

Effects of Blended Learning on Student Engagement Among University EFL Students in China

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Abstract

This study investigated the effects of blended learning on student engagement among university EFL students in China. Using a quasi-experimental pretest-posttest design, the study involved 106 second-year non-English majors from two intact classes at a public university in Hubei Province. Over 12 weeks, one class (EG) studied through blended learning, while the other class (CG) followed traditional face-to-face instruction. Student engagement was assessed across four dimensions: behavioral, cognitive, emotional, and agentic engagement. Paired-samples t-tests, an independent-samples t-test and MANCOVA were employed to analyze the data. The results showed significant increases in overall student engagement from pretest to posttest in both groups. At posttest, the experimental group demonstrated significantly higher student engagement than the control group. After controlling for the pretest scores, MANCOVA revealed a significant multivariate group effect across the four engagement dimensions. Follow-up analyses indicated significantly higher behavioral and agentic engagement in the blended learning group, whereas cognitive and emotional engagement did

not differ significantly between the groups. These findings indicate that blended learning can support university EFL students' engagement, particularly their behavioral participation and proactive contribution to learning.

Keywords: blended learning, student engagement, behavioral engagement, agentic engagement, EFL

1. Introduction

1.1 Background of the Study

Student engagement (SE) is a key indicator of effective learning in higher education, as it reflects how actively students take part in learning and how much effort they devote to it. In EFL education, engagement is particularly important because language development requires sustained effort over time, and active participation in the learning environment (Li & Li, 2022a). Student engagement is also linked to learning persistence, academic achievement, and course satisfaction (Huang et al., 2022). In Chinese higher education, however, promoting student engagement in EFL classrooms faces challenges. Chinese college English instruction has relied heavily on teacher-centered lectures and rote memorization, which lead to low levels of student participation and motivation (Zhao et al., 2023). Student engagement does not occur automatically but depends on specific learning conditions and instructional support, including opportunities for peer interaction, collaboration, and learner autonomy (Huang & Kuang, 2024). Moreover, within China's educational culture, teacher support and active presence play a decisive role in students' active behaviors in learning (Li et al., 2026). Therefore, establishing a supportive, interactive, and structured learning environment is important for fostering student engagement.

Blended learning is considered a promising teaching approach in education. However, its effect on student engagement is inconsistent. Cao's (2023) meta-analysis of Chinese samples reported that blended learning did not show a significant superiority over non-blended learning in promoting student engagement. This suggests that simply adding online learning components to a course does not necessarily improve student engagement. Students' engagement may vary across different learning modes, activities, and engagement dimensions (Huang et al., 2022; Tran et al., 2026). When online and classroom activities are closely connected and appropriate support is provided, students may participate more actively in learning (Tran et al., 2026). The effectiveness of BL may depend on the design of learning activities, the support provided by teachers, and students' ability to regulate their own learning (Ngo, 2026).

Student engagement is a multidimensional construct, including different ways in which learners actively participate, invest psychologically, and respond emotionally to learning (Li & Li, 2022a; Tran et al., 2026). Most EFL studies have focused on the traditional behavioral, cognitive, and emotional dimensions, while agentic engagement has received comparatively less empirical attention (Myagmarkhorloo & Habók, 2026; Samaila et al., 2025). Agentic engagement refers to students' constructive contribution to the teaching process through expressing preferences, raising questions, and communicating their learning needs (Reeve,

2013). A recent systematic review in higher education reported that agentic engagement was examined in only 24% of the included studies, substantially less often than behavioral (88%) and cognitive engagement (76%) (Myagmarkhorloo & Habók, 2026). This imbalance highlights the need to consider agentic engagement alongside other engagement dimensions in the present blended learning study.

Understanding how BL influences different aspects of student engagement remains important in university EFL contexts. Although recent Chinese EFL studies have examined student engagement in blended environments, many of these studies have focused on instructional and support-related factors within blended learning environments (Huang & Kuang, 2024; Li et al., 2026). Evidence on the direct effects of blended learning across behavioral, cognitive, emotional, and agentic engagement remains limited. Consequently, this study used a quasi-experimental pretest-posttest design to assess the four dimensions described above.

1.2 Objectives of the Study

The present study aimed to examine how blended learning instruction influences overall student engagement among university EFL learners. More specifically, instead of looking at engagement as a single concept, this research investigated the impact of the blended approach across four distinct dimensions: behavioral, cognitive, emotional, and agentic engagement.

1.3 Hypotheses

The null hypotheses were tested as follows:

H01a There is no significant difference in student engagement between pre-test and post-test scores within the experimental group (EG).

H01b There is no significant difference in student engagement between pre-test and post-test scores within the control group (CG).

H02 There is no significant difference in post-test overall student engagement between the experimental and control groups.

H03 There is no significant difference in post-test behavioral, cognitive, emotional, and agentic engagement between the experimental and control groups when controlling for pre-test scores.

1.4 Scope and Limitations of the Study

This study focuses on the impact of blended learning on student engagement among university EFL students at one public university in Hubei Province, China. A total of 106 second-year arts-major students from two intact classes took part in the study. One class was taught through a BL approach, whereas the other followed traditional face-to-face classroom instruction.

Here are some limitations to consider when interpreting the research results. As the existing university timetable did not allow students to be randomly assigned, the study adopted a quasi-experimental design based on two intact classes. This means that some differences between the two groups may have already existed before the intervention. To reduce this concern, baseline

equivalence was examined and the relevant pretest scores were controlled statistically. In addition, all participants came from the same university and were arts majors. Consequently, the findings may not be directly applicable to students at other institutions or in different academic disciplines. As the intervention lasted for 12 weeks, this study did not investigate whether changes in student engagement persisted beyond the intervention period.

2. Theoretical Framework

Self-Determination Theory (SDT) offers a comprehensive explanation of human needs, motivation, and well-being within social and cultural contexts (Ryan & Deci, 2017; 2020). SDT proposes three basic psychological needs: autonomy, relatedness, and competence. When these three needs are met, individuals experience a greater sense of psychological fulfilment; conversely, when needs remain unsatisfied, they feel isolated and discouraged (Ryan & Deci, 2017; 2020; Chiu, 2022). In the field of education, the satisfaction of these psychological needs can support students' motivation and engagement in learning (Ryan & Deci, 2017, 2020).

Students are more likely to actively engage in learning when they perceive a sense of choice, feel capable of meeting learning demands, and establish meaningful connections with others (Reeve, 2013). These conditions are particularly relevant to blended learning, as it offers

diverse ways to support students' psychological needs. Flexible and self-paced learning can provide greater opportunities for autonomy. Competence can be supported by teacher guidance, feedback, and scaffolding. Relatedness can be developed through interaction and collaboration with teachers and peers.

Recent evidence suggests that teacher and digital support can foster engagement by helping satisfy students' three psychological needs. In blended EFL learning, digital teacher support has been shown to enhance student engagement both directly and indirectly through basic psychological needs satisfaction (Li et al., 2026). Teacher autonomy support and digital relatedness support have been linked to stronger agentic engagement, while digital competence and relatedness support have been connected with emotional engagement in BL environments at universities (Kok et al., 2025). These findings suggest that students may be more engaged in blended learning when their needs for autonomy, competence, and relatedness are adequately supported.

Based on the conceptual framework of multidimensional engagement proposed by Reeve (2013), student engagement in this study encompasses behavioral, cognitive, emotional, and agentic engagement. Although interrelated, these dimensions represent conceptually distinct forms of engagement (Reeve, 2013). In this study, SDT is used to explain how blended learning may influence student engagement through support for students' psychological needs. Reeve's four-dimensional framework provides the basis for examining these effects in terms of behavioral, cognitive, emotional, and agentic engagement.

3. Method

A quantitative approach was adopted in this study, using a quasi-experimental non-equivalent control group pretest-posttest design. Student engagement was measured before and after the intervention, allowing changes over time to be examined alongside differences between the two instructional conditions. This design was considered suitable for the university context of the study because the existing class structure had to be retained.

3.1 Population and Sampling

The study selected non-English-major EFL students from one university in Hubei Province, China. Using purposive sampling, 106 sophomores were recruited from two intact classes with the same academic year and English proficiency level. Random assignment of participants was not possible because of institutional constraints, and group allocation was determined through coin flipping. The experimental group ($n=56$) received blended learning instruction supported by Superstar Learning (LMS in China), and the control group ($n=50$) received conventional instruction as usual. Both groups received instruction from the same instructor, using the same textbook materials throughout the 12-week intervention.

3.2 Instrumentation

To collect data on student engagement (SE), a 19-item Likert-scale questionnaire was employed to measure participants' engagement in this study. The student engagement questionnaire was based on Reeve's (2013) four-dimensional framework, and can be divided into four subscales, each corresponding to one dimension of SE. These 19 items include behavioral engagement (BE) Items 1-5, cognitive engagement (CE) Items 6-9, emotional engagement (EE) Items 10-14, and agentic engagement (AE) Items 15-19. The items for behavioral and emotional engagement were adapted from Skinner et al. (2009), cognitive dimension was adapted from Wolters (2004), and agentic engagement was measured using items from Reeve's (2013) Agentic Engagement Scale, which assesses students' proactive efforts to express their learning needs.

All items were rated from 1 (strongly disagree) to 7 (strongly agree). The same questionnaire was used as both the pretest and the posttest, and was administered separately before and after the intervention. Considering the clarity and accessibility of the questionnaire, the original English questionnaire was translated into Chinese. The researcher followed the back-translation procedure to ensure that the items were accurate and equivalent to those in the original version. The reliability of the questionnaire was supported by Cronbach's alpha ($\alpha=.960$), indicating high internal consistency. The reliability coefficients for the four subscales were also satisfactory, with .918 for behavioral engagement, .950 for cognitive engagement, .928 for emotional engagement, and .898 for agentic engagement.

3.3 Research Design

The study adopted a non-equivalent control group pretest-posttest design. Before the intervention, both groups completed the student engagement questionnaire to establish their initial engagement levels. During the intervention, the experimental group received blended

learning instruction integrating face-to-face teaching with activities supported by the Superstar Learning platform, whereas the control group received traditional face-to-face instruction. To maintain consistency across the two conditions, both groups were taught by the same instructor and used the same teaching materials. At the end of the intervention, the student engagement questionnaire was distributed again to the two groups to assess changes in engagement.

During the 12-week intervention, the blended learning in the experimental group followed a cycle including pre-class preparation, in-class interaction, and post-class follow-up. Before class, students viewed short learning materials and completed preparation tasks such as vocabulary study, short video-based materials and guiding tasks. During class, students were organized in collaborative reading activities, including pair or group discussion, timed reading, vocabulary consolidation, text analysis, and teacher- or peer-supported reading tasks. After class, students completed follow-up activities through Superstar Learning, such as short quizzes, written assignments, or reflective discussion. The proportion of online and face-to-face activity varied slightly across teaching units, with face-to-face instruction remaining the main component. In contrast, the control group relied mainly on teacher-led explanation, textbook reading, paper-based exercises, and oral sharing.

4. Results

Prior to hypothesis testing, baseline engagement scores were compared between the two groups. No significant pretest difference was found in overall student engagement, indicating comparable initial engagement levels. To test the hypotheses, the analysis was conducted in three stages.

First, paired-samples *t*-tests were used to examine changes in overall student engagement from pre-test to post-test separately within each group. As shown in Table 1, student engagement in EG increased from the pre-test ($M = 4.21$, $SD = 0.86$) to the post-test ($M = 5.27$, $SD = 0.62$). The increase was statistically significant, $t(55) = -7.57$, $p < .001$. Therefore, $H01a$ was rejected.

Similarly, CG showed a significant increase in student engagement from the pre-test ($M = 4.29$, $SD = 0.76$) to the post-test ($M = 4.94$, $SD = 0.59$), $t(49) = -4.87$, $p < .001$. Thus, $H01b$

was rejected. Student engagement increased significantly from pretest to posttest in both groups, and the experimental group showed a larger mean increase than the control group.

Table 1. Paired Samples T-tests of Student Engagement within Groups

Group	M pre (SD)	M post (SD)	<i>t</i>	df	<i>p</i>
EG	4.21 (0.86)	5.27 (0.62)	-7.57	55	< .001
CG	4.29 (0.76)	4.94 (0.59)	-4.87	49	< .001

Second, an independent-samples t-test was conducted to compare post-test overall student engagement scores between EG and CG. Prior to interpreting the t-test, Levene's test for equality of variances was examined. The result was not statistically significant ($F=.073$, $p = .788$), indicating that the assumption of homogeneity of variance was satisfied. According to Table 2, the experimental group ($M = 5.27$, $SD = 0.62$) had significantly higher post-test student engagement scores than the control group ($M = 4.94$, $SD = 0.59$), $t(104) = 2.81$, $p = .006$. Cohen's d was 0.55, indicating a moderate effect size. Thus, H02 was rejected, indicating a significant difference in post-test overall student engagement between the experimental and control groups.

Table 2. Independent Samples T-test of Student Engagement Post-tests between Groups

Group	M	SD	t	df	<i>p</i>
EG	5.27	0.62	2.81	104	.006
CG	4.94	0.59			

Finally, one-way MANCOVA was conducted to examine the effect of group on the four dimensions of post-test student engagement while controlling for the corresponding pre-test engagement scores. Before running the MANCOVA, preliminary checks confirmed that there was no substantial violations of the assumptions. Equality of covariance matrices was supported by Box's M test ($M = 14.04$, $p = .199$). Levene's tests further confirmed that error variances were comparable across groups for all four engagement dimensions ($ps > .05$). None of the group $\times$ pretest interactions reached statistical significance (see Table 3), supporting the homogeneity of regression slopes.

Table 3. Homogeneity of Regression Slopes

Post-test DV	Interaction	<i>F</i>	<i>p</i>
BE	Group $\times$ BE pre	0.404	.527
CE	Group $\times$ CE pre	0.860	.356
EE	Group $\times$ EE pre	0.162	.688
AE	Group $\times$ AE pre	0.465	.497

As presented in Table 4, after controlling for pre-test behavioral, cognitive, emotional, and

agentic engagement, there was a statistically significant multivariate effect of group on the combined post-test engagement dimensions, Pillai's Trace = .105, $F(4, 97) = 2.835$, $p = .029$, partial $\eta^2 = .105$, indicating a moderate multivariate effect.

Table 4. Multivariate Effect of Group on Post-test SE

Effect Pillai's Trace	F	Hypothesis df	Error df	p	Partial η^2
Group.105	2.835	4	97	.029	.105

Table 5 shows the follow-up univariate tests for each dimension of SE, indicating significant group effects on behavioral engagement (BE), $F(1, 100) = 5.102$, $p = .026$, partial $\eta^2 = .049$, and agentic engagement (AE), $F(1, 100) = 8.547$, $p = .004$, partial $\eta^2 = .079$. In contrast, no significant group effects were found for cognitive engagement (CE), $F(1, 100) = 1.242$, $p = .268$, partial $\eta^2 = .012$, or emotional engagement (EE), $F(1, 100) = 1.385$, $p = .242$, partial $\eta^2 = .014$. Accordingly, H03 was rejected at the multivariate level, with the overall group effect primarily reflected in behavioral and agentic engagement.

Table 5. Follow-up Univariate Results for the Four Dimensions of SE

Dimension	$F(1, 100)$	p	Partial η^2	Result
BE	5.102	.026	.049	Significant
CE	1.242	.268	.012	Not significant
EE	1.385	.242	.014	Not significant
AE	8.547	.004	.079	Significant

5. Discussion

The findings indicate that blended learning positively influenced overall student engagement among university EFL students. Similar results have been reported in earlier studies, where students showed greater student engagement in blended learning (He & Said, 2023; Zhao et al., 2023). Nevertheless, evidence regarding its impact on engagement remains mixed. Cao (2023) found that students in blended learning settings did not show significantly higher engagement than those receiving non-blended learning among Chinese students. These mixed findings suggest that the effects of blended learning on student engagement may depend on how its online and face-to-face components are designed and integrated.

5.1 Behavioral and Agentic Engagement

The significant group differences in behavioral engagement suggest that this dimension responded particularly well to the participatory opportunities provided by the blended learning design. Zhao et al. (2023) reported that the integration of PBL within a blended EFL

course successfully extends students' study time beyond the classroom, and boosts their active behavioral participation during face-to-face sessions. Similar results in behavioral engagement have also been reported in flipped learning settings (Li & Li, 2022b; Samaila & Al-Samarraie, 2024; Samaila et al., 2025). De Vega et al. (2023) similarly found high levels of active participation and sustained engagement in mobile-supported blended learning. In the present study, repeated learning opportunities before, during, and after class may have encouraged students not only to participate more consistently but also to take greater initiative in their learning.

Agentic engagement also showed a significant improvement in the blended learning group. This result is consistent with Samaila et al. (2025), who reported greater agentic engagement in a guided flipped learning model with pre-class preparation and interactive in-class activities. Similarly, previous studies found links between behavioral engagement and agentic engagement in blended and flipped learning contexts (Samaila & Al-Samarraie, 2024). When students actively complete pre-class preparation and participate in classroom activities, they may develop greater confidence to express their interests, communicate their learning needs, and provide feedback or suggestions during the learning process. Kok et al. (2025) further found that teacher autonomy support and digital relatedness support were linked to agentic engagement in blended higher education. Therefore, blended learning may strengthen both students' visible participation and their willingness to contribute to the learning process.

5.2 Cognitive and Emotional Engagement

In contrast, cognitive and emotional engagement did not show significant between-group differences. Cognitive engagement is characterized by persistent cognitive effort, self-directed regulation, and strategic approaches to learning. Huang et al. (2022) found that task autonomy was associated with cognitive engagement across different blended learning activities, suggesting that opportunities for greater learner control may be particularly relevant to students' cognitive involvement. Students' readiness for self-regulation may influence how effectively they engage with autonomous pre-class tasks. Ngo (2026) suggests that a lack of independent learning habits may contribute to cognitive overload and task avoidance, especially for low-proficiency students.

The non-significant difference in emotional engagement is consistent with previous EFL research, in which emotional engagement showed fewer improvements than other dimensions (Li & Li, 2022b; He & Said, 2023). Previous studies have reported that students may experience boredom, anxiety, or frustration when they face technological difficulties, repetitive online tasks and limited feedback (Li & Li, 2022b; Tran et al., 2026). Emotional engagement in blended learning appears to be conditional on how learning activities are designed and supported.

5.3 Implications for BL design

The effects of blended learning on student engagement may be dimension-specific rather than uniform. Behavioral and agentic engagement appeared more responsive to participation and interaction, and opportunities for learner initiative, whereas cognitive and emotional engagement may be more sensitive to task characteristics, learner readiness, and individual experience (Li & Li, 2022b; Tran et al., 2026). In practice, pre-class preparation can be kept focused and clearly connected to in-class tasks, while classroom activities can provide regular opportunities for discussion, collaboration, questioning, and student input. Moreover, blended learning design may need to pay greater attention to the quality and manageability of learning tasks, the level of guidance provided, and the support available to students during independent learning. These considerations are especially important for EFL learners who vary in proficiency, self-regulation, and confidence. English teachers need to align different learning activities with the particular forms of engagement they intend to support rather than expecting one instructional feature to improve all aspects of engagement equally.

6. Conclusion

This study suggests that student engagement in blended EFL learning is multidimensional and does not necessarily respond uniformly to the same instructional design. Behavioral and agentic engagement appeared more responsive to the blended learning intervention, whereas cognitive and emotional engagement showed less pronounced between-group differences. These findings highlight the importance of examining student engagement as a multidimensional construct rather than as a single overall outcome.

For EFL teachers, these findings highlight the importance of treating student engagement as multidimensional when designing blended instruction. Different dimensions may require different forms of support. From an SDT perspective, such features may be interpreted as potentially supportive of autonomy, competence, and relatedness, although these mechanisms were not directly tested in the present study. Future research could examine whether similar dimension-specific patterns emerge across different learner groups and blended learning contexts, directly investigate possible explanatory mechanisms such as basic psychological needs, and further validate the four-dimensional factor structure of the engagement instrument using larger samples.

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