning and performance. Furthermore, Ajzen (1991) postulated that the user attitude toward using technology can result in user behaviors or UT.

Empirically, Chu (2023) found that UT in the peer feedback process played an important part in improving EFL students' WP. Likewise, Qureshi et al. (2021) examined the effects of social media use on students' learning results from the perspectives of communication, idea sharing, and task completion. They reported that UT encourages students' engagement in in-class learning activities, which then results in improved achievements. In this CW study, the author extended Qureshi et al.'s (2021) scale and defined UT in terms of using technology for entries, communication, collaboration, and revision.

In short, Bandura (1989) claimed that the environment affects BL directly and BF indirectly; therefore, the theorized relations between EF and other research constructs in the research model should be based on Bandura's theory. The hypotheses (H1-3) are stated below.

H1: EF directly affect BL.

H2: EF indirectly affect BF.

H3: EF indirectly affect WP.

EF in most previous studies, though defined differently in research projects, were examined as a direct predictor of students' learning results, and the author has found significant direct effects of EF on students' learning (Chu & Nguyen, 2020; Khatib & Meihami, 2015; Nguyen & Le, 2018); however, EF in this study were explored as a predictor that impacts EFL students' WP indirectly via BL and BF.

BL

Personal factors refer to individuals' mental characteristics and processes such as experience, cultures, expectations, beliefs, self-perceptions, goals, and intentions, or their biological properties such as age, gender identity, race, and physical attractiveness (Bandura, 2003). As part of personal factors, BL in this study were manifested through SE, intrinsic motivation (IM), and extrinsic motivation (EM).

SE

SE refers to the belief in one's capabilities to organize and execute courses of action required to produce given attainments (Bandura, 2003; Pajares et al., 2009). This construct is very similar to Ajzen's (1991) perceived behavioral control, which refers to people's perception of the ease or difficulty of performing behaviors of interest. Empirically in many researchers' reports, SE can be used to predict people's intentions and actions (Callum, 2011; Chu & Nguyen, 2020; Li, 2023). In terms of writing, SE refers to writers' confidence that they possess specific writing skills or complete a writing task. SE and learning outcomes are related in a way that students' confidence in their writing capabilities influences their writing motivation as well as varied writing outcomes.

SE has been an established scale used in different applied fields. For example, Callum (2011) used SE to estimate students' and teachers' adoption of mobile technology in Malaysia, and Chu and Nguyen (2022) adopted SE to explore English majors' acceptance of technology in studying writing. In this study, Callum's (2011) SE was adopted and adapted to fit the CW context. SE was observed through BL in the efficacy of CW and the achievability of the set objectives.

IM

IM is related to such factors as self-determination, competence, task involvement, curiosity, enjoyment, and interest (Callum, 2011). Intrinsically motivated activities are ones for which there is no apparent reward except the activity itself, and behaviors target certain internal rewarding results such as competence and self-determination (Brown, 2000). Bandura (2009) also explained that "people do not perform everything they learn... they are more likely to exhibit a modeled behavior if it results in valued outcomes" (p. 267). They pursue activities that they find self-satisfying and that give them a sense of worth but reject those they disapprove of.

Rahman et al. (2017) explained that personal attitude affects an individual's motivation to learn a language, and good inner conditions could lead to good learning results. Empirically, Callum (2011) gauged IM via students' interest in the challenge of learning tasks, the enjoyability of learning activities, and the desire for new knowledge. To make it work for this study's context, Callum's (2011) IM was modified in the sense that it would be measured through students' interest in English writing, CW, the enjoyment of the task, and the creation of the meaning in writing.

EM

EM is concerned with such factors as competition, evaluation, recognition, grades, and constraints imposed by others (Callum, 2011). According to Brown (2000), "extrinsically motivated behaviors are carried out in anticipation of a reward from outside and beyond the self" (p. 164). Bandura (2003) also discussed that people are motivated by the successes of others who are similar to themselves, and Alsayed (2003) reported that instrumental motivation is most influential on students' achievements.

Callum (2011) measured EM in terms of teacher and peer recognition, rewardedness, social presence, and instrumental functions. In this research, the author partly drew on the findings of observations and interviews and partly modified Callum's (2011) EM. Consequently, EM was observed in students' motivation by social presence, future usefulness of the course content, and peer recognition.

In conclusion, BL are composed of SE, IM, and EM. The grouping of those three constructs was based on Bandura's SCLT and Hair et al.'s (2017) statistical calculation. In earlier research, BL were examined as a factor impacting students' learning directly or indirectly influencing students' engagement. Differently, BL in this research were hypothesized to affect BF directly and WP indirectly via BF.

H4: BL directly affect BF.

H5: BL indirectly affect WP.

BF

BF refer to one's actual acts that are proactive, self-reflected, and self-regulated. Bembenutty et al. (2016) also claimed that "individuals are competent and active agents whose actions can influence their development, learning, and behavior" (p. 216). In Bandura's agentic view, he explained that people's learning is directly affected by their behavior, and their behavioral engagement is mostly manifested in their self-regulation (SR) and self-reflection (SF).

SR

SR indicates that students control and direct their thoughts, emotions, motivation, and actions toward their set goals (Bandura, 2003; Brockett & Hiemstra, 1991). Nabavi (2012) added that when individuals self-regulate their learning, they develop functional patterns of thinking and behaving in response to the environment to achieve their set goal. This means that SR is manifested in a cognitive and behavioral process of one's learning, and it is perceived as a continuous approach that students adopt to improve their skills, knowledge, and expertise (Brockett & Hiemstra, 1991). In this sense, SR means a cognitively driven behavior that helps students self-regulate their learning.

SR was defined differently in each study and is influential on people's learning and knowing. McCoach and Siegle (2003) originally used a single indicator construct to define EM. Other researchers developed it into a multiple-indicator construct and applied it in different applied fields (Callum, 2011; Chu & Nguyen, 2022; Nguyen & Le, 2018). In this study, SR was adapted from Nguyen and Le's (2018) established scale and measured via four features: using different resources, being engaged in class activities, reviewing teacher and peer feedback, and revising their draft. These features were examined as behaviors through which students manage their writing learning.

SF

SF means that students reflect on what they have acquired at certain points of time in their learning process in terms of knowledge, skills, and competence, (Bandura, 2003; Brockett & Hiemstra, 1991). Bandura (2003) explained that people are the agents of actions as well as the examiners of those actions, and Pajares et al. (2009) posited that through SF, students can measure how much they have achieved compared to the set objectives. SF is a cognitive factor that can help students gauge the progress of their learning, and this cognitive behavior can help them self-direct their learning toward the set goal (Nabavi, 2012).

Empirically, Nguyen and Le (2018) adopted McCoach and Siegle's (2003) goal valuation to form SF, and explored it as a significant predictor of academic achievements, while Ramirez-Arellano et al. (2018) posited that SF indirectly affects learning outcomes via learning strategies. Regarding the contribution of SF, Nabavi (2012) argued that SF can help learners see their strengths and weaknesses to make appropriate strategies and behaviors to achieve their goals. In this study, the author adopted and modified Nguyen and Le's (2018) SF as a cognitive factor to gauge EFL students' thoughts of being able to study writing through CW, comprehending the benefits of CW, and finding ways to improve writing learning with CW. Because Bandura (1989) argued that BF impact WP directly, the relation between BF and WP in the theorized model is hypothesized below.

H6: BF directly affect WP.

RESEARCH DESIGN

Approach and Procedure

The CW factors affecting EFL students' WP were under-researched in the literature; therefore, the author decided to use a sequential exploratory mixed methods research design

(Creswell & Creswell, 2018). He began by exploring the earlier published resources on CW, Bandura's SCLT, and WP to get theoretical and empirical evidence for the factors likely to influence EFL students' writing. Next, he observed in-class activities six times and interviewed five students in a CW course. These on-site methods aimed to get more empirical data to improve the quality of the indicator variables. In reality, the previous indicators and the constructs, with the intervening empirical evidence in the qualitative phase, were substantially modified and, in some cases, redefined to make them valid for the study context.

Because the study was based on a survey project, the measurement features relied substantially on the established scales for construct validity and reliability (see Appendix A). The new things reside in the theory-driven calculation methods in which the author defined and arranged the constructs in a multi-order model, and justified and redefined those constructs with empirical evidence to make them work for the new study context.

Sampling

The research was conducted in a course on Business English Writing in 2024 at a university in Vietnam where CW was applied. The sample included 85 students who experienced the genre approach to learning business English correspondence. Demographically, 82% of the respondents identified as female, and 93% were in their second year when the survey was carried out. With regard to the students' learning results, the statistical figures indicate that none of them received a score below 4; in fact, the scores ranged from 4.0 to 5.4 (7%), 5.5 to 6.9 (27%), 7.0 to 8.0 (52%), and finally 8.5 or higher (14%). The categorization of students' scores into five groups is based on the regulations on tertiary education in grading students by their competences (Ministry of Education and Training of Vietnam, 2021).

In each CW class meeting, EFL students planned, generated, translated, and transcribed ideas collectively to produce collaboratively written texts (detailed outlines). Then, they worked independently to draft their individually written texts. When it came to the feedback session, they reviewed each other's drafts by giving and receiving feedback collaboratively. Finally, they revised the texts and submitted them for teacher feedback. The ultimate result of the CW process was multiple individual texts, which came from the joint effort of the entire team earlier. Descriptive statistics showed that 90% of them were satisfied with CW, and 95% agreed that they achieved the outcome that they had wished.

Data Collection and Analysis

The main instrument to collect data to address the research problem is the questionnaire. In comparison with the original constructs and their indicator variables in earlier studies (Callum, 2011; McCoach & Siegle, 2003; Molinillo et al., 2018; Nguyen & Le, 2018; Qureshi et al., 2021), the measurement scale went through substantial changes due to the empirical findings.

Qualitatively, document reviews were employed to tentatively construct a questionnaire with 10 constructs represented by 42 indicator variables. When attending the CW classes, the number of constructs remained unchanged, while the indicators were modified and/or redefined to capture the nuanced phenomena of the CW environment. In this sense, the qualitative findings helped increase the validity of the questionnaire constructs.

By the end of the CW course, all the students were asked to respond to the questionnaire in class via Google Forms. About a week before the course ended, the measurement scale was piloted, but no extreme cases were located. Consequently, the official questionnaire was delivered on the last day of the course, and 85 responses were recorded. Because the questionnaire acquired data for both descriptive and analytical statistics, the author used Microsoft Excel and SmartPLS software to handle the calculations.

DATA ANALYSIS AND INTERPRETATION

Measurement Model Assessment

When the data was run on the partial least squares structural equation modelling, the author examined the measurement model. The hypothesized model included 41 indicators or ten lower-order constructs. The outer loading statistics (see Appendix B) showed that all indicators bore loadings of .40 or higher, which is the acceptance threshold for exploratory research (Hulland, 1999, as cited in Hair et al., 2017). However, when assessing the construct validity and convergent validity, the results showed that EM received .539, .568, and .419 for Cronbach’s alpha, composite reliability (rho_a), and average variance extracted (AVE) respectively. These indexes (see Appendix C) were below the threshold of acceptance for construct reliability ($\alpha \geq .70$; $\rho_a \geq 0.7$) and construct validity ($AVE \geq .5$) (Hair et al., 2017); therefore, EM was removed from the research model.

The new model comprised 37 indicator variables or nine lower-order constructs. Then, the author performed the calculation again. Table 1 shows that the outer loading indexes of all the indicator variables were above .40. This means that all the indicator variables met the acceptance threshold.

Table 1. Outer loadings of the measurement model (lower-order constructs)

	ATC	IM	IWP	IWT	SE	SF	SR	UT	WP
ATC1	0.847								
ATC2	0.859								
ATC3	0.834								
ATC4	0.846								
IM1		0.709							
IM2		0.684							
IM3		0.767							
IM4		0.776							
IWP1			0.685						
IWP2			0.803						
IWP3			0.802						
IWP4			0.848						
IWP5			0.660						
IWT1				0.888					
IWT2				0.822					
IWT3				0.882					
IWT4				0.791					
SE1					0.794				
SE2					0.646				
SE3					0.766				
SE4					0.840				
SF1						0.738			
SF2						0.766			

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Table 1. Continued

	ATC	IM	IWP	IWT	SE	SF	SR	UT	WP
SF3						0.579			
SF4						0.717			
SF5						0.754			
SR1							0.828		
SR2							0.746		
SR3							0.794		
SR4							0.736		
UT1								0.810	
UT2								0.807	
UT3								0.866	
UT4								0.840	
WP1									0.881
WP2									0.878
WP3									0.634
WP4									0.901
Significant level	$\geq .40$ (Hulland, 1999, as cited in Hair Jr. et al., 2017)								

Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

The next step was assessing construct reliability and validity. Hair et al. (2017) claimed that the assessment of the internal consistency reliability and convergent validity only applies to the reflective constructs via Cronbach's alpha ($\geq .0.7$), composite reliability ($\geq .0.7$), and average variance extracted ($\geq .0.5$). Table 2 demonstrates that the indexes of Cronbach's alpha and composite readability (ρ_a) in all reflective constructs superseded the acceptable level of .70 or higher and the average variance extract indexes of all the indicators were $\geq .50$, indicating that the validity and reliability of all the nine lower-order constructs were met.

Table 2. Reliability and validity construct

	Cronbach's alpha	Composite reliability (ρ_a)	Composite reliability (ρ_c)	Average variance extracted (AVE)
ATC	0.869	0.878	0.910	0.717
IM	0.715	0.716	0.824	0.540
IWP	0.817	0.827	0.873	0.582
IWT	0.868	0.870	0.910	0.717
SE	0.759	0.760	0.848	0.585
SF	0.758	0.772	0.837	0.510
SR	0.781	0.787	0.858	0.603

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Table 2. Continued

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
UT	0.851	0.859	0.899	0.691
WP	0.845	0.872	0.898	0.691
Significant level	≥ .70	≥ .70	≥ .70	≥ .50

Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

After that, the assessment focused on discriminant validity. Fornell and Larcker (1981, as cited in Hair et al., 2017) stated that the square root of the AVE of each latent variable should be greater than the correlations among the latent variables. Based on that reference, Table 3 indicates that all the reflective constructs met the acceptable level of discriminant validity.

Table 3. Fornell and Larcker scale

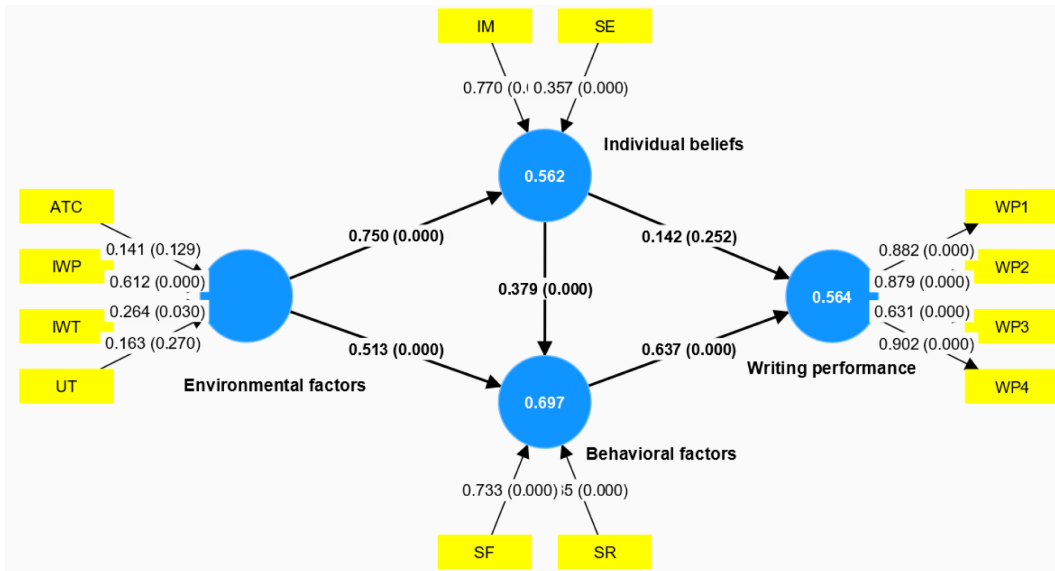
	ATC	IM	IWP	IWT	SE	SF	SR	UT	WP
ATC	0.846								
IM	0.285	0.735							
IWP	0.343	0.701	0.763						
IWT	0.406	0.648	0.693	0.847					
SE	0.326	0.506	0.451	0.473	0.765				
SF	0.464	0.699	0.695	0.639	0.597	0.714			
SR	0.357	0.577	0.647	0.559	0.356	0.615	0.777		
UT	0.399	0.538	0.567	0.745	0.500	0.526	0.547	0.831	
WP	0.340	0.579	0.728	0.569	0.509	0.711	0.611	0.503	0.831

Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

Finally, the author looked at the collinearity of the indicators in the research model. Hair et al. (2017) posited that the tolerance value (VIF) of each construct should be higher than .20 and lower than 5. The statistical results showed that VIF ranged from 1.178 (SE2) to 3.138 (UT4), indicating that there was little or no possibility of collinearity among the indicator variables.

In general, the assessment of the measurement model indicated that all the indicators met the acceptance levels, and the author could go on with further calculations. Because there were many constructs in the hypothesized model, the calculation required that some lower-order constructs should be grouped to make higher-order constructs. In response, the author grouped ATC, IWT, IWP, and UT to make EF; IM and SE to make BL; and SR and SF to form BF. Then, the new hypothesized model (Figure 3) included 4 constructs defined through 12 indicator variables.

Figure 3. Results of the measurement model (higher-order constructs)



Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

After forming a few higher-order constructs, the author ran and examined the measurement model again. Figure 3 shows that the indicator reliability of the overall scale was met. The outer loadings of most indicator variables hit the threshold of 0.7 or higher (Hair et al., 2017), except for ATC and WP3, which came with the outer loadings of .523 and .631 respectively. Hulland (1999, as cited in Hair et al., 2017) posited that an outer loading of .40 can be kept in exploratory research; as a consequence, all the indicator variables in Figure 3 were retained.

With regard to the assessment of construct validity and reliability, WP was a reflective construct, and it had been assessed in the lower construct model already (Table 2); nonetheless, EF, BL, and BF worked as formative constructs (Figure 3), which would not go through this stage of assessment (Hair et al., 2017). As a result, the last stage of assessing the measurement model focused on collinearity. The statistical result showed that VIF ranged from 1.236 (UT) to 3.001 (IWT), indicating that there was little or no possibility of collinearity among the indicator variables.

In summary, the measurement model was assessed, with EM being removed from the beginning of the analysis process. The results revealed that the indexes of all the indicator variables of the measurement models met the acceptable thresholds.

Structural Model Assessment and Hypothesis Testing

The assessment of the structural model involved the model fit, coefficients of determination, path coefficients, and effect sizes. The statistical analysis indicated that the standardized root mean squared residual index of the estimated model was .60, which means a good fit in reference to the acceptable threshold of below .80 suggested by Hair et al. (2017). This index also means that the validated model can well estimate the effects of the exogenous constructs on their corresponding endogenous ones.

The next step was to assess the coefficient of determination (R^2). Figure 3 shows that EF could explain 56.2% of the variance of BL. EF and BL together could explain 69.7% of the variance of BF, and BL and BF together could explain 56.4% of the variance of WP. According to Hair et al.

(2017), the R^2 values of .75, .50, and .25 for the exogenous constructs are described respectively as substantial, moderate, and weak. Under this reference frame, EF and BL together could substantially explain the variance of BF, while BL and WP could be moderately explained by their immediate exogenous constructs.

Regarding the significance of path coefficients, Table 4 shows that all relations stated in the hypotheses (H1-H6) bore a significant p value of below .50. This means that hypotheses H1-H6 were accepted, and the causal relations between each pair of constructs were statistically validated. In the direct relations, EF affected BL most (.750), next BF impacted WP (.637), and finally, BL influenced BF least (.379). In the indirect relations, EF affected WP most (.614), then EF influenced BF (.284) and finally BL impacted WP least (.241).

Table 4. Regression coefficients and hypothesis testing

Hypotheses	Relations		Original sample	Sample mean	Standard deviation	T statistics	P values	Acceptance
H1	EF-> BL	Direct	0.750	0.744	0.085	8.779	0.000	Yes
H6	BF -> WP		0.637	0.643	0.110	5.774	0.000	Yes
H4	BL -> BF		0.379	0.364	0.096	3.953	0.000	Yes
H2	EF-> BF	Indirect	0.284	0.270	0.074	3.837	0.000	Yes
H3	EF-> WP		0.614	0.611	0.097	6.339	0.000	Yes
H5	BL -> WP		0.241	0.233	0.069	3.488	0.000	Yes

Note. EF = environmental factors; BL = individual beliefs; BF = behavioral factors; WP = writing performance.

The newly validated positive relations above indicate that the increase of a causative factor will entail that of its corresponding dependent ones. Hair et al. (2017) proposed three thresholds of .02, .15, and .35 as small, medium, and large effects. Therefore, to quantify the effect size (f^2), the author split EF up into ATC, IWT, IWP, and UT and performed the calculation again.

The statistical significance requires that the p value should be .05 or lower. This threshold indicates that the influences of ATC on BL, BL on WP, IWT on BF, UT on BL, and UT on BL were not statistically significant; as a result, the f^2 of these relations would not be counted. In contrast, the remaining relations in Table 5 reach statistical significance with their p value of .50 or lower. The influence of BF on WP is the biggest ($f^2=.388$), and next comes the medium impact of IWP on BL ($f^2=.220$) and BL on BF ($f^2=.218$). Table 5 also indicates that the effect of IWP on BF is small ($f^2=.145$) and the other effects of ATC on BF ($f^2=.087$) and IWT on BL ($f^2=.051$) are very small.

Table 5. Regression weights and effect sizes

	Original sample	Sample mean	Standard deviation	Effect sizes (f^2)	T statistics	P values
ATC -> BF	0.177	0.182	0.077	0.087	2.295	0.022
ATC -> BL	0.026	0.034	0.085	0.001	0.300	0.764
BF -> WP	0.638	0.644	0.110	0.388	5.777	0.000
BL -> BF	0.388	0.386	0.099	0.218	3.930	0.000
BL -> WP	0.141	0.127	0.124	0.019	1.134	0.257

continued on following page

Table 5. Continued

	Original sample	Sample mean	Standard deviation	Effect sizes (f2)	T statistics	P values
IWP -> BF	0.321	0.320	0.113	0.145	2.846	0.004
IWP -> BL	0.433	0.435	0.104	0.222	4.173	0.000
IWT -> BF	0.107	0.098	0.115	0.013	0.925	0.355
IWT -> BL	0.252	0.233	0.124	0.051	2.034	0.042
UT -> BF	0.027	0.039	0.110	0.001	0.245	0.806
UT -> BL	0.157	0.159	0.120	0.026	1.306	0.192

Note. UT = use of technology; WP = writing performance; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course; BF = behavioral factors; BL = individual beliefs.

To know more about the indirect effects of the CW EF on EFL students' WP, the author examined the original sample values of ATC, IWT, IWP, and UT on their indirect endogenous constructs. Regarding the indirect effect of EF on one's BF, only the relation between IWP and BF is validated with its *p* value below .50, while the other relations are statistically insignificant. Also, Table 6 demonstrates that except for the insignificant relation between UT and WP, the other relations come with a significant *p* value. In fact, IWP causes the most impact on WP (.373) and next come IWT (.150) and ATC (.125). These validated path coefficients are positive, meaning that the increase of the independent factors will entail that of their dependent ones in the sense that the higher the value is, the greater the positive change is.

Table 6. Indirect effects of collaborative writing factors on writing process

Relations	Original sample	Sample mean	Standard deviation	T statistics	P values
ATC -> BL ->BF	0.010	0.011	0.034	0.292	0.771
ATC -> BL ->BF ->WP	0.123	0.125	0.052	2.361	0.018
IWP -> BL-> BF	0.168	0.170	0.066	2.556	0.011
IWP -> BL ->BF ->WP	0.373	0.376	0.084	4.412	0.000
IWT -> BL-> BF	0.098	0.090	0.056	1.737	0.082
IWT -> BL ->BF ->WP	0.166	0.150	0.082	2.018	0.044
UT -> BL-> BF	0.061	0.058	0.047	1.286	0.199
UT -> BL ->BF -> WP	0.078	0.084	0.092	0.852	0.394

Note. UT = use of technology; WP = writing performance; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course; BF = behavioral factors; BL = individual beliefs.

In summary, the hypothesized model originally consisted of 10 constructs or 41 indicator variables. After EM was excluded, some lower constructs were grouped to make higher-order constructs; as a consequence, the validated model is now composed of 4 constructs or 12 indicators. Measurement and structure modeling have validated the estimated model, and a lot can be learned from the analysis process. The author has located the indirect influences of EF on BF, EF on WP, and BL on WP, which were under-researched in the literature. This study has also successfully pointed out that BF are the most influential on WP, and BF are affected directly by BL and indirectly by EF at varying degrees.

DISCUSSION

The validated model has deepened Bandura's (2009) triadic reciprocal determinism in the CW context. In fact, Bandura's theory has helped quantify the effects of CW factors on EFL students' writing. Based on the regression coefficients that show the varying causal relations among the constructs, some major discussions are provided below.

First, WP is affected directly by BF most. Figure 3 shows that BF can moderately explain the variance of WP by 56.4%. This statistical percentage hints that if a teacher wishes to increase EFL students' WP, it is necessary to increase their BF first. Figure 3 also indicates that SF (cognitive engagement) and SR (behavioral engagement), which form BF, bear the path coefficients of .958 and .816 respectively, meaning that SF is more important than SR in their contributions to BF. This finding is different from McCoach and Siegle (2003), Nguyen and Le (2018), and Chu and Nguyen (2020), who reported that SF or goal valuation directly affects students' success in learning English. With regard to English writing, this finding implies that the teacher should help students do some reflection on their learning such as thinking about what they are learning and have gained through CW, comprehending the benefits of CW, and searching for ways to improve writing learning with CW. Increased SF in combination with SR will help improve their WP.

Second, WP is indirectly influenced by BL via BF. In contrast to earlier research that located the direct effect of IM on BF (Callum, 2011), or that treated IM and SE as direct predictors of students' learning results (Chu & Nguyen, 2020), this study has established a significant indirect relation between BL and WP. Figure 3 shows that IM and SE, which form BL, bear the regression weights of .952 and .748 respectively, meaning that IM makes a larger contribution to BL than SE does. This finding implies that students pay more attention to self-determination, competence, task involvement, curiosity, enjoyment, and interest than the belief in the capabilities to organize and execute courses of action required to produce given attainments. Therefore, besides helping students realize that they can complete the course well during the teaching and learning process, teachers of English writing should create classes that interest their students first. When BL are increased, they will directly affect BF, which results in students' improved WP.

Third, WP is indirectly impacted by EF via BL and BF. Table 2 shows that in comparison with the indirect effect of BL on WP (.241), EF indirectly influence WP by 61.4%, meaning that EF are very important to improving WP. This finding does not coincide with some earlier research in which EF, though represented by different definitions, were found to affect students' learning scores directly (Alsayed, 2003; Chu, 2023; Mushtaq & Khan, 2012; Nguyen & Le, 2018) or their learning performance indirectly (Abrantes et al., 2007; Chan et al., 2019; Molinillo et al. 2018; Qureshi et al., 2021). This study's finding implies that creating a truly good learning environment is much more important than what belief students hold about it. In other words, the statistical figures reveal that students might not hold a good belief of what a good learning environment is, yet a good CW class is actually helpful for them. As a result, it is advisable for a teacher to create a learning environment in which students can have a positive ATC, maintain IWT and IWP, and make good UT. When the learning environment is improved, BL and BF are enhanced, and then their WP is improved too.

Fourth, among the CW factors of ATC, IWT, IWP, and UT, which are grouped to form EF, Figure 3 reveals that IWP is the most important in contributing to EF (.936), meaning that peers are the most influential in WP. It can be inferred that when building up a good CW environment for students to learn English writing, the teacher should give students time and freedom to exchange ideas, improve language use, give feedback, and develop new skills and learning abilities. In addition, the contribution of IWT to BL is the second largest among the CW factors; hence, teachers should pay attention to their teaching methods, care for students, encouragement, and relations with their students so that EFL students' WP can improve. This finding of EF is partly in the same vein as earlier researchers such as Qureshi et al. (2021), Molinillo et al. (2018), and Nguyen and Le (2018), who reported that teachers and peers play a crucial role in increasing students' learning results.

Besides the success in locating the effects of some exogenous constructs on their corresponding endogenous constructs, the author has witnessed two relations that are not supported by the statistical analysis. First, EM was removed from BL right at the assessment of the measurement model. The exclusion of this factor from the hypothesized model means that EFL students are not motivated by social presence, future usefulness of the course content, and peer recognition. This result coincides with Chu and Nguyen's (2022) finding when they estimated the effect of EM on students' success in learning English, and EM was not retained in the exploratory factor analysis. Another problem is that UT in Table 5 is not statistically significant in relation to BL and BF. Though UT makes some contribution to EF (Figure 3), the statistical analysis (Table 5) shows that this factor bears a p value of above .50 in relation to BL and BF; accordingly, UT is not treated as affecting BL and BF. Though the class observations indicated that students frequently used technology to support their writing activities, the calculation of data showed that they did not perceive the efficacy of technology on their WP.

In short, WP is mainly affected by BF, and BF are indirectly impacted more by EF than by BL. If teachers and/or stakeholders wish to increase EFL students' writing results, they should increase the endogenous constructs of the CW environment first.

CONCLUSION

Thanks to the application of Bandura's (1989) theory, the research findings have successfully addressed two research questions as well as pointed out how EFL students' WP is affected in a CW environment. The validated model has quantitatively shown how an exogenous construct, directly and indirectly, influences its endogenous factors, systematically explaining how WP can be improved in the CW context. Nonetheless, because this study is exploratory and was conducted on a limited number of participants in one institution, the findings are mostly predictive (Hair et al., 2017). Regarding replicability, subsequent researchers or practitioners are advised to examine, analyze, and consider this study's context and the new one to see if there are similarities between the two before making use of this research's findings to conduct confirmatory research on a larger sample.

Moreover, the exclusion of EM from the validated model and the statistically insignificant relation between UT and its endogenous constructs may have come from the limited number of observations in this exploratory research. As a result, future research in this field should increase the number of participants so that the sample will be more representative of the population, and then the findings of such research can be more conclusive.

COMPETING INTERESTS STATEMENT

The author of this publication declares there are no competing interests.

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REFERENCES

- Abrantes, J. L., Seabra, C., & Lages, L. F. (2007). Pedagogical affect, student interest, and learning performance. *Journal of Business Research*, 60(9), 960–964. DOI: 10.1016/j.jbusres.2006.10.026
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. DOI: 10.1016/0749-5978(91)90020-T
- Alawaji, N. N. M. (2020). Students' perceptions of collaborative summary writing. *Theory and Practice in Language Studies*, 10(6), 700–707. DOI: 10.17507/tpls.1006.11
- Alsayed, M. (2003). Factors that contribute to success in learning English as a foreign language. *Damascus University Journal*, 9(1+2), 21-44. <https://www.damascusuniversity.edu.sy/mag/human/images/stories/03230.pdf>
- Anshu, A. H., & Yesuf, M. Y. (2022). Effects of collaborative writing on EFL students' paragraph writing performance: Focus on content and coherence. *International Journal of Education and Literacy Studies*, 1(10), 36. Advance online publication. DOI: 10.7575/aiac.ijels.v.10n.1p.36
- Bandura, A. (1989). Social cognitive theory. *Annals of Child Development*, 1–60. PMID: 11148297
- Bandura, A. (2003). Social Cognitive Theory for Personal and Social Change by Enabling Media. In Singhal, A., Cody, M. J., Rogers, E. M., & Sabido, M. (Eds.), *Entertainment-Education and Social Change* (pp. 97–118). Routledge., DOI: 10.4324/9781410609595-11
- Bandura, A. (2009). Social cognitive theory of mass communication. *Media Psychology*, 3(3), 265–299. DOI: 10.1207/S1532785XMEP0303_03
- Bembenutty, H., White, M. C., & DiBenedetto, M. K. (2016). Applying social cognitive theory in the development of self-regulated competencies throughout K-12 grades. In Lipnevich, A. A., Preckel, F., & Roberts, R. D. (Eds.), *Psychosocial skills and school systems in the 21st century. The Springer series on human exceptionality* (pp. 215–239). Springer International Publishing., DOI: 10.1007/978-3-319-28606-8_9
- Brockett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: Perspectives on theory, research, and practice*. Routledge.
- Brown, H. D. (2000). *Principles of language learning and teaching* (4th ed.). Longman. URL OR DOI
- Callum, K. F. C. (2011). *Influences on the adoption of mobile technology by students and teachers* [Doctoral dissertation, Massey University].
- Chan, C. H. S., Wan, C. L. J., & Co, S. (2019). Interactivity, active collaborative learning, and learning performance: The moderating role of perceived fun by using personal response systems. *International Journal of Management Education*, 17(1), 94–102. DOI: 10.1016/j.ijme.2018.12.004
- Chu, Q. P. (2023). Exploring the effects of collaborative peer-written corrective feedback on EFL students' business English writing performance. *Journal of Knowledge Learning and Science Technology*, 2(3), 189–211. DOI: 10.60087/jklst.vol2.n3.p211
- Chu, Q. P., & Nguyen, H. T. (2020). Exploring different factors affecting economics majors' success in studying English. In *ELT for Lifelong Learning in the New Decade, The 5th International Conference on English Language Teaching* (pp. 39-60). Ho Chi Minh: VNU-HCM Press.
- Chu, Q. P., & Nguyen, H. T. (2022). Exploring different factors affecting students' success in studying business English writing. *Journal of Inquiry into Languages and Cultures*, 6(3), 316–330. <https://vjol.info.vn/index.php/nvvh/article/view/75127/63884>
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design* (4th Ed.). Sage.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *Management Information Systems Quarterly*, 13(3), 319–340. DOI: 10.2307/249008
- Engin, A. O., & Seven, M. A. (2007). *Factors which affect the success in English Teaching in Turkey*. ERIC: Institute of Education Sciences. <https://files.eric.ed.gov/fulltext/ED497452.pdf>

- Hair, Jr., J. F., Hunt, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on the partial least squares structural equation modelling (PLS-SEM)*. Sage.
- Helaluddin, N., Nurhayati, N., Nadya, N. L., Ismail, G., Guntur, M., & Fransori, A. (2023). The use of collaborative strategies to improve students' writing ability and self-efficacy: A mixed method study. *European Journal of Educational Research*, 12(1), 265–280. DOI: 10.12973/eu-jer.12.1.265
- Huong, L. T. P., & Phung, D. (2023). Engagement in collaborative writing: Exploring learners' control of task content and text quality. *International Journal of Applied Linguistics*, 33(2), 242–259. DOI: 10.1111/ijal.12462
- Huynh, N. T. (2022). The effects of peer feedback on EFL students' writing performance. *Vietnam Journal Of Education*, 6(2), 123–136. DOI: 10.52296/vje.2022.185
- Khatib, M., & Meihami, H. (2015). Language and writing skill: The effect of collaborative writing on EFL students' writing performance. *Advances in Language and Literary Studies*, 6(1), 1–9. DOI: 10.7575/aiac.all.s.v.6n.1p.203
- Li, Y. (2023). The effect of online collaborative writing instruction on enhancing writing performance, writing motivation, and writing self-efficacy of Chinese EFL learners. *Frontiers in Psychology*, 14(1), 165–221. DOI: 10.3389/fpsyg.2023.1165221 PMID: 37441335
- Lin, O. P., & Maarof, N. (2013). Collaborative writing in summary writing: Student perceptions and problems. *Procedia: Social and Behavioral Sciences*, 90, 599–606. DOI: 10.1016/j.sbspro.2013.07.131
- Mai, L. (2022). Các yếu tố ảnh hưởng tới khả năng viết tiếng Anh của sinh viên không chuyên Tiếng Anh tại một trường đại học của Việt Nam. *Tạp chí Khoa học Ngoại ngữ*, 72, 106–122. DOI: 10.56844/tckhnn.72.204
- Martin, J. L. O., Hameleers, I. B., Trujillo-Torres, J. M., & Moreno-Guerrero, A. J. (2020). A comparison between collaborative and individual writings in promoting motivation and language acquisition. *Sustainability (Basel)*, 12(19), 7959. DOI: 10.3390/su12197959
- McCoach, D. B., & Siegle, D. (2003). Factors that differentiate underachieving gifted students from high achieving gifted students. *Gifted Child Quarterly*, 47(2), 144–154. DOI: 10.1177/001698620304700205
- Ministry of Education and Training of Vietnam. (2015). *Decision No 730/QĐ-BGDĐT: Tài liệu hướng dẫn áp dụng Định dạng đề thi đánh giá năng lực sử dụng tiếng Anh từ bậc 3 đến bậc 5 theo Khung năng lực ngoại ngữ 6 bậc dùng cho Việt Nam trong việc xây dựng đề thi và chấm thi*. URL OR DOI Ministry of Education and Training of Vietnam. (2021). *Quy chế đào tạo đại học (Ban hành kèm theo Thông tư số 08/2021/TT-BGDĐT)*.
- Mohamad, F., Anuar, N., & Daud, N. S. M. (2022). Actors influencing academic writing behavior among undergraduates. *International Journal of English Language Education*, 10(2), 56–72. DOI: 10.5296/ijele.v10i2.20453
- Molinillo, S., Aguilar-Illescas, R., Anaya-Sánchez, R., & Vallespín-Arán, M. (2018). Exploring the impacts of interactions, social presence and emotional engagement on active collaborative learning in a social web-based environment. *Computers & Education*, 123, 1–24. DOI: 10.1016/j.compedu.2018.04.012
- Mushtaq, I., & Khan, S. N. (2012). Factors affecting students' academic performance. *Global Journal of Management and Business Research*, 12(9), 16–22. <https://journalofbusiness.org/index.php/GJMBR/article/view/721>
- Nabavi, R. T. (2012). Bandura's social learning theory & social cognitive learning theory. <https://davidamerland.com/images/pdf/BandurasTheory.pdf>
- Nguyen, Q., & Le, T. K. T. (2018). Using the ordered logit to assess students' English learning outcomes at state-owned universities in Ho Chi Minh City. *Journal of Education*, 444(2), 48–54.
- Pajares, F., Prestin, A., Chen, J., & Nabi, R. L. (2009). Social cognitive theory and mass media effects. In Nabi, R. L., & Oliver, M. B. (Eds.), *The SAGE handbook of media processes and effects* (pp. 283–298)., <https://scholarworks.wm.edu/bookchapters/3>
- Pham, V. P. H. (2021). The effects of collaborative writing on students' writing fluency: An efficient framework for collaborative writing. *SAGE Open*, 11(1), 2158244021998363. Advance online publication. DOI: 10.1177/2158244021998363

Phuong, H. Y., & Nguyen, T. T. T. (2021). The impacts of collaborative writing on EFL students' paragraph writing performance. *International Journal of Science and Management Studies*, 4(4), 177–190. DOI: 10.51386/25815946/ijsms-v4i4p117

Putzeys, K., Van Keer, H., & De Wever, B. (2024). Unknown is not chosen: University student voices on group formation for collaborative writing. *Education Sciences*, 14(31), 1–18. DOI: 10.3390/educsci14010031

Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2021). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 31(4), 2371–2391. DOI: 10.1080/10494820.2021.1884886

Rahman, H. A., Rajab, A., Wahab, S. R. A., Nor, F. M., & Zarina, W. (2017). Factors affecting motivation in language learning. *International Journal of Information and Education Technology (IJJET)*, 7(7), 543–547. DOI: 10.18178/ijiet.2017.7.7.927

Ramirez-Arellano, A., Acosta-Gonzaga, E., Bory-Reyes, J., & Hernández-Simón, L. M. (2018). Factors affecting student learning performance: A causal model in higher blended education. *Journal of Computer Assisted Learning*, 34(6), 807–815. DOI: 10.1111/jcal.12289

So, H. J., & Brush, T. A. (2007). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51(1), 318–336. DOI: 10.1016/j.compedu.2007.05.009

Storch, N. (2011). Critical feedback on written corrective feedback research. *International Journal of English Studies*, 10(2), 29–46. DOI: 10.6018/ijes/2010/2/119181

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, 27(3), 425–478. DOI: 10.2307/30036540

Vygotsky, L. S. (1978). *Mind in Society: The development of higher psychological processes*. Harvard University Press.

APPENDIX A

Table 7. The overall scale

Factors	Indicator variables	Source
Self-reflection (SF)	SF1. I comprehend what is taught.	McCoach and Siegle (2003); Nguyen and Le (2018)
	SF2. Collaborative activities help me improve my writing skills.	
	SF3. What I do in the classroom improves my writing results.	
	SF4. I find the best ways to complete my writing tasks in class.	
	SF5. I want to gain a high score at university.	
Self-regulation (SR)	SR1. I draw on various resources to write better.	McCoach and Siegle (2003); Nguyen and Le (2018)
	SR2. I engage in different class activities to learn English writing.	
	SR3. I review my teacher's and peers' feedback to learn new things.	
	SR4. I revise my draft according to my peers' feedback.	
Self-efficacy (SE)	SE1. I believe that collaborating with my peers will generate what I want.	Callum (2011); Chu and Nguyen (2022)
	SE2. I believe that collaboration will help me write better.	
	SE3. I will get the score I wish.	
	SE4. I will attain the achievements that I wish.	
Intrinsic motivation (IM)	IM1. Collaborative writing is interesting.	Callum (2011)
	IM2. I learn new things in collaborative writing.	
	IM3. I prefer to figure things out with peers.	
	IM4. I enjoy writing to express my ideas in English.	
Extrinsic motivation (EM)	EM1. I am strongly motivated by my teacher and peers.	Callum (2011)
	EM2. I will get something in return for everything I do now.	
	EM3. I want other people to appreciate how well I can write.	
	EM4. Studying English well will help me find a good job.	
Interaction with peers (IWP)	IWP1: My peers and I discuss ideas in the writing process.	Qureshi et al. (2021)
	IWP2. My peers improve my use of language in writing.	
	IWP3: My peers help identify and correct my mistakes.	
	IWP4: I develop new skills with the other members in my group.	
	IWP5. I develop my learning abilities through peer collaboration.	
Interaction with the teacher (IWT)	IWT1. The lecturer maintains a good relationship with us.	Qureshi et al. (2021); Molinillo et al. (2018)
	IWT2. He encourages us to express our opinions during the lesson.	
	IWT3. He cares for our learning needs.	
	IWT4. He does a good job.	
Use of technology (UT)	UT1. I use technology to discuss and share ideas with my peers.	Qureshi et al. (2021)
	UT2. I use technology to communicate with my peers.	
	UT3. Technology helps me complete my writing tasks.	
	UT4. I use technology to revise my draft.	

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Table 7. Continued

Factors	Indicator variables	Source
Attitude toward the course (ATC)	ATC1. I like to use collaborative writing in learning English writing.	Qureshi et al. (2021)
	ATC2. Collaborative writing is appropriate for learning English writing.	
	ATC3. Collaborative writing is beneficial for me.	
	ATC4. Collaborative writing makes me more engaged.	
Writing performance (WP)	WP1. I can address the writing requirements.	Ministry of Education and Training of Vietnam (2015)
	WP2. I can organize the information in a piece of writing logically.	
	WP3. I can use a variety of vocabulary in a piece of writing.	
	WP4. I can have good control of grammar.	

APPENDIX B

Table 8. Indicator loadings

	ATC	EM	IM	IWP	IWT	SE	SF	SR	UT	WP
ATC1	0.842									
ATC2	0.860									
ATC3	0.828									
ATC4	0.852									
EM1		0.692								
EM2		0.750								
EM3		0.439								
EM4		0.666								
IM1			0.707							
IM2			0.691							
IM3			0.762							
IM4			0.776							
IWP1				0.682						
IWP2				0.809						
IWP3				0.801						
IWP4				0.849						
IWP5				0.654						
IWT1					0.882					
IWT2					0.808					
IWT3					0.883					
IWT4					0.808					
SE1						0.799				
SE2						0.630				
SE3						0.777				
SE4						0.841				
SF1							0.725			
SF2							0.760			
SF3							0.594			
SF4							0.733			
SF5							0.746			
SR1								0.822		
SR2								0.751		
SR3								0.792		
SR4								0.738		
UT1									0.811	

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Table 8. Continued

	ATC	EM	IM	IWP	IWT	SE	SF	SR	UT	WP
UT2									0.818	
UT3									0.862	
UT4									0.834	
WP1										0.878
WP2										0.878
WP3										0.638
WP4										0.902
Significant level	≥ .40 (Hulland, 1999, as cited in Hair Jr. et al., 2017)									

Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

APPENDIX C

Table 9. Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
ATC	0.869	0.877	0.91	0.717
EM	0.539	0.554	0.742	0.421
IWP	0.817	0.827	0.873	0.582
IWT	0.868	0.87	0.91	0.717
IM	0.715	0.715	0.824	0.54
SE	0.759	0.764	0.849	0.587
SF	0.758	0.772	0.837	0.51
SR	0.781	0.787	0.858	0.603
UT	0.851	0.859	0.899	0.691
WP	0.845	0.868	0.898	0.691

Note. UT = use of technology; WP = writing performance; SF = self-reflection; SR = self-regulation; IM = intrinsic motivation; SE = self-efficacy; IWT = interaction with the teacher; IWP = interaction with peers; ATC = attitude in the course.

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