

Enhancing English Reading Comprehension Through Flipped Learning: A Mixed-Methods Study Among Thai University Students

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Abstract

This article aimed to (1) investigate the impact of flipped learning on the English reading comprehension skills of first-year Thai undergraduate students and (2) explore their perceptions of flipped learning to derive practical insights for EFL instruction. Conducted over eight weeks in an “English for Academic Purposes” course at a Thai public university, the study involved 169 students. The experimental group accessed pre-class videos and readings and engaged in task-based in-class activities, while the control group received traditional lectures. Data were collected through reading comprehension pre- and post-tests and semi-structured interviews. The research instruments were (1) pre- and post-tests of English reading comprehension and (2) semi-structured interviews. The research findings revealed that (1) flipped learning significantly enhanced students’ English reading comprehension, as evidenced by the experimental group’s higher post-test scores ($M = 33.78$, $SD = 4.61$) compared to the control group; and (2) students held positive perceptions of the flipped model, citing increased engagement, motivation, collaboration, and critical thinking, which they attributed to its interactive and self-paced nature. These results demonstrate the pedagogical benefits of flipped learning in EFL contexts and offer practical guidance for its classroom implementation.

Keywords: Flipped Learning; Learner engagement; EFL; Thai University Students; Reading Comprehension; Mixed-Methods

Introduction

The flipped classroom shifts foundational content to pre-class learning and uses class time for interactive, cognitively engaging activities (Han & Klein, 2019). It redefines traditional instruction by leveraging digital tools such as video lectures and readings to prepare students

beforehand, thereby allowing class sessions to focus on deeper exploration through discussion, problem-solving, and applied tasks. This approach promotes higher-order thinking, supports self-paced, differentiated learning, and positions the teacher as a facilitator rather than a sole content provider (Zain et al., 2022), promoting higher-order thinking and self-paced learning (Irianti et al., 2022).

In language education, flipped learning enhances engagement, interaction, autonomy, and peer revision, especially in writing (Challob, 2021). It encourages student-centred interaction and peer-driven revision processes that are crucial for language development. However, most studies focus on short-term results in Western settings, with long-term language proficiency effects underexplored—particularly in Thailand, where teacher-centred methods limit interactivity.

This study fills the gap by examining flipped learning’s impact on English reading comprehension among first-year Thai undergraduate students, also exploring student perceptions to inform effective practice.

● **Research Objective:**

1. To investigate the impact of flipped learning on the English reading comprehension skills of first-year Thai undergraduate students.
2. To explore students' perceptions of flipped learning and derive practical insights for improving its implementation in EFL reading instruction.

Literature Review

English as a Foreign Language (EFL) instruction in higher education is shifting toward student-centred approaches to better support engagement and critical skills. Reading comprehension remains a key focus, yet traditional methods often fail to foster deep cognitive processing. In response, flipped learning has emerged as a promising model, offering increased interactivity and learner autonomy. The following sections examine its theoretical basis, benefits, and relevance to EFL reading instruction in the Thai context.

1. Traditional vs. Innovative Pedagogies

Traditional lecture-based methods in higher education often limit student engagement and hinder the development of critical thinking and problem-solving skills (Bhuttah et al., 2024; Shreeve, 2008). To address these limitations, educators have increasingly adopted

student-centred strategies such as flipped learning, which promotes active participation and learner autonomy (Alarifi, 2023).

2. Flipped Learning: Benefits and Application

Flipped learning reverses the traditional model by assigning content review—via videos or readings—before class, and using classroom time for application-based tasks (Amiryousefi, 2019). This approach transforms the teacher into a learning facilitator, fostering autonomy, critical analysis (Goksu & Duran, 2020), collaboration (Voss & Kostka, 2019), and self-regulation (Ahmad Uzir et al., 2020). It is particularly effective for language education, where students benefit from engaging with materials both independently and interactively.

3. Learner Perceptions and Engagement

Students' perceptions are crucial to flipped learning's effectiveness. Studies have shown that learners value the model's flexibility and reported increased confidence, motivation, and ownership of learning (Birgili et al., 2021; Tsai, 2021). Pre-class preparation strengthens participation and cognitive engagement (Zainuddin, 2018), especially in reading-focused tasks, where students demonstrate greater readiness for real-time analysis (Sosa-Díaz et al., 2021).

4. Flipped Learning and Reading Comprehension

Reading comprehension, central to EFL success, is particularly suited to the flipped model. It allows students to engage with texts beforehand and apply strategies through discussion and problem-solving during class (Bean & Melzer, 2021). The structured nature of reading tasks also aligns well with the flipped format, making it measurable and impactful.

5. Evidence from EFL Contexts

Research in EFL contexts supports flipped learning's effectiveness. Nja (2022) reported a 15% gain in reading comprehension scores; Samiei and Ebadi (2021) observed significant improvements; and Zou (2022) highlighted enhanced analytical skills. Yet, most studies focus on general language outcomes and are concentrated in Western or non-Thai settings.

6. Research Gaps and Rationale

Three main gaps persist: (1) limited research on flipped learning in Thai EFL contexts; (2) few studies focused exclusively on reading comprehension; and (3) a lack of qualitative insights into student perceptions. This study addresses these gaps by investigating how flipped learning affects Thai university students' reading comprehension and cognitive engagement, combining quantitative and qualitative perspectives.

Research Methodology

1. Population and Samples

This study involved 169 first-year undergraduate students from a Thai public university, proportionally selected from the humanities, sciences, and social sciences using Taro Yamane's formula. All participants met the university's English placement criteria (60–80%), indicating basic to intermediate proficiency, and were randomly assigned to equally sized control and experimental groups.

The experimental group underwent an eight-week flipped learning intervention, attending two 90-minute sessions per week. Pre-class materials included video lectures and exercises targeting core reading skills (e.g., skimming, scanning, inference, and vocabulary). In-class sessions emphasised collaborative tasks such as discussion and problem-solving.

Ten experimental group students (5 excellent, 3 good, 2 average) participated in semi-structured interviews to provide diverse perspectives. Data collection combined quantitative (pre-/post-tests and a Likert-scale questionnaire) and qualitative (interviews) tools. Materials were delivered via a learning management system with offline access to ensure equal engagement.

2. Data Analysis

This study adopted a mixed-methods design, combining quantitative (paired t-tests, independent t-tests, and multiple regression) and qualitative (content and thematic analysis) approaches. Data triangulation linked statistical results with students' experiences, offering a nuanced understanding of the intervention's impact (Creswell, 2016).

3. Data Collection Procedures

3.1 Pre-Test and Post-Test

A pre-test showed no significant difference in baseline reading comprehension between the control ($n = 84$, $M = 22.16$, $SD = 5.67$) and experimental groups ($n = 85$, $M = 22.29$, $SD = 5.32$), indicating comparable starting levels. Post-tests were administered after each lesson to track progress, with the experimental group using flipped learning and the control group receiving traditional instruction (Cheng et al., 2019a). Each 40-point test included five CEFR-aligned texts with multiple-choice and short-answer questions assessing main idea, inference, vocabulary, and detail recognition. To ensure content validity, the test items underwent expert review using the Item-Objective Congruence (IOC) method; items scoring below 0.5 were revised or removed, and only those rated between 0.69 and 1.00 were

retained. Serving as both formative and summative assessments, these tests enabled continuous monitoring and credible evaluation of the flipped classroom's impact.

3.2 Questionnaire

To supplement test scores and explore students' cognitive and affective experiences, a 24-item post-intervention questionnaire was administered to the experimental group ($n = 85$) after the tenth lesson. The researcher-developed questionnaire was based on Nation et al.'s (2010) reading framework and Bergmann and Sams' (2012) flipped learning model, adapted for the Thai EFL university context. It assessed three domains: understanding (Items 1–8), use (Items 9–16), and intrinsic motivation (Items 17–24) related to flipped learning in English reading. Items were rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with mean scores interpreted as follows: 1.00–1.80 = very low, 1.81–2.60 = low, 2.61–3.40 = moderate, 3.41–4.20 = high, and 4.21–5.00 = very high.

Content validity was ensured through expert review using the Item-Objective Congruence (IOC) method. Items with scores below 0.5 were revised or discarded, and the final version retained only items rated between 0.67 and 1.00. The questionnaire was administered online immediately following the post-test in the eighth lesson, completed by all 85 students within 15 minutes under anonymous conditions (100% response rate). Designed to complement test results, the instrument provided insights into students' engagement with flipped learning, including how they understood and applied the method and the degree to which it fostered intrinsic motivation. These findings support the pedagogical value of flipped learning in enhancing both reading comprehension and learner autonomy. Value of the test: It provided reliable supplementary evidence of student engagement and autonomy, reinforcing the flipped model's pedagogical effectiveness.

3.3 Interviews

Semi-structured, audio-recorded interviews with 10 experimental group volunteers, representing varied performance levels, were conducted to validate and deepen questionnaire insights.

Research Result

A pre-test was administered to both groups to confirm comparable baseline English reading comprehension levels, addressing the first research objective.

Table 1 Pre-Test Results

Group	N	Mean	SD	Minimum	Maximum
Control	84	22.16	5.67	18	25
Experimental	85	22.29	5.32	19	24

In line with Objective 1, pre-test results showed no significant difference between the control ($M = 22.16$, $SD = 5.67$) and experimental groups ($M = 22.29$, $SD = 5.32$), indicating comparable baseline reading levels. This equivalence supports the validity of attributing post-test differences to the flipped learning intervention. Post-test outcomes were then examined to assess its impact (see Table 2).

Table 2 Post-Test Results

Group	N	Lesson	Mean	SD	t-value	p-value
Control	84	1	24.32	5.62	-1.797	0.001
Experimental	85		26.16	5.12		
Control	84	2	24.19	5.73	-1.591	0.03
Experimental	85		26.56	5.08		
Control	84	3	24.15	5.70	-1.480	0.01
Experimental	85		26.69	5.05		
Control	84	4	24.26	5.79	-6.293	0.02
Experimental	85		31.32	4.99		
Control	84	5	24.22	5.81	-6.446	0.01
Experimental	85		32.49	4.78		
Control	84	6	24.35	5.82	-7.306	0.001
Experimental	85		33.15	4.59		
Control	84	7	25.16	5.81	-5.307	0.04
Experimental	85		33.24	4.65		
Control	84	8	25.56	5.98	-3.126	0.005
Experimental	85		33.69	4.54		
Control	84	9	25.36	5.83	-6.613	0.003
Experimental	85		33.55	4.62		
Control	84	10	25.56	5.81		

Group	N	Lesson	Mean	SD	t-value	p-value
Experimental	85		33.78	4.61	-5.765	0.02

According to Objective 1, post-test analysis across 10 lessons revealed that the experimental (flipped learning) group progressively outperformed the control group. Initial lessons (1–3) showed modest yet significant gains (e.g., Lesson 1: $M = 26.16$ vs. 24.32 ; $t = -1.797$, $p = 0.001$), reflecting early adaptation. From Lesson 4 onwards, improvements became more substantial (e.g., Lesson 6: $M = 33.15$ vs. 24.35 ; $t = -7.306$, $p = 0.001$), continuing through Lesson 10 ($M = 33.78$ vs. 25.56 ; $t = -5.765$, $p = 0.02$). Overall, the experimental group improved by 42%, compared to 18% for the control group. These findings indicate that sustained engagement with flipped learning significantly enhanced reading comprehension, supported by qualitative feedback on improved text analysis through pre-class preparation (Cheng et al., 2019a).

Table 3 Questionnaire

To address Objective 1, students' perceptions of flipped learning in English reading comprehension were measured across three dimensions: understanding, usage, and intrinsic motivation. Only the highest-scoring and lowest-scoring items are reported.

Topic	No.	Statement	Mean	SD
Learners' Understanding of Flipped Learning English in Reading Comprehension	1.	I am familiar with the idea of active learning in the context of flipped learning in English Reading Comprehension.	3.53	.571
	2.	I understand how flipped learning can enhance my understanding of course material in English Reading Comprehension.	4.94	.183
Overall			4.49	.553
Learners' Understanding of Flipped Learning English in Reading Comprehension	3.	I actively engage in discussions and activities during in-person flipped classroom sessions in English Reading Comprehension.	5.00	.000
	4.	I use additional online resources,	4.67	.661

Topic	No.	Statement	Mean	SD
		such as readings and quizzes, to supplement my learning in English Reading Comprehension.		
	5.	I find it easy to access and navigate the online platform or learning management system used in the flipped classroom in English Reading Comprehension.	5.00	.000
Overall			4.92	.181
Learners' Intrinsic Motivation for Flipped Learning English in Reading Comprehension	18.	I am motivated to participate actively in class discussions and activities in English Reading Comprehension.	4.87	.346
	22.	I appreciate the flexibility that flipped learning offers in terms of when and where I can study in English Reading Comprehension.	5.00	.000
Overall			4.92	.185

1. Learners' Understanding of Flipped Learning

As the table above shows, students reported a high overall understanding of flipped learning in English reading ($M = 4.49$, $SD = 0.553$). They strongly agreed it enhanced comprehension ($M = 4.94$), though their familiarity with active learning was comparatively lower ($M = 3.53$), suggesting a need for further instructional support.

2. Learners' Use of Flipped Learning

Learners showed high engagement ($M = 4.92$, $SD = 0.181$), actively participating in sessions ($M = 5.00$), using online quizzes ($M = 4.67$), and finding the platform user-friendly ($M = 5.00$), indicating successful implementation.

3. Learners' Intrinsic Motivation

High intrinsic motivation was also evident ($M = 4.92$, $SD = 0.185$). Students valued flexibility ($M = 5.00$) and felt motivated to participate in discussions ($M = 4.87$), reflecting positive attitudes toward flipped learning.

Multiple Regression Analysis Results

Quantitative survey findings revealed that learners demonstrated a strong understanding of flipped learning ($M = 4.49$, $SD = 0.553$), particularly in how it enhanced reading comprehension ($M = 4.94$). However, their familiarity with active learning was relatively lower ($M = 3.53$), suggesting room for further pedagogical reinforcement. Learners actively engaged with flipped learning strategies ($M = 4.92$, $SD = 0.181$), fully participating in in-person sessions ($M = 5.00$), utilising supplementary materials such as online quizzes ($M = 4.67$), and finding the digital platform accessible ($M = 5.00$). They also reported high intrinsic motivation ($M = 4.92$, $SD = 0.185$), appreciating the flexibility of the approach ($M = 5.00$) and feeling encouraged to participate in class discussions ($M = 4.87$).

To identify key predictors of student engagement or performance, a multiple regression analysis was conducted (Table 4). Pre-class preparation ($\beta = 0.52$, $p < .001$), classroom engagement ($\beta = 0.38$, $p < .001$), and intrinsic motivation ($\beta = 0.47$, $p < .001$) emerged as significant positive predictors, underscoring the critical role of cognitive and motivational factors in the flipped classroom model. Gender (female = 1) had a modest but statistically significant effect ($\beta = 0.32$, $p = .035$), while disciplinary background (sciences vs. social sciences) showed no significant influence.

To identify key predictors of flipped learning effectiveness, a multiple regression analysis was conducted with post-test scores as the dependent variable (Table 4).

Table 4 Regression analysis results

Variable	β Coefficient	Standard Error	t-value	p-value
Intercept	15.23	2.01	7.58	< .001
Pre-class Preparation	0.52	0.09	5.78	< .001
Classroom Engagement	0.38	0.07	5.43	< .001
Intrinsic Motivation	0.47	0.11	4.27	< .001
Gender (female = 1)	0.32	0.15	2.13	0.035
Discipline (sciences)	-0.10	0.14	-0.71	0.478
Discipline (social)	0.21	0.13	1.62	0.106

Impact of Flipped Learning on Reading Comprehension: Regression Analysis

Table 5 presents the results of a regression analysis conducted to examine the impact of the flipped learning intervention on students' English reading comprehension scores. The model includes gender and academic discipline as control variables to account for potential background influences. The analysis yielded a statistically significant result ($F = 35.21$, $p < .001$), explaining 72% of the variance in post-test scores ($R^2 = 0.72$). This indicates that the flipped learning approach had a substantial effect on learners' performance after controlling for demographic factors.

Table 5 Regression Model Summary with Control Variables

Statistic	Value
F-statistic	35.21
p-value	< 0.001
R ² (Variance Explained)	0.72 (72% of the variance in scores)
Control Variables	Gender (male = 0, female = 1) Academic Discipline (humanities = 0, sciences = 1, social sciences = 2)

The regression model was significant ($F = 35.21$, $p < .001$), accounting for 72% of the variance in reading comprehension. Pre-class preparation was the strongest predictor ($\beta = 0.52$, $p < .001$), followed by intrinsic motivation ($\beta = 0.47$, $p < .001$) and classroom engagement ($\beta = 0.38$, $p < .001$), highlighting the impact of cognitive and motivational factors. Gender had a minor but significant effect ($\beta = 0.32$, $p = .035$), with female students slightly outperforming males, while academic discipline showed no significant influence. These findings emphasize the roles of preparation, engagement, and motivation in flipped learning effectiveness (Cheng et al., 2019), and suggest gender-related patterns warrant further exploration.

Standardized β Coefficients for Predictors of Reading Comprehension

Figure 1 displays standardized β coefficients for key predictors of reading comprehension: pre-class preparation ($\beta = 0.52$), intrinsic motivation ($\beta = 0.47$), and classroom engagement ($\beta = 0.38$). Pre-class preparation was the strongest predictor, highlighting the

importance of academic preparation, followed by intrinsic motivation and classroom engagement, which also contributed meaningfully to reading outcomes.

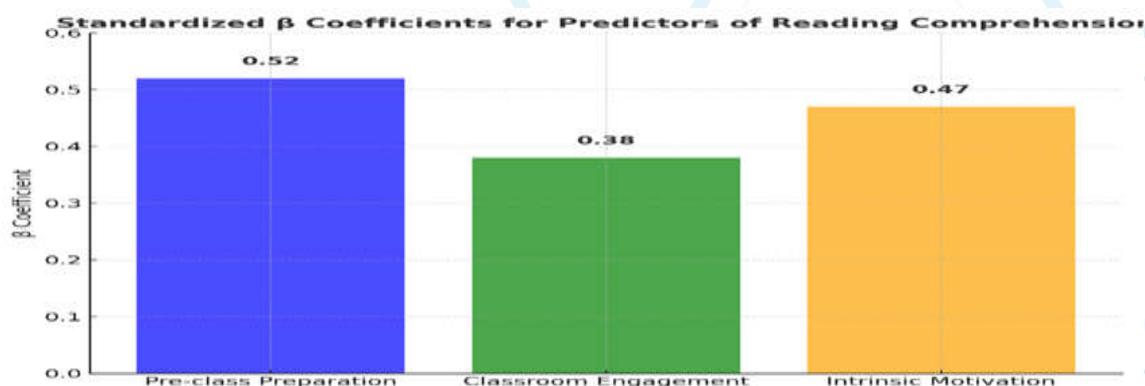


Figure 1 Visualization of Results

Insights from Regression Analysis

The regression analysis identified key predictors of student performance in flipped learning. Pre-class preparation was the strongest predictor of reading comprehension, supporting Cheng et al. (2019b) and emphasizing the need for well-designed pre-class materials. Minor gender differences suggest further research on gender-related learning preferences for equity. Enhancing intrinsic motivation and engaging in-class activities are crucial for improving flipped learning effectiveness. These findings align with the study’s objectives and inform pedagogical strategies for EFL instruction in Thai universities.

Qualitative Insights from Student Interviews

Qualitative feedback thematically analysed revealed students’ nuanced perceptions of flipped learning across four areas:

Learning Materials and Pace

Students valued the flexibility of pre-recorded lectures for personalised learning, but some struggled with self-discipline. One student said, “I liked that I could pause the video and replay difficult parts, but sometimes I left the videos until the last minute and rushed through them.”

Challenges and Suggestions

Technical issues were manageable with downloads, but students desired more real-time interaction. As one noted, “When I had questions, I had to wait until the next class. I wish there were more live Q&A sessions or chat options.” This suggests a need for hybrid support strategies.

Critical Thinking and Collaboration

Active group work and pre-class preparation enhanced critical thinking. One student shared, “Explaining the text to my group helped me realise how much I really understood. Sometimes, my friends' questions made me think in new ways.”

Comparison with Traditional Learning

Flipped learning promoted autonomy, but some missed immediate feedback. A student remarked, “In traditional classes, I could ask immediately if I didn't understand, but in the flipped class, I had to wait.” A blended approach may combine benefits of both models.

Discussion

Regarding Objective 1, flipped learning significantly improved English reading comprehension among first-year Thai undergraduates. The experimental group's post-test mean ($M = 29.87$) was significantly higher than the control group's ($M = 24.76$, $p < 0.001$), indicating that combining pre-class preparation with active in-class engagement enhances academic reading skills in EFL contexts. Regression analysis identified pre-class preparation ($\beta = 0.52$), classroom engagement ($\beta = 0.38$), and intrinsic motivation ($\beta = 0.47$) as significant predictors, aligning with Fathi and Rahimi (2022) on the role of participation and motivation and Belda (2021) on multimedia pre-tasks with peer interaction improving reading. These findings support constructivist principles emphasising scaffolding and learner autonomy (Kharroubi & ElMediouni, 2024).

The model promoted deeper engagement and critical thinking by blending pre-class tasks with in-class reflection. Students valued the flexibility to revisit materials at their own pace and appreciated the learner-centred nature of the approach. However, some reported difficulties with time management and required more structured support. While flipped learning encouraged autonomy and active engagement, the absence of real-time feedback was a recurring concern. A hybrid model integrating live Q&A sessions could enhance interaction and balance self-paced learning with instructor presence. Technical issues were mostly manageable through strategies such as pre-downloading materials, though inconsistent self-regulation remained a challenge. Notably, a minor but significant gender difference ($\beta = 0.32$, $p = 0.035$) suggests motivational or behavioural influences, highlighting the importance of equitable instructional strategies.

Regarding Objective 2, students generally viewed flipped learning positively, valuing

flexible access to materials, repeated content review, and peer collaboration, which fostered confidence and comprehension. The approach promotes learner autonomy and engagement, but challenges included time management, limited real-time support, and digital platform guidance needs. This concurs with Alghasab (2020) on flexibility enhancing satisfaction and Erbil (2020) on the necessity of structured support, while Puspitasari (2021) recommends integrating live Q&A to balance asynchronous and synchronous learning. Additionally, a minor but significant gender difference ($\beta = 0.32, p = 0.035$) suggests motivational or behavioural influences, consistent with Blume (2021) emphasising gender-sensitive approaches in digital EFL instruction.

Educators are encouraged to provide concise, goal-aligned pre-class materials and design in-class tasks that foster critical thinking and collaboration. Teacher training should emphasise multimedia content development and active learning facilitation. Institutions can support implementation by adopting low-cost platforms and ensuring live interaction opportunities. Future research should further examine the interplay of preparation, engagement, and motivation, as well as explore multivariate factors that influence flipped learning outcomes across diverse educational contexts.

New Knowledge

Flipped learning significantly enhanced EFL reading comprehension (Experimental: $M=29.87$ vs. Control: $M=24.76, *p<0.001$), with pre-class preparation ($\beta=0.52$), engagement ($\beta=0.38$), and motivation ($\beta=0.47$) as key drivers. Students reported higher critical thinking and confidence, though self-discipline and limited instructor access remained challenges.

FLIPPED LEARNING IN EFL	
<p>Positive Outcomes</p> <ul style="list-style-type: none"> • 29.87 vs. 24.76 ($p < 001$) • Critical thinking 	
<p>Key Predictors of Success</p> <ul style="list-style-type: none"> • Pre-class prep ($\beta = 0.52$) • Classroom engagement ($\beta = 0,80$) • Intrinsic motivation ($\beta = 0,47$) 	
<p>Challenges & Solutions</p> <ul style="list-style-type: none"> • Self-discipline → Structured reminders 	
<p>4-Step Implementation</p> <ul style="list-style-type: none"> • Pre-class: Videos + Scaffolding • In-class: Group discussions 	

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