

AI-Supported Collaborative Learning to Reduce EFL College Students' Anxiety in Story Writing

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Abstract

In traditional collaborative learning, English as a Foreign Language (EFL) students with similar levels of foreign language writing anxiety (FLWA) frequently showed limited knowledge organization and teamwork effectiveness. This study proposed AI-supported collaborative learning to reduce EFL college students' FLWA in story writing. The 36 students participated, with one class receiving AI-supported collaborative learning (the experimental group) and the other receiving traditional collaborative learning (the control group). Data were from pre- and post-FLWA scales and story-writing tests. Results revealed that the experimental group reported significantly lower FLWA and higher story writing proficiency than the control group. Different from traditional collaborative learning, AI-supported collaborative learning provided automated feedback (story chain, grammar check, word choice, and evaluation) that helped the students overcome challenges (e.g., idea generation, storyline organization, and lexical usage). This AI support, with positive feedback

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among peers, initiated positive emotional responses. Under the broaden-and-build theory, these positive emotions broadened the students' thoughts, built knowledge, and ultimately reduced FLWA and improved English story writing.

Keywords: AI-supported collaborative learning, broaden-and-build theory, college students, English story writing, foreign language writing anxiety

Study Background

English story writing competency is crucial for college students in their future careers, as stories are widely used in marketing to attract customers' attention (Ahmad et al., 2020). Story writing refers to narrating fictional or non-fictional events, requiring various elements (e.g., characterization, plot organization, and dialogue) (Vaezi & Rezaei, 2018). Given its complexity, many English as a Foreign Language (EFL) college students frequently experience foreign language writing anxiety (FLWA), defined as negative emotions triggered in writing contexts (Horwitz, 2017; Lai & Yang, 2024). FLWA is commonly provoked by fears of negative evaluations, grammatical concerns, and low self-confidence, which hinders writing development (Prasetyaningrum et al., 2021).

The broaden-and-build theory (Fredrickson, 2001), a key model of positive psychology, suggests the role of positive emotions in counteracting negative emotions. Positive emotions, defined as positive emotional responses to events, are signals initiating a cascade of optimal behaviors. That is, positive emotions broaden thoughts and actions, build personal knowledge, and ultimately undo negative emotions (Fredrickson, 2001). In educational settings, positive emotions are shaped by learning environments, and collaborative learning is encouraged, as social interactions can be predictors of happiness (Volet et al., 2019). However, the benefits of collaborative learning may be hindered, particularly when anxious students work together because they tend to demonstrate limited idea organization and generation (Ye & Zhou, 2022).

Generative AI can serve as knowledgeable scaffolding to help anxious students collaboratively address challenges by analyzing learning processes and providing automated feedback (Shadiev & Feng, 2024). Nevertheless, limited research has examined the effects of AI-supported collaborative learning on emotions and outcomes (Yan, 2024), and further investigation is required (Jin et al., 2021). Thus, this study investigated the effects of AI-supported collaborative learning on EFL college students' FLWA and story writing proficiency. The following research questions were addressed:

1. What were the effects of AI-supported collaborative learning on students' FLWA?

2. What were the effects of AI-supported collaborative learning on students' story writing proficiency?

Methods

This 14-week study (three hours per week) involved 36 EFL students (CEFR B1), aged 20–22, from an elective story writing course at a university in central Taiwan. Two classes were randomly assigned to the experimental and control groups. Data were collected through the FLWA scale and story-writing test in weeks 1 and 14. The FLWA scale (Cronbach's $\alpha = .88$), adapted from Cheng (2004), incorporated seven items for somatic anxiety (physiological reactions), seven items for avoidance behavior (writing avoidance), and eight items for cognitive anxiety (mental perceptions). The story-writing test, adapted from Lai (2011), consisted of four pictures for story writing. Before instructions, both groups shared similar levels of FLWA ($Z = -1.928$, $p = .054$) and writing proficiency ($Z = -.749$, $p = .454$). Instructions started from weeks 2 to 13. Both groups first received five-week lectures on story components. Then, the experimental group received AI-supported collaborative learning, while the control group received traditional collaborative learning for the last seven weeks.

AI-supported collaborative learning (see Figure 1) was designed based on the broaden-and-build theory (Fredrickson, 2001). The in-house story writing system features four functionalities: Story Chain (idea generation), Grammar Check (detection of grammatical errors), Word Choice (recommendations for vocabulary precision), and Story Evaluation (positive feedback on five story components). It also allows for peer review. The four instructional stages are described below.

- **Stage 1 (3 weeks):** Students co-wrote English stories. For example, G3 drafted, *"... Difference between the little boy and his sisters, wasn't only these, when they grow up, his sister wants to move out of the countryside ..."* During drafting, they received AI support. For example, Grammar Check provided instant feedback: *"Clarify what 'these' refers to. Ensure tense consistency: 'wants to' should be 'wanted'...."*
- **Stage 2 (1 week):** Students conducted peer reviews to exchange positive feedback based on three criteria: specific (areas of strength), understandable (actions for improvement), and achievable (goals). For example, *"Narrations were clear [specific]. You can try to add more dialogue [understandable] to make the story more vivid! [achievable]"* (S13).

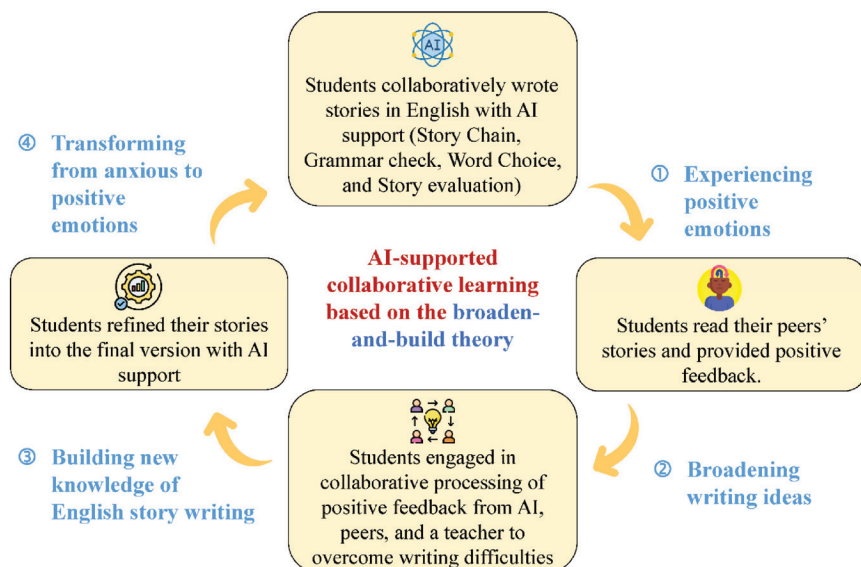


Figure 1. AI-Supported collaborative learning.

- **Stage 3 (1 week):** Students co-processed positive feedback from AI, peers, and the teacher, as S6 noted, *“Peers’ comments enhance my confidence. Besides, AI helps us generate ideas and check grammar, reducing my fear of making errors during writing.”*
- **Stage 4 (2 weeks):** Students refined their stories based on feedback. For example, G3 improved their story by adding dialogues and correcting grammatical errors:
“...These were not the only differences between the children. When they grew up, the girl wanted to move out of the countryside. ... ‘You are just a girl. You are just dreaming for something that you are not deserved!’ the father shouted. ...”

The control group followed the same four-stage sequence and educational content. However, they wrote and revised stories through group discussions without AI and positive feedback support.

Results

The Wilcoxon signed-rank test was used due to non-normally distributed data and a small sample size ($n < 30$) to ensure statistical robustness (Orcan, 2020). Table 1 shows the experimental group greatly reduced FLWA and

Table 1. College students’ FLWA and story writing proficiency before and after instructions

Groups	Factors	n	Pre-test		Past-test		Wilcoxon Signed-rank Test		
			M	SD	M	SD	Z	p	Cohen's d
Exp.	Somatic anxiety	16	21.19	6.23	14.13	5.68	−3.07	.002**	.77
	Avoidance Behaviour	16	20.81	5.39	16.19	4.97	−3.05	.002**	.76
	Cognitive anxiety	16	28.00	7.01	20.00	5.38	−3.52	<.001***	.88
	Overall FLWA	16	70.00	15.86	50.31	12.50	−3.41	.001**	.85
	Overall story writing proficiency	16	12.13	1.41	15.56	2.37	−3.31	.001**	.83
Con.	Somatic anxiety	20	21.25	4.83	20.70	4.91	−.60	.552	.13
	Avoidance Behaviour	20	19.25	2.22	18.85	3.54	−.49	.623	.11
	Cognitive anxiety	20	24.15	2.46	24.35	2.13	−.40	.688	.09
	Overall FLWA	20	64.65	6.82	63.90	6.59	−1.22	.221	.27
	Overall story writing proficiency	20	11.85	1.53	12.35	2.30	−1.32	.189	.29

Note. Exp. = experimental group; Con. = control group **p* < .05, ***p* < .01, ****p* < .001 (two-tailed test).

improved writing proficiency, with moderate ($d \geq .5$) and large effect sizes ($d \geq .8$) observed. Contrarily, the control group showed no significant change. Moreover, the experimental group reported significantly lower FLWA ($Z = -3.236, p = .001^*$) and higher writing proficiency ($Z = -3.757, p < .001^{***}$) than the control group.

Discussion and Conclusion

In AI-supported collaborative learning, the students received support with idea generation, grammar checking, and word suggestions. This AI support reduced the students’ fear of making mistakes, further facilitating positive emotions, such as confidence. Positive feedback also lessened their fears of negative social evaluation. These findings aligned with the broaden-and-build theory (Fredrickson, 2001), highlighting positive emotions could broaden ideas, build knowledge, and transform negative into positive emotional states. Contrarily, the control group lacked AI and positive feedback support, faced emotional challenges, and remained fearful of social judgment. This study

suggests that instructors incorporate AI tools and positive feedback to create supportive collaborative environments that reduce FLWA and enhance story writing proficiency.

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