

PREFACE TO THE EDITION

We are pleased to present Volume 2, Issue 4 of **International Journal of Education and Pedagogy (IJEP)**. The five articles in this issue address learner strategies, self-regulation, inclusive practice, game-based learning, and blended instruction, in studies set in Vietnam and Kerala, India.

The issue opens with a case study of reading comprehension strategy use among English-major students at a Vietnamese university. Fifty-nine students reported using strategies at a slightly above-average level, with cognitive strategies used most and social-affective strategies least.

The second article, an explanatory sequential mixed-methods study, finds that self-regulated learning is significantly and positively related to academic achievement among secondary school students in Kerala. Interviews show higher achievers planning deliberately, monitoring themselves, and persisting.

The third article explores teachers' perceptions of inclusive education in Kerala. Teachers endorsed inclusion in principle but felt underprepared. They attributed their difficulties mainly to systemic barriers and named collaboration as a key support.

The fourth contribution is a systematic review of game-based learning. It reports small-to-moderate gains in achievement and favourable effects on motivation, with outcomes depending largely on design and implementation.

The issue closes with a quasi-experimental study of blended learning among ninth-grade students. The blended group showed significantly higher achievement and engagement than the conventional group.

Together, these articles show that learning outcomes depend on both learners' own strategies and the systems and designs that support them. We hope the issue will be useful to researchers, practitioners, and policymakers.

We thank the authors, reviewers, and editorial team for their work, and we invite readers to contribute to future issues.

Dr. Renjisha R.
Chief Editor

CONTENTS

SL. NO.	TITLE	AUTHOR	PAGE NO.
1.	Reading Comprehension Strategy Use among English-Majored Students: A Case Study in a Vietnamese University	Thu Nguyen Thi Anh & Lam Thai Quang	1-8
2.	Self-Regulated Learning and Academic Achievement among Secondary School Students: An Explanatory Sequential Mixed-Methods Study	Josly Joseph	9-14
3.	Secondary School Teachers' Perceptions of Inclusive Education in Kerala, India: Challenges, Preparedness, and Support Needs	Anitha N. V	15-20
4.	Game-Based Learning and Student Outcomes: A Systematic Review of Academic Achievement, Motivation, and Implementation Factors	A. R. Sreela	21-26
5.	Learning Beyond the Classroom: Examining Achievement and Engagement in Blended Learning Environments	Sreelatha. P	27-32

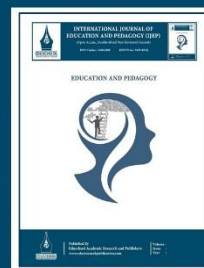


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Reading Comprehension Strategy Use among English-Major Students: A Case Study in a Vietnamese University

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Abstract

Reading comprehension plays a critical role in EFL learning, yet many learners struggle to apply strategies effectively when constructing meaning from texts. This study examines the use of reading comprehension strategies among second-year English-major students at a Vietnamese university, addressing the limited empirical evidence on strategy use in local tertiary English language education settings. It explores both the overall frequency of strategy use and students' preference for specific strategy categories. Fifty-nine English majors participated in the study. Data were collected through a 30-item questionnaire and analyzed using descriptive statistics. The results indicate that the participants used reading strategies at a slightly above-average level ($M = 3.45$). Cognitive strategies were used most frequently, followed by metacognitive strategies, whereas social-affective strategies were the least employed. These patterns suggest a strong reliance on cognitive processing, with comparatively limited engagement in collaborative or affective support mechanisms during reading. The study highlights the need for instructional practices that promote strategic awareness, reflective reading behaviors, and a more balanced use of strategy types in university-level English language learning.

Keywords:- Reading Comprehension Strategies, Cognitive Strategies, Metacognitive Strategies, Social-Affective Strategies, EFL Learners, Vietnamese Tertiary Education, English Majors.

I. INTRODUCTION

Among the four language skills, reading holds a central role in academic contexts, enabling learners to access information, engage with scholarly texts, and build disciplinary knowledge. As Wei (2005) notes, enabling students to read and comprehend texts effectively is one of the core goals of English language education. For university English majors, reading is especially significant, yet reading comprehension in a foreign language remains highly challenging. Factors such as limited vocabulary, insufficient background knowledge, and ineffective strategy use can heavily impede comprehension (Carrell & Floyd, 1987). Because reading is a cognitively demanding activity, the ability to select, apply, and regulate appropriate strategies is essential for achieving deeper levels of understanding.

In Vietnam, reading comprehension continues to be a major difficulty for many tertiary learners. Classroom instruction often remains traditional and teacher-centered, emphasizing direct vocabulary explanation and comprehension questions, which severely limits opportunities for students to develop autonomy and employ a broader range of reading strategies. Recent local studies show that Vietnamese learners tend to rely heavily on translation and individual work while significantly underusing metacognitive and social-affective strategies (Nguyen & Tran, 2021; Le & Nguyen, 2023).

Although strategy-based instruction has gained attention internationally, empirical research examining the specific strategic behaviors of English-major university students in Vietnam remains limited. Most existing studies focus on general reading proficiency rather than detailing how learners engage with academic texts at the strategic level. Understanding these specific strategic patterns can better inform instructional practices, promote greater strategic awareness, and support more effective reading behaviors in tertiary EFL programs. Accordingly, the present study examines the frequency and patterns of reading comprehension strategy use among second-year English-major students at a Vietnamese university.

II. LITERATURE REVIEW

2.1. The Nature of Reading

To fully understand how learners adopt reading strategies, it is essential to first define the nature of reading as a cognitive and linguistic process. Rather than being a passive activity, reading is a dynamic, complex, and interactive process between the reader and the text.

According to Urquhart and Weir (1998), reading is defined as the process of receiving and interpreting information encoded in language form via the medium of print. This definition highlights the decoding aspect of reading, where visual stimuli are translated into linguistic meaning. Expanding on this view, Grabe and Stoller (2011) conceptualize reading as the ability to draw meaning from the printed page and interpret this information appropriately. They emphasize that reading is inherently purposeful, requiring the simultaneous activation of multiple cognitive processes, including automatic lexical access, syntactic parsing, and semantic integration. Consequently, reading comprehension is not merely about recognizing individual words but involves constructing a coherent mental representation of the text. For foreign language (EFL) learners, this process becomes doubly demanding as they must manage both linguistic deficiencies and cognitive processing loads concurrently.

2.2. Classifications of Reading Comprehension Strategies

In the field of second language acquisition, reading strategies are generally understood as deliberate, goal-directed plans and behaviors that learners use to manage and regulate their text comprehension. To operationalize these behaviors, researchers have proposed various taxonomies, among which the triarchic classification by O'Malley and Chamot (1990) and Oxford (1990) is most widely adopted in EFL contexts. This framework divides strategies into three core domains: cognitive, metacognitive, and social-affective.

- Cognitive strategies involve direct manipulation of the language material itself. In reading, these include actions such as translating into the native language (L1), guessing word meanings from context, note-taking, skimming for main ideas, and scanning for specific information to facilitate direct comprehension.
- Metacognitive strategies refer to higher-order executive processes that involve planning, monitoring, and evaluating one's own reading comprehension. Strategic behaviors in this domain include setting reading goals, previewing text structures, checking understanding during reading, and assessing whether reading objectives have been met.
- Social-affective strategies encompass interactive behaviors and emotional regulation techniques. These involve cooperating with peers to clarify ambiguous points, asking instructors for assistance, and employing self-talk to reduce anxiety during challenging reading tasks.

2.3. Previous Empirical Studies on Reading Strategy Use

Empirical research investigating reading strategy use has consistently shown that strategic awareness is closely linked to reading proficiency and pedagogical contexts. Globally, studies indicate that while proficient readers tend to employ metacognitive strategies to orchestrate their reading process, less proficient language learners rely heavily on localized cognitive and bottom-up text processing (Carrell, 1989; Anderson, 1991). For instance, Hsu (2016) observed that Asian EFL learners frequently underutilize metacognitive evaluation, remaining overly dependent on immediate textual cues and repetitive reading.

In the Vietnamese tertiary context, empirical attention has increasingly focused on how university students engage with academic texts. Earlier local studies (Nguyen, 2018; Lac et al., 2019) reported a strong, pervasive reliance on cognitive and translation-based strategies among EFL learners. More recently, Nguyen and Tran (2021) as well as Le and Nguyen (2023) confirmed that Vietnamese university students demonstrate a moderate awareness of reading strategies but exhibit limited use of collaborative, social-affective, and self-regulatory mechanisms. Most of these local studies, however, targeted general English proficiency groups. Empirical insights examining the specific, detailed strategic behaviors of English-major students who face higher academic text demands - remain limited, creating a distinct gap that the present study aims to address.

2.4. Contextual and Cultural Factors in EFL Reading

Beyond individual cognitive factors, strategy deployment is profoundly shaped by the educational and cultural environments of the learners. In many Asian EFL contexts, particularly in Vietnam, traditional instructional norms heavily dictate how students engage with texts.

Confucian heritage cultures often promote a high respect for authority, leading to teacher-centered classrooms where the instructor is viewed as the primary source of knowledge. In these settings, reading lessons frequently default to intensive reading, vocabulary memorization, and word-for-word translation. This product-oriented approach fosters passive learning habits, as students focus on finding the "correct" answers to pass high-stakes, exam-oriented assessments rather than developing process-oriented skills. Furthermore, cultural values such as modesty and the fear of "losing face" or making mistakes significantly discourage social interaction and collaborative learning in the classroom. Consequently, learners frequently develop individualistic reading habits, relying almost exclusively on bottom-up cognitive strategies while rarely engaging in cooperative or metacognitive behaviors.

III. METHODOLOGY

3.1. Research Design

This study employed a descriptive quantitative design to investigate the frequency and patterns of reading comprehension strategy use among second-year English-major students. The research was executed in four successive stages: (1) adapting and synthesizing the questionnaire tool; (2) conducting a pilot study (N = 61) to verify instrument reliability; (3) administering the validated questionnaire to the target cohort (N = 59); and (4) coding and analyzing the dataset using SPSS.

3.2. Research Questions and Hypothesis

The study addressed two central research questions:

- To what extent do English-major students use reading comprehension strategies?
- Which types of reading comprehension strategies are most frequently used?

Hypothesis: Students would report using reading comprehension strategies at approximately an average level, with a potential preference for metacognitive strategies over cognitive and social-affective ones.

3.3. Participants

The main participants comprised 59 second-year English-major students from two classes (Class 1: n = 31; Class 2: n = 28) at a Vietnamese university. The sample demonstrated a diverse range of English proficiency, with a predominant concentration at the average level: participants ranged from 19 to 22 years old, shared approximately nine years of English education, followed an identical curriculum, and were instructed by the same faculty. To ensure the readability and internal consistency of the research instrument, a pilot study was conducted prior to the main data collection with a cohort of EFL students (N = 61) from a comparable tertiary institution. No data from this pilot phase were pooled with the main study sample (N = 59) for the final analyses.

A descriptive overview of the main participants’ specific reading proficiency, categorized based on their official semester grades and instructor evaluations, is provided in **Table 1**.

Table 1. Descriptive Overview of Participants’ Reading Proficiency

Reading Proficiency Level	Description	Approximate proportion
Lower	Students occasionally struggle with academic texts and need frequent teacher support.	27.1%
Average	Students can comprehend general texts with moderate vocabulary and structural support.	50.8%
Relatively Good	Students demonstrate consistent comprehension with occasional difficulties in complex passages.	11.9%
Good	Students read academic texts independently with minimal assistance.	10.2%

3.4. Research Instrument

A structured questionnaire was deployed as the primary research tool to map large-scale language learning behaviors and identify strategic trends (Cohen, 1998; Oxford & Crookall, 1989). Divided into two sections, the survey first gathered demographic background data (class and years of English study). The second section contained 30 strategy items adapted from Fotovatian (2006) and Marzban (2006), utilizing the frameworks of O’Malley and Chamot (1990) and Block (1986).

The items measured three core operational domains evaluated on a 5-point Likert scale (1 = never, 5 = always): 18 cognitive items, 10 metacognitive items, and 2 social-affective items. The overall instrument demonstrated adequate internal consistency, yielding an acceptable Cronbach’s alpha of 0.77 in the pilot phase and 0.76 in the main study. Analysis of individual subscales revealed Cronbach’s alpha values of 0.75 for cognitive strategies (18 items), 0.71 for metacognitive strategies (10 items), and 0.48 for the 2-item social-affective strategies during the pilot phase. In the main study, the subscale alphas were 0.74 (cognitive), 0.70 (metacognitive), and 0.46 (social-affective). The lower coefficient for the social-affective subscale is an expected statistical consequence of its brief 2-item length rather than poor item quality (Streiner, 2003).

3.5. Data Collection Procedures

The study was conducted in strict accordance with ethical research standards involving human subjects. Because the research involved non-invasive educational questionnaires with minimal risk, it was granted an institutional ethical exemption by the academic administration of the host institution. Prior to data collection, formal administrative permission was obtained from the participating university’s leadership. The data collection was completed within one week during regular academic periods under the researchers’ direct supervision. To mitigate social desirability bias and encourage honest self-reporting, participants were fully briefed on the scholarly purpose of the project, and participation was entirely voluntary. Written informed consent was obtained from all students prior to their participation, and they were guaranteed total grading anonymity and data confidentiality. The administration required approximately 15 minutes per student, resulting in a 100% retrieval rate (N = 59).

3.6. Data Analysis

The quantitative data were coded and processed using SPSS software. Descriptive statistics, including mean (M), standard deviation (SD), minimum, and maximum values were computed to determine overall strategic frequency and

variance. Mean scores across the three main domains (cognitive, metacognitive, and social-affective) were compared to define structural preferences. Finally, a One-sample T-test evaluated whether the students' aggregate mean score ($M = 3.45$) significantly deviated from the scale's theoretical average midpoint (3.0), providing empirical data to address the proposed hypothesis.

IV. RESULTS

4.1. Overall Strategy Use

Descriptive statistics revealed that the general mean of the 30-item questionnaire answered by 59 students was 3.45, indicating a moderate level of reading strategy use. To determine whether this mean significantly differed from the scale's midpoint (3.0), a one-sample t-test was conducted (see Table 2).

Table 2. One-Sample T-Test

	t	df	Sig. (2-tailed)	Mean
MEAN	8.506	58	0.000	0.4508

Note: Test Value = 3.0.

The t-test results ($t = 8.506$, $p < .001$) confirm that the overall mean score was significantly higher than the test value of 3.0, showing that the participants utilized reading comprehension strategies slightly above the average level.

Table 3. Summary of the Overall Use of Reading Comprehension Strategies

Number of valid participants	Minimum	Maximum	Mean	S.D
59	2.60	4.63	3.45	0.40

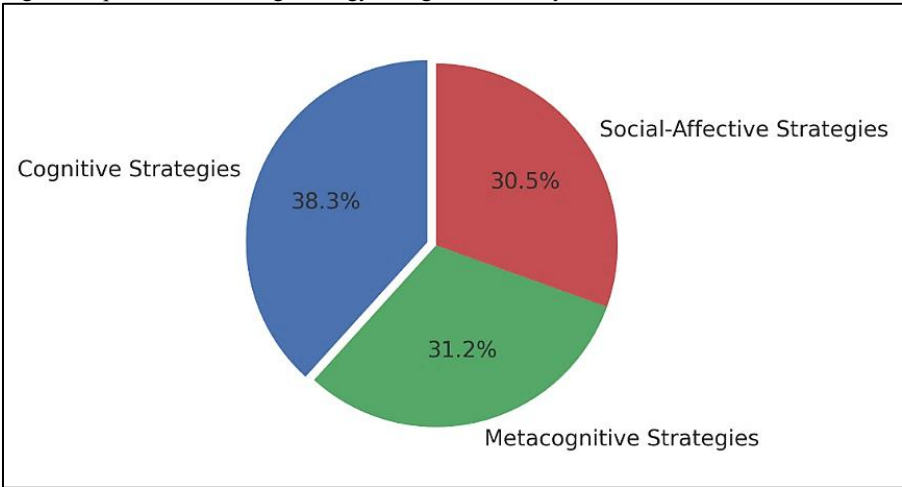
As summarized in Table 3, the low standard deviation ($SD = 0.40$) indicates minimal variation among the participants, with most students utilizing strategies within a relatively homogeneous, moderate range.

4.2. The Most Frequently Used Reading Comprehension Strategies

To explore students' preferences, the 30 items were categorized into three core strategy domains. Overall, cognitive strategies were employed most frequently ($M = 3.47$, $SD = 0.44$), followed closely by metacognitive strategies ($M = 3.45$, $SD = 0.56$), whereas social-affective strategies were the least utilized ($M = 3.37$, $SD = 0.69$). This close distribution indicates a subtle variance in how learners allocate their strategic efforts during text processing. The moderately high mean score for cognitive strategies suggests that participants consistently engage in active, direct manipulation of the linguistic input to decode meaning. In contrast, the slightly lower placement of metacognitive and social-affective domains implies that higher-order regulatory oversight and collaborative language support mechanisms remain marginally secondary options for this cohort.

This distribution, visually illustrated in Fig. 1, demonstrates that the students showed a slight preference for direct, text-based cognitive operations rather than reflective or collaborative mechanisms during reading.

Fig. 1: Proportion of Reading Strategy Categories Used by Students



To identify specific strategic behaviors within these broad categories, individual questionnaire items were ranked by their respective mean scores, as presented in Table 4.

Table 4. Rank of Reading Comprehension Strategy Use

Rank	Item	Strategy	Mean	SD
1	8	While reading the text, I translate a phrase from English into Vietnamese. (COG)	4.08	0.93
2	5	While reading the text, I use my own words to better understand what I read. (COG)	3.98	1.04

3	26	While reading the text, I focus on the main points of the text. (META)	3.90	0.99
4	3	While reading the text, I repeat a word or a phrase in order to remember its meaning for a long time. (COG)	3.90	1.04
5	10	While reading the text, I use a dictionary to help me understand what I read. (COG)	3.90	1.14
6	6	While reading the text, I guess the meaning of unknown words or phrases through context. (COG)	3.76	1.15
7	15	While reading the text, I take notes. (COG)	3.71	1.27
8	2	While reading the text, I predict what is related to the information given in the text. (COG)	3.71	1.01
9	24	While reading the text, I check if I understand the new text. (META)	3.69	1.16
...	...	...	...	...
29	14	While reading the text, I use tables, figures, and pictures in the text. (COG)	2.81	1.38
30	27	While reading the text, I do not pay attention to part of the reading. (META)	2.44	1.11

As indicated in Table 4, the most preferred individual strategy was L1 translation (Item 8, $M = 4.08$), followed closely by using one's own words for comprehension (Item 5, $M = 3.98$) and focusing on main points (Item 26, $M = 3.90$). Conversely, utilizing visual aids (Item 14, $M = 2.81$) and ignoring text segments (Item 27, $M = 2.44$) were reported as the least favored behaviors. While Item 27 was theoretically classified under the metacognitive domain to capture selective attention and purposeful skimming, this low mean must be interpreted with caution due to inherent semantic ambiguity. The phrasing may have been perceived by students as an indicator of simple disengagement or academic distraction rather than an intentional, strategic decision to bypass redundant text, which likely discouraged them from endorsing it. This clear hierarchy reinforces that the top-ranked strategies are predominantly cognitive, indicating an apparent student preference for direct, individual text-processing over interactive or cooperative approaches. This strategic pattern could be tentatively interpreted through the lens of traditional, teacher-centered instructional practices common in Vietnamese EFL classrooms, which often emphasize immediate linguistic decoding and solitary comprehension.

V. DISCUSSION

The findings of this study reveal that the overall use of reading comprehension strategies among English-major students at a Vietnamese university was slightly above the average level. This suggests that students possess a moderate awareness of reading strategies but have not yet developed systematic or advanced control over their reading processes. Similar patterns have been observed in other EFL contexts, where learners demonstrate partial yet inconsistent use of strategies in reading tasks (Carrell, 1989). This implies that while students recognize the importance of employing reading strategies, their application remains limited and unsystematic, possibly due to insufficient instruction or lack of metacognitive training in strategy use.

These findings partly support the initial hypothesis that students would use reading comprehension strategies at approximately an average level. However, contrary to the expectation that metacognitive strategies would be preferred, the results show that cognitive strategies were the most frequently used, followed closely by metacognitive and social-affective strategies. This indicates that students tend to rely marginally more on direct text processing rather than on planning, monitoring, or evaluating their comprehension.

The slight preference for cognitive strategies, particularly "translating from English into Vietnamese" highlights a notable reliance on L1 mediation and direct linguistic processing to access meaning. This preference supports earlier studies by Block (1986) and Anderson (1991), who found that less proficient EFL readers often depend on text-based, bottom-up strategies to compensate for limited vocabulary and background knowledge, using translation and repetition as coping mechanisms (Oxford, 1990). In the Vietnamese context, this pattern could be tentatively interpreted through the lens of traditional, teacher-centered traditions and exam-oriented systems that prioritize accuracy and literal comprehension over inferential or critical reading. From a psycholinguistic perspective, while L1 translation facilitates initial comprehension, excessive reliance on it during this transitional phase can impede the automatization of lexical access and syntactic processing in L2. Therefore, encouraging students to gradually shift from translation toward inferencing and summarizing is essential to promote deeper target-language engagement and reading fluency.

While cognitive strategies were used most frequently, students showed a remarkably similar, moderate-to-high awareness of metacognitive strategies. The marginally lower use of metacognitive and social-affective strategies suggests that while self-regulation and collaborative engagement are active, there is still room for optimization in reading autonomy. This is partially consistent with Hsu's (2016) study, which found that Asian EFL learners, including Taiwanese students, seldom engage in planning, monitoring, or evaluating their reading process. Carrell (1989) similarly emphasized that less proficient readers often fail to apply metacognitive control, relying instead on immediate textual cues. The same pattern emerged in the present study, where students moderately employed metacognitive strategies such as checking comprehension or focusing on main ideas but engaged less frequently in pre-reading planning or post-reading evaluation. This finding highlights a potential gap in learners' strategic awareness that could be addressed through explicit instruction.

The limited use of metacognitive strategies may also stem from students' lack of exposure to strategy-based instruction. In many Vietnamese EFL programs, reading classes emphasize product-oriented outcomes, such as finding correct answers to comprehension questions, rather than process-oriented skills like self-monitoring or reflection. Without explicit training, students may remain unaware of how to regulate their reading behavior effectively.

The minimal deployment of social-affective strategies, such as cooperation, asking for clarification, and self-talk, may reflect individualistic reading habits potentially shaped by institutional and cultural norms. In Vietnamese classrooms, which are traditionally characterized by Confucian heritage values, expectations of respect for authority and a persistent fear of negative evaluation or "losing face" might discourage students from verbalizing confusion or engaging in collaborative learning. Recent empirical evidence in Vietnam consistently validates this pattern; Nguyen and Tran (2021) observed that tertiary reading students demonstrate a clear preference for individualistic work over cooperative tasks, while Le and Nguyen

(2023) identified that psychological barriers, including acute shyness and limited language confidence, severely obstruct productive peer collaboration. Consequently, these entrenched cultural and contextual constraints undermine social interaction and reinforce an over-dependence on teacher guidance, leaving social-affective mechanisms as the least utilized strategic domain.

From a pedagogical perspective, these findings highlight the critical importance of integrating explicit strategy instruction and metacognitive training into the Vietnamese EFL reading curricula. Instructors should play an active role in shifting the classroom culture from teacher-centered to learner-centered by modeling core elements of metacognitive control through techniques such as think-aloud protocols, reciprocal teaching, and strategy mapping. Furthermore, to reduce cultural and psychological barriers like shyness, teacher education programs should emphasize process-oriented activities - including peer discussions, collaborative summarization, post-reading journals, and self-assessment checklists.

The results also contribute to theoretical discussions of strategy use in EFL contexts and align with previous Vietnamese research. Earlier local studies (Nguyen, 2018; Lac et al., 2019) also reported a strong reliance on cognitive and translation-based strategies, which is consistent with the present findings. Moreover, similar to other Vietnamese studies that found moderate use of metacognitive strategies, the current study validates that English majors maintain a comparable, steady engagement in self-monitoring, though structured metacognitive instruction remains highly beneficial. These cross-study comparisons reinforce the idea that reading strategy use is context-dependent and shaped by instructional traditions, linguistic demands, and cultural expectations (Grabe & Stoller, 2011).

In summary, the study reinforces existing evidence that while EFL learners demonstrate awareness of basic reading strategies, their systematic metacognitive and social-affective strategy use can be further optimized. The findings extend earlier Vietnamese research by providing more specific insights into English-major students - a group that has received relatively little empirical attention. These results underscore the need to promote explicit, reflective, and interactive approaches to reading instruction to enhance students' comprehension, autonomy, and long-term academic success as readers.

VI. CONCLUSION

This study investigated the use of reading comprehension strategies among English-major students at a Vietnamese university. The findings revealed that students employed reading strategies at a slightly above-average level, with cognitive strategies being used most frequently, followed by metacognitive and social-affective strategies. This pattern indicates that students primarily relied on direct, text-based operations such as translating and summarizing, while underutilizing higher-order self-monitoring or collaborative reading behaviors. The slight preference for cognitive strategies reflects the lingering influence of traditional, teacher-centered and exam-oriented instructional practices in Vietnam, which treat reading as a linguistic decoding activity rather than a reflective process of meaning construction. Consequently, there is an urgent need to integrate explicit reading strategy training into tertiary EFL curricula to foster metacognitive awareness and active peer collaboration.

Despite its valuable contributions, this study has several limitations, particularly its sole reliance on a small self-reported questionnaire sample (N=59) from a single institution, which limits generalizability and is subject to social desirability bias. Crucially, another key methodological limitation lies in the structural imbalance of the research instrument, which contains an unequal number of items across domains (18 cognitive, 10 metacognitive, and only 2 social-affective items). Consequently, the observed descriptive differences among the domains should be interpreted with caution, as a two-item subscale is statistically limited and insufficient to support definitive or generalized conclusions regarding students' social-affective strategy deployment.

To obtain richer insights, future research should adopt mixed-method frameworks incorporating real-time qualitative instruments such as think-aloud protocols, learner diaries, or classroom observations. Longitudinal and comparative investigations across diverse institutions, proficiency cohorts, and regional contexts are necessary to track the development of strategic reading behaviors over time. Additionally, subsequent studies should empirically explore the direct relationship between reading strategy frequency and academic performance indicators like GPA. Finally, future researchers are encouraged to utilize experimental or quasi-experimental designs to evaluate the concrete efficacy of targeted strategy training interventions, and conduct cross-cultural comparative studies to verify whether this heavy reliance on cognitive strategies is a unique product of Vietnam's exam-driven system or a common trait across wider Asian EFL environments.

From a pedagogical standpoint, the findings call for comprehensive innovation in reading instruction. Teacher education programs must prioritize strategy-based instruction as a core pedagogical competency. Incorporating reflective tools such as post-reading journals, peer log reviews, and self-evaluation checklists can help learners internalize strategic reading habits. Curriculum designers should also integrate authentic reading materials that stimulate higher-order skills like inference, synthesis, and critical evaluation. Such pedagogical shifts can effectively transform reading classrooms from teacher-centered to learner-centered environments that foster lasting autonomy and independent learning competence.

In conclusion, this study contributes to a deeper understanding of how Vietnamese EFL learners approach reading comprehension and underscores the need for pedagogical practices that cultivate metacognitive awareness, learner autonomy, and collaborative engagement. Through explicit strategy instruction and meaningful interaction with texts, students can gradually become more proficient, reflective, and independent readers. Overall, the findings provide empirical evidence that can inform future EFL reading pedagogy and curriculum design in similar Asian educational contexts, offering both theoretical and practical contributions to the field of language education.

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Appendix: Survey of Reading Comprehension Strategies

Participant Info: Code / Major / Reading GPA: _____

Instruction: Rate strategic behaviors in academic reading on a 5-point Likert scale (5 = Always, 1 = Never). Adapted from Fotovatian (2006) and Marzban (2006).

Table A1.

Domain	Item	Core Strategic Behavior Evaluated in Academic Reading
Cognitive (18 Items)	1	Utilizing world knowledge and text content to process meaning.
	2	Predicting upcoming information based on textual cues.
	3	Repeating words/phrases to facilitate long-term retention.
	4	Repeating preceding contextual words to parse difficult vocabulary.
	5	Paraphrasing text segments using one's own words.
	6	Guessing the meaning of unknown words/phrases through context.
	7	Re-reading adjacent phrases to decode unfamiliar vocabulary.
	8	Translating phrases from English into the native language (Vietnamese).
	9	Storing unfamiliar items mentally for later processing.
	10	Utilizing a dictionary to resolve comprehension blockages.
	11	Breaking words into syllables for pronunciation and meaning capture.
	12	Comparing unknown words to phonetically similar familiar items.
	13	Classifying words/phrases according to grammatical categories.
	14	Utilizing non-textual aids (tables, figures, and pictures).
	15	Note-taking and annotating text segments during reading.
	16	Skimming to extract the text's overall gist.
	17	Categorizing vocabulary and concepts according to semantic meanings.
	18	Relating current text to prior language baseline or skills.
Metacognitive (10 Items)	19	Previewing titles to plan upcoming reading actions.
	20	Identifying specific problems regarding localized word meaning.
	21	Pinpointing breakdown areas in sentence comprehension.
	22	Re-reading problematic text segments to fix comprehension gaps.
	23	Self-questioning to identify unclear elements within the text.
	24	Checking and monitoring overall comprehension of new texts.
	25	Self-correcting mispronounced or misparsed words.
	26	Maintaining focal attention on the main points of the text.
	27	Selectively ignoring non-essential parts of the text.
	28	Evaluating whether the text is being interpreted correctly.
Social-Affective (2 Items)	29	Engaging in pair/group work to enhance text comprehension.
	30	Employing think-aloud protocols or self-talk to reduce reading anxiety.

Note: In the actual questionnaire distributed to participants, items followed a uniform prompt structure: "While reading the text, I [strategic behavior]..." to measure frequency. The items are systematically categorized based on the theoretical frameworks of Oxford (1990) and O'Malley & Chamot (1990).

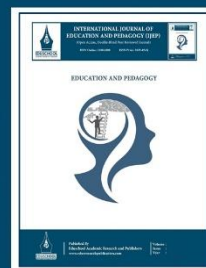


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Self-Regulated Learning and Academic Achievement among Secondary School Students: An Explanatory Sequential Mixed-Methods Study

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Abstract

Self-regulated learning, the capacity of students to plan, monitor, and evaluate their own learning, is increasingly recognised as a key determinant of academic success. This study examined the relationship between self-regulated learning and academic achievement among secondary school students in Kerala, India, and explored how students with differing levels of self-regulation experience the learning process. An explanatory sequential mixed-methods design was employed. In the quantitative phase, a validated self-regulated learning scale was administered to 260 ninth- and tenth-grade students, and its relationship with achievement, indexed by term examination marks, was analysed using Pearson correlation and multiple regression. In the qualitative phase, semi-structured interviews with sixteen purposively selected students were analysed thematically to explain and elaborate the quantitative findings. The quantitative results showed that self-regulated learning was significantly and positively related to achievement, with the metacognitive and effort-regulation components emerging as the strongest predictors. The qualitative findings illuminated these results, revealing that higher-achieving students described deliberate planning, self-monitoring, and persistence, whereas lower-achieving students reported reactive, unstructured approaches. Integration of the two strands produced a coherent account in which self-regulatory strategies underpin achievement through goal-directed, reflective study. The study recommends the explicit teaching of self-regulated learning strategies and discusses implications for classroom practice, teacher education, and curriculum design in the Indian context.

Keywords:- Self-Regulated Learning, Academic Achievement, Secondary Education, Mixed-Methods Research, Metacognition

I. INTRODUCTION

Why some students learn more effectively than others, even under similar conditions, is a question of enduring interest to educators. Part of the answer lies in the extent to which learners take active control of their own learning, setting goals, selecting strategies, monitoring progress, and adjusting their approach in response to feedback. This capacity, known as self-regulated learning, has become one of the most influential constructs in educational psychology, precisely because it is associated with achievement and because, unlike fixed traits, it can be developed through instruction (Zimmerman, 2002). As secondary schooling places growing demands on students to manage complex content and prepare for high-stakes examinations, the ability to regulate one's own learning assumes particular importance.

Self-regulated learning is generally understood as a cyclical process in which learners plan, perform, and reflect, drawing on cognitive strategies, metacognitive awareness, and motivational resources (Zimmerman, 2000). A considerable body of research links stronger self-regulation to higher achievement across subjects and age groups (Pintrich & De Groot, 1990; Dignath & Büttner, 2008). Yet correlational evidence alone cannot fully explain how self-regulation operates in the lived experience of students, nor why some learners deploy these strategies while others do not. Combining quantitative measurement with qualitative inquiry offers a fuller understanding than either can provide in isolation.

The Indian secondary context lends this question practical urgency. Examination pressure is intense, study is often equated with memorisation, and explicit instruction in how to learn is uncommon. Understanding the role of self-regulated

learning in this setting, and how students actually experience it, could inform efforts to move beyond rote approaches toward more strategic and reflective study. The National Education Policy 2020 similarly calls for a shift toward competencies such as critical thinking and learning to learn (Ministry of Human Resource Development, 2020), goals closely allied to self-regulation.

This study therefore examined the relationship between self-regulated learning and academic achievement among secondary school students in Kerala, and explored how students with differing levels of self-regulation experience learning. It addressed three questions: whether self-regulated learning is significantly related to achievement; which components of self-regulation most strongly predict achievement; and how students account for the ways in which they regulate, or fail to regulate, their learning. By pairing measurement with the students' own explanations, the study aims to provide both evidence of association and insight into process, of use to teachers, teacher educators, and curriculum designers.

The significance of the study is both scholarly and practical. Scholarly, it responds to calls for mixed-methods work capable of connecting the robust but abstract statistical associations of the self-regulation literature to the concrete experience of learners, and it does so in an Indian secondary setting that remains under-represented in that literature. Practically, if particular components of self-regulation prove especially consequential and if students' accounts reveal how those components operate, the findings can guide teachers toward the specific strategies most worth cultivating. In a system where students are often exhorted to work harder without being shown how to work more strategically, evidence of this kind has direct relevance for classroom practice.

II. LITERATURE REVIEW

2.1. Conceptualising Self-Regulated Learning

Self-regulated learning refers to the processes by which learners activate and sustain cognitions, behaviours, and emotions that are systematically oriented toward the attainment of goals. Zimmerman (2000) describes a cyclical model comprising forethought, performance, and self-reflection phases, in which learners set goals and plan, monitor and control their learning in action, and evaluate and adapt afterward. Boekaerts (1999) similarly situates self-regulation at the intersection of cognition, metacognition, and motivation, and Panadero (2017), reviewing the major models, notes their broad convergence on the centrality of goal-directed monitoring and adaptation. Comprehensive treatments of the field document both this convergence and the breadth of its applications across settings and age groups (Zimmerman & Schunk, 2011). These accounts frame self-regulation as an active, constructive, and cyclical enterprise rather than a static ability.

A key implication of these models is that self-regulation is domain-general in its principles yet enacted in domain-specific ways: the same cycle of planning, monitoring, and reflection applies across subjects, but its expression depends on the demands of the task at hand. This dual character helps explain why self-regulation can be taught as a set of transferable habits while still requiring adaptation to particular content. It also underscores that self-regulation is not merely a matter of intelligence or aptitude but of learnable process, a distinction central to the educational interest in the construct.

2.2. Components of Self-Regulated Learning

Self-regulated learning is multidimensional. Cognitive strategies include rehearsal, elaboration, and organisation of material; metacognitive regulation encompasses planning, monitoring, and evaluating one's understanding; and resource-management strategies include the regulation of effort, time, and environment (Pintrich, 2004). Motivation is integral rather than separate, since learners must be willing as well as able to regulate, and the regulation of motivation itself is an important and sometimes neglected component (Wolters, 2003). This componential view informs both the measurement of self-regulation and the interpretation of which aspects matter most for achievement.

Distinguishing these components is not merely a theoretical nicety, for they may differ in how strongly they relate to achievement and in how readily they respond to instruction. Cognitive strategies are relatively concrete and teachable, but their benefit depends on being deployed at the right moments, which is a metacognitive matter. Effort and motivation regulation, meanwhile, determine whether strategies are sustained in the face of difficulty. A componential analysis therefore allows a study to identify not only whether self-regulation matters but which facets of it carry the greatest weight, a question of direct relevance to the design of instruction.

2.3. Self-Regulated Learning and Academic Achievement

The association between self-regulation and achievement is well documented. Pintrich and De Groot (1990) found that self-regulation and motivational beliefs predicted classroom performance, and subsequent research has repeatedly confirmed the relationship. Meta-analytic evidence indicates that interventions fostering self-regulated learning can improve both strategy use and achievement, with effects that are stronger when metacognitive strategies are explicitly taught (Dignath & Büttner, 2008). Zimmerman and Martinez-Pons (1986) demonstrated early on that higher-achieving students report using a wider range of self-regulatory strategies, a pattern that has proved robust across contexts.

Importantly, the relationship appears to be reciprocal and developmental rather than fixed. Success achieved through effective strategy use reinforces the motivation and self-efficacy that sustain further self-regulation, while repeated failure can erode both. This dynamic suggests that early support for self-regulatory skill may yield compounding benefits, and that students who lack such skill are not simply less able but may be caught in a cycle that appropriate instruction could interrupt. The educational value of the construct rests substantially on this malleability.

2.4. Self-Regulated Learning in the Indian Context

Although self-regulated learning has been studied extensively worldwide, evidence from Indian secondary schools is comparatively limited. The prevailing emphasis on examinations and the widespread equation of study with repeated reading

and memorisation create a context in which strategic, reflective learning may be neither modelled nor rewarded. At the same time, the strong aspiration for academic success that characterises many Indian families provides motivational ground on which self-regulatory skill could be built if it were explicitly taught. Examining self-regulation in this setting is therefore of particular interest, both because the need may be acute and because the construct's assumptions, developed largely in Western contexts, warrant local examination.

2.5. Theoretical Framework

The study is grounded in the social cognitive perspective on self-regulation, which holds that learning results from the reciprocal interaction of personal, behavioural, and environmental factors (Bandura, 1986). Within this perspective, Zimmerman's cyclical phase model provides the organising framework, and Schunk and Zimmerman (1997) trace how self-regulatory competence develops through observation, emulation, and internalisation with the support of teachers and peers. This framing implies that self-regulation is both a predictor of achievement and a capacity that schooling can deliberately cultivate. The reciprocal interaction it posits also accommodates the developmental and motivational dynamics noted above, linking the individual learner to the instructional environment that shapes their growth.

2.6. Research Gap and Questions

Although the quantitative literature linking self-regulation to achievement is extensive, fewer studies, particularly in Indian secondary settings, combine measurement with in-depth exploration of how students experience self-regulation, and such integration is needed to interpret associations and inform practice. Accordingly, the study asked whether self-regulated learning relates to achievement, which components predict it most strongly, and how students themselves describe regulating their learning. A mixed-methods approach was chosen precisely to connect the what of association with the how of experience (Creswell & Plano Clark, 2018).

III. METHODS

3.1 Research Design

An explanatory sequential mixed-methods design was employed, in which a quantitative phase is followed by a qualitative phase that helps to explain the quantitative results (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2003). This design was chosen because the quantitative phase could establish the strength and structure of the relationship between self-regulation and achievement, while the subsequent qualitative phase could illuminate the processes underlying that relationship by drawing on students' own accounts. Priority was given to the quantitative phase, with the qualitative phase serving an explanatory function, and the two strands were integrated at the interpretation stage.

3.2. Quantitative Phase

In the quantitative phase, a validated self-regulated learning scale measuring cognitive strategy use, metacognitive regulation, and effort regulation was administered to 260 ninth- and tenth-grade students selected through stratified random sampling from six secondary schools in the Malappuram district of Kerala. The scale used a five-point Likert format and demonstrated satisfactory internal consistency, with a Cronbach's alpha of .88 for the full scale. Academic achievement was operationalised as the percentage of aggregate marks in the most recent term examination, obtained from school records. Data were analysed using Pearson correlation and multiple linear regression, with the assumptions of the analyses examined and found tenable.

The stratified sampling procedure defined strata by school management type and gender to ensure that the sample reflected the broader student population, and the sample size comfortably exceeded the minimum required for stable estimation with three predictors. Prior to the main analyses, the data were screened for missing values and outliers, and the distributional assumptions of correlation and regression, together with the absence of problematic multicollinearity among the three components, were verified. This preparatory work provided a sound basis for interpreting the associations reported below.

3.3. Qualitative Phase

In the qualitative phase, sixteen students were purposively selected from the quantitative sample to represent contrasting profiles, comprising eight who scored high and eight who scored low on the self-regulated learning scale, with variation in gender and school. Semi-structured interviews explored how these students approached their studies, set goals, monitored their progress, and responded to difficulty. Interviews were audio-recorded with consent, transcribed verbatim, and analysed using reflexive thematic analysis following the six-phase approach of Braun and Clarke (2006), with coding conducted inductively and themes reviewed against the data.

3.4. Integration and Rigour

The strands were integrated through a joint display that juxtaposed the quantitative findings with the qualitative themes to produce an interpretation richer than either alone. Quality was pursued in both strands: the quantitative phase attended to reliability, valid measurement, and assumption checking, while the qualitative phase drew on member checking, an audit trail, and reflexive journaling to support trustworthiness. Attention was also given to the fit between the two strands, examining where they converged and where they added complementary insight.

The sequencing of the strands was deliberate. The qualitative participants were selected on the basis of their quantitative scores, so that the interviews could probe the contrasts the numbers had revealed, and the interview schedule was shaped by the quantitative findings, giving particular attention to the components that had emerged as strongest predictors. This

connection between the strands at the sampling and instrument stages, as well as at interpretation, is characteristic of a well-integrated explanatory sequential design and strengthens the coherence of the resulting account.

3.5. Ethical Considerations

Ethical approval was obtained from the institutional review committee. Informed consent was secured from parents or guardians and assent from the participating students, participation was voluntary, and confidentiality was maintained through the anonymisation of records and the use of pseudonymous identifiers. Achievement data were accessed only with appropriate authorisation.

IV. RESULTS

4.1. Quantitative Results

Self-regulated learning was significantly and positively correlated with academic achievement, $r = .49$, $p < .01$, indicating a moderate-to-strong association. Multiple regression of achievement on the three components of self-regulation is reported in Table 1.

Table 1. Correlations and Regression of Academic Achievement on Self-Regulated Learning Components

Predictor (SRL component)	r	B	β	t
Metacognitive regulation	.47**	4.82	.30	5.42**
Effort regulation	.44**	4.16	.27	4.88**
Cognitive strategy use	.36**	2.71	.18	3.21**

Note. N = 260. Overall SRL–achievement $r = .49$. Model $R^2 = .31$, $F(3, 256) = 38.4$, $p < .001$. ** $p < .01$.

As Table 1 shows, the three components together explained approximately 31 per cent of the variance in achievement, $R\text{-squared} = .31$, $F(3, 256) = 38.4$, $p < .001$. Metacognitive regulation was the strongest unique predictor ($\beta = .30$), followed closely by effort regulation ($\beta = .27$), while cognitive strategy use made a smaller but significant contribution ($\beta = .18$). These results indicate that the planning and monitoring of learning, together with the regulation of sustained effort, are especially consequential for achievement.

The relative weighting of the three components is itself informative. That metacognitive regulation and effort regulation outweighed cognitive strategy use suggests that knowing how to direct and sustain one's learning matters more than the mere possession of particular study techniques. In other words, students may know a range of techniques yet achieve poorly if they do not plan, monitor, and persist. This interpretation, generated by the quantitative strand, motivated the questions pursued in the follow-up interviews, which sought to understand how students actually enact, or fail to enact, these regulatory processes.

4.2. Qualitative Results

The interviews produced themes that explained the quantitative pattern. Higher-scoring students described deliberate, strategic approaches to study, characterised by planning, self-monitoring, and persistence. One such student explained: “Before an exam I make a plan and check myself as I go. If I do not understand something, I stop and find another way instead of just continuing.” (Student H3)

Lower-scoring students, by contrast, described reactive and unstructured approaches, often beginning to study only under pressure and rarely monitoring their understanding: “I usually study the night before. I just read again and again. I do not really check whether I have understood until the exam.” (Student L5)

Across the interviews, the difference between the two groups lay less in effort intended than in effort organised: higher-achieving students converted intention into structured, monitored action, whereas lower-achieving students expressed similar goals but lacked the strategies to pursue them systematically.

A further distinction concerned the regulation of motivation and setbacks. Higher-achieving students described strategies for maintaining focus and recovering from discouragement, treating difficulty as a signal to change approach rather than as a reason to stop. Lower-achieving students more often described being derailed by frustration or distraction, with few means of restoring their engagement. This pattern echoes the argument that the regulation of motivation is an integral yet frequently overlooked dimension of self-regulated learning, and it suggests that supporting students' volitional strategies may be as important as teaching cognitive ones.

4.3. Integration of Findings

Integrating the two strands through a joint display clarified how the measured associations play out in practice, as summarised in Table 2.

Table 2. Joint Display Integrating Quantitative Findings and Qualitative Themes

Quantitative finding	Qualitative theme	Integrated interpretation
Metacognition strongest predictor	Planning and self-monitoring	Deliberate goal-setting drives achievement
Effort regulation second predictor	Persistence through difficulty	Sustained effort converts intent to result
Lower SRL linked to lower marks	Reactive, unstructured study	Absence of strategy limits attainment

The joint display shows a coherent correspondence between the strands. The statistical prominence of metacognition matched the planning and self-monitoring described by higher achievers; the significance of effort regulation matched their accounts of persistence; and the lower marks associated with weaker self-regulation matched the reactive, unstructured study reported by lower achievers. The qualitative strand thus explained the quantitative results by showing the processes through which self-regulation supports, or its absence limits, achievement.

V. DISCUSSION

5.1. Self-Regulation as a Driver of Achievement

The findings confirm and extend the established link between self-regulated learning and achievement (Pintrich & De Groot, 1990; Dignath & Büttner, 2008). The moderate-to-strong correlation, together with the substantial variance explained by the regression model, situates self-regulation among the meaningful correlates of secondary achievement. The prominence of metacognitive and effort-regulation components is consistent with theoretical accounts that place monitoring, adaptation, and volition at the heart of effective learning (Zimmerman, 2002; Wolters, 2003), and with evidence that metacognitive strategies are especially responsive to instruction.

The finding that the regulatory and volitional components outweighed cognitive strategy use has a practical corollary. It implies that efforts to raise achievement by teaching study techniques in isolation may disappoint unless they also cultivate the overarching capacity to plan, monitor, and persist. The value of a technique depends on its strategic deployment, and it is this orchestrating function, rather than the inventory of techniques, that most distinguished higher from lower achievers in the present data.

5.2. Understanding the Process

The qualitative strand added explanatory depth that the quantitative results alone could not provide. By revealing that higher and lower achievers differed chiefly in whether effort was organised and monitored rather than merely intended, the interviews illuminated the mechanism implied by the statistics. This coherence between strands strengthens confidence in the interpretation and exemplifies the value of the mixed-methods design in connecting association with experience (Creswell & Plano Clark, 2018). The account aligns with Zimmerman's cyclical model, in which forethought and self-reflection distinguish skilled from unskilled learners (Zimmerman, 2000).

5.3. Implications

Because self-regulation is learnable, the findings carry clear implications for practice. Teachers can model and scaffold planning, monitoring, and evaluation, and can make strategy use an explicit object of instruction rather than leaving it to chance, an approach supported by the developmental account of self-regulatory competence (Schunk & Zimmerman, 1997). Teacher education should prepare teachers to foster these capacities, and curricula could incorporate learning-to-learn objectives consistent with the aims of the National Education Policy 2020 (Ministry of Human Resource Development, 2020). Such measures may be particularly valuable in examination-oriented settings where strategic, reflective study is often overshadowed by rote preparation.

Practical steps need not be elaborate. Brief routines in which teachers ask students to set a goal before a task, check their understanding partway through, and reflect afterward on what worked can embed the self-regulatory cycle within ordinary lessons. Making these processes visible and habitual, and gradually transferring responsibility for them to students, aligns with how self-regulatory competence is understood to develop. For students currently caught in reactive patterns of study, such structured support may offer a realistic route toward the strategic learning that the quantitative and qualitative findings alike associate with success.

5.4. Limitations and Future Research

Several limitations should be noted. The quantitative strand is correlational and cannot establish causation, and self-report measures of self-regulation may diverge from actual behaviour. The qualitative sample was small and drawn from a single district, and the study was cross-sectional. Future research could employ intervention designs to test whether teaching self-regulation raises achievement, use longitudinal and observational methods to capture development and behaviour, and extend the inquiry across regions and subjects. Studies examining how motivational and contextual factors shape the uptake of self-regulatory strategies would further enrich understanding.

It is also worth acknowledging the boundary conditions of the integration achieved here. The convergence between the strands lends confidence to the interpretation, but convergence is not proof, and alternative explanations, such as the influence of prior attainment or home circumstances on both self-regulation and achievement, cannot be excluded by the present design. Reporting the points of agreement between measurement and experience is a strength of the mixed-methods approach, yet the account remains, appropriately, a well-supported interpretation rather than a demonstrated causal chain.

VI. CONCLUSION

This mixed-methods study examined the relationship between self-regulated learning and academic achievement among secondary school students in Kerala and explored how students experience the regulation of their learning. Self-regulated learning was significantly related to achievement, with metacognitive and effort-regulation components the strongest predictors, and the qualitative findings explained this pattern by revealing the structured, monitored study of higher achievers against the reactive approaches of their lower-achieving peers. Integrating the two strands produced a coherent account in which self-regulatory strategies underpin achievement through goal-directed, reflective learning. Because these strategies can

be taught, the study points to the explicit cultivation of self-regulated learning as a promising avenue for improving secondary education.

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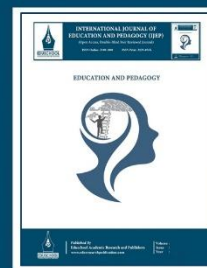


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Secondary School Teachers' Perceptions of Inclusive Education in Kerala, India: Challenges, Preparedness, and Support Needs

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Abstract

Inclusive education has become a central goal of education policy worldwide, yet its realisation ultimately depends on the perceptions and practices of classroom teachers. This study explored how secondary school teachers in Kerala, India, understand inclusive education and the challenges they encounter in implementing it. A qualitative, interpretive design was adopted, and semi-structured interviews were conducted with fifteen secondary school teachers selected through purposive sampling from government and aided schools. Interviews were audio-recorded, transcribed verbatim, and analysed using reflexive thematic analysis. Trustworthiness was addressed through member checking, an audit trail, and reflexive journaling. Five themes were constructed from the data: a cautious commitment to inclusion as a principle coupled with uncertainty about personal capacity; structural and resource barriers such as large class sizes and inadequate materials; significant gaps in pre-service preparation and ongoing professional development; the rigidity of a standardised curriculum and examination system; and the importance of collaboration with peers, special educators, and families as a source of support. Teachers endorsed inclusion in principle but felt insufficiently equipped to enact it, and they attributed difficulties primarily to systemic rather than personal shortcomings. The study recommends sustained teacher preparation, flexible curricula and assessment, and strengthened support structures, and discusses implications for teacher education, school leadership, and inclusive education policy in India.

Keywords:- Inclusive Education, Teacher Perceptions, Secondary Education, Thematic Analysis, Qualitative Research

I. INTRODUCTION

Inclusive education has emerged as one of the defining aspirations of contemporary schooling. Rooted in the principle that all learners, regardless of ability, background, or circumstance, have the right to learn together in mainstream settings, it reframes diversity as an ordinary feature of the classroom rather than a problem to be managed elsewhere. International agreements such as the Salamanca Statement gave early impetus to this movement by calling on schools to accommodate all children within a common system (UNESCO, 1994), and subsequent global monitoring has continued to place inclusion at the centre of the agenda for equitable education (UNESCO, 2020). Yet the gap between the promise of inclusion in policy and its realisation in practice remains wide, and closing it depends heavily on the teachers who translate policy into daily classroom life.

Teachers occupy a pivotal position in inclusive reform because their beliefs, competencies, and working conditions shape whether inclusive intentions become inclusive experiences. A substantial literature indicates that teachers' attitudes toward inclusion are generally favourable in principle but are moderated by concerns about preparedness, resources, and workload (Avramidis & Norwich, 2002). Where teachers feel unsupported or ill-equipped, inclusive placement can amount to physical presence without genuine participation. Understanding how teachers themselves perceive inclusive education, and what they experience as enabling or constraining, is therefore essential to improving practice.

In India, the commitment to inclusion has been strengthened by legislation and policy, and the National Education Policy 2020 reaffirms the goal of an equitable and inclusive system in which no child is left behind (Ministry of Human

Resource Development, 2020). At the same time, scholars have noted that the transfer of an internationally derived concept into the Indian context raises distinctive challenges of interpretation, capacity, and provision (Singal, 2006; Kalyanpur, 2008). Kerala, with its comparatively strong educational infrastructure and history of social reform, offers an informative setting for examining how these tensions play out at the secondary level, where subject specialisation, examination pressure, and larger classes complicate inclusive practice.

Against this background, the present study explored secondary school teachers' perceptions of inclusive education and the challenges they face in implementing it. Two research questions guided the inquiry: how do secondary school teachers understand and interpret inclusive education; and what challenges do they experience in putting it into practice? By foregrounding teachers' own accounts, the study contributes context-sensitive, qualitative evidence to a field in which large-scale surveys have predominated, and it aims to inform teacher education, school leadership, and policy.

The significance of the study lies in its attention to the perspectives of those on whom inclusive reform ultimately depends. Policy statements and legal mandates set expectations, but it is teachers who determine, day by day, whether a diverse classroom becomes a site of genuine participation or merely of shared physical space. Much existing research has measured teachers' attitudes at a distance through questionnaires; comparatively little has listened closely to how teachers narrate their own experiences, reasoning, and constraints. By privileging these accounts within a specific Indian setting, the study seeks to surface the practical realities that shape implementation and to generate insights that are directly usable by teacher educators, school leaders, and policymakers pursuing inclusion.

II. LITERATURE REVIEW

2.1. Conceptualising Inclusive Education

Inclusive education is understood not merely as the placement of learners with disabilities in mainstream classrooms but as an ongoing process of increasing participation and reducing exclusion for all students (Booth & Ainscow, 2002). Ainscow (2005) characterises inclusion as a principled reform of the whole system rather than a targeted programme, requiring changes in cultures, policies, and practices. Florian and Black-Hawkins (2011) advance the notion of inclusive pedagogy, which extends what is ordinarily available to all learners rather than providing something different for some, thereby avoiding the marginalisation that can accompany individualised provision. These conceptions frame inclusion as a matter of ordinary good teaching for a diverse class.

2.2. Teacher Attitudes and Beliefs

Teachers' attitudes are among the most studied determinants of inclusive practice. Avramidis and Norwich (2002) concluded from their review that attitudes are generally positive but conditional, shaped by the nature of the students' needs, the availability of support, and teachers' sense of efficacy. Positive attitudes do not automatically translate into inclusive practice when structural conditions are unfavourable. Sharma, Forlin, and Loreman (2008) found that appropriate training reduced pre-service teachers' concerns and improved their attitudes and confidence, underscoring the malleability of beliefs through preparation.

A related strand of work highlights the role of self-efficacy, the belief in one's capability to bring about desired outcomes, in mediating between attitudes and practice. Teachers who feel competent to manage diverse classrooms are more likely to persist with inclusive strategies in the face of difficulty, whereas low efficacy can lead to avoidance or reliance on withdrawal-based provision. Because efficacy is itself shaped by experience, feedback, and support, it offers a promising point of leverage: strengthening teachers' sense of capability, rather than exhorting them to hold more positive attitudes, may be the more effective route to inclusive practice.

2.3. Barriers to Implementation

Research consistently identifies a cluster of barriers that impede inclusion, including large class sizes, insufficient teaching and learning materials, inaccessible physical environments, rigid curricula, and examination-oriented systems that reward uniformity over differentiation. In the Indian context, Das, Kuyini, and Desai (2013) reported that a majority of teachers felt inadequately prepared to teach students with disabilities and lacked access to necessary resources. Kalyanpur (2008) argued that constraints of quantity and quality in provision, together with the transplantation of Western models, complicate the pursuit of genuine inclusion in resource-constrained settings.

2.4. Teacher Preparation and Support

The preparation teachers receive is widely seen as decisive. Forlin (2010) contends that teacher education must be reformed to equip all teachers, not only specialists, with the values and competencies for inclusion. Loreman, Deppeler, and Harvey (2010) emphasise practical strategies for supporting diversity, while collaborative structures such as co-teaching and access to special educators are repeatedly identified as important supports. Where such preparation and support are absent, teachers are left to improvise, and inclusive placement risks becoming nominal.

Beyond formal training, the wider culture and leadership of a school shape whether inclusion is sustained. Supportive leadership that articulates an inclusive vision, allocates resources, and protects time for collaboration can create conditions in which teachers are willing to take pedagogical risks. Conversely, where inclusion is treated as the responsibility of a designated specialist rather than as a shared commitment, mainstream teachers may disengage from it. The literature thus points to preparation and support as operating at multiple levels, from the individual teacher's competencies to the collective ethos and structures of the institution.

2.5. Theoretical Framework

The study is informed by the social model of disability and by ecological systems theory. The social model locates disability not in individual deficit but in the barriers that societies and institutions erect, directing attention to the removal of those barriers rather than the remediation of learners (Oliver, 1996). Ecological systems theory situates the teacher and student within nested systems of influence, from the immediate classroom to the wider institutional and policy environment (Bronfenbrenner, 1979). Together these lenses frame teachers' challenges as arising from the interaction of individuals with their surrounding structures, rather than from personal shortcomings alone.

2.6. Research Gap and Questions

Although the international literature on inclusive education is extensive, much of it relies on attitudinal surveys, and qualitative accounts of how secondary teachers in Indian settings experience inclusion remain comparatively scarce. Understanding these experiences in depth is necessary to interpret the patterns surveys reveal and to design responsive support. The present study therefore asked how secondary school teachers understand inclusive education and what challenges they encounter in implementing it, seeking rich, context-grounded insight rather than generalisable frequencies.

III. METHODS

3.1. Research Design

A qualitative, interpretive design was adopted, on the premise that teachers' perceptions and experiences are best understood through their own accounts and in their own terms. Such a design is well suited to exploring meaning, context, and complexity, which are difficult to capture through standardised instruments. Semi-structured interviews were selected as the primary method because they combine a consistent focus with the flexibility to pursue participants' concerns as they arise.

3.2. Participants

Fifteen secondary school teachers were selected through purposive sampling from government and aided schools in the Malappuram district of Kerala. Selection sought variation in gender, subject area, and years of experience to capture a range of perspectives. Participants had between four and twenty-six years of teaching experience and had taught classes that included students with diverse learning needs. Sampling continued until the interviews were yielding little that was new, indicating that a sufficient depth of information had been reached.

3.3. Data Collection

Data were generated through individual semi-structured interviews guided by an open-ended schedule covering teachers' understandings of inclusion, their classroom experiences, the challenges they faced, and the supports they drew upon. Interviews lasted between forty and sixty minutes, were conducted in the language in which participants were most comfortable, and were audio-recorded with consent. Recordings were transcribed verbatim, and translated where necessary, with care to preserve meaning.

3.4. Data Analysis

Transcripts were analysed using reflexive thematic analysis following the six-phase approach of familiarisation, coding, theme generation, review, definition, and reporting (Braun & Clarke, 2006). Analysis proceeded inductively, with codes derived from the data rather than imposed from a prior framework, and codes were then collated into candidate themes that were reviewed against the coded extracts and the full data set. The process was iterative, and the researcher moved repeatedly between the parts and the whole to ensure that themes were well grounded.

Consistent with the reflexive orientation of this analytic approach, the researcher's own background as an educator was treated as a resource rather than a source of bias to be eliminated. Prior familiarity with school settings aided interpretation, but it also carried the risk of imposing preconceptions, and this was managed through reflexive journaling and through deliberate attention to instances that did not fit emerging patterns. Coding was revisited several times, and provisional interpretations were tested against the full set of transcripts, so that the themes reported here reflect a considered engagement with the data rather than first impressions.

3.5. Trustworthiness

Trustworthiness was pursued through the criteria of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was supported by member checking, in which participants reviewed summaries of their interviews, and by prolonged engagement with the data. Thick description was provided to support transferability, an audit trail documented analytic decisions to strengthen dependability, and reflexive journaling was used to make the researcher's assumptions explicit and thereby support confirmability.

3.6. Ethical Considerations

Ethical approval was obtained from the institutional review committee. Participation was voluntary and based on informed consent, and participants were free to withdraw at any time. Confidentiality was protected by anonymising transcripts and using pseudonymous identifiers, and data were stored securely. Care was taken to ensure that discussion of challenges did not expose individuals or schools to identification.

IV. FINDINGS

Analysis of the interviews produced five themes describing how teachers understood inclusive education and the challenges they faced. The themes and their representative subthemes are summarised in Table 1. Illustrative extracts are presented below with pseudonymous identifiers; all quotations are indicative of patterns across the data set.

Table 1. Themes and Subthemes Constructed from the Teacher Interviews

Theme	Representative subthemes
Cautious commitment to inclusion	Inclusion as a right; uncertainty about personal capacity
Structural and resource barriers	Large classes; scarce materials; physical accessibility
Gaps in preparation	Limited pre-service training; few development opportunities
Curricular and assessment rigidity	Standardised curriculum; examination pressure
Sources of support	Peer collaboration; special educators; family partnership

Note. Themes were constructed through reflexive thematic analysis of fifteen teacher interviews.

4.1. A Cautious Commitment to Inclusion

Teachers expressed a clear endorsement of inclusion as a principle, describing it as a matter of fairness and of every child's right to belong. This commitment, however, was tempered by uncertainty about their own capacity to meet diverse needs. One participant captured this tension: "I believe every child should be in the same classroom. That is right. But honestly, I am not always sure how to teach a child who learns very differently while forty others are waiting." (Teacher 4)

This pattern, of principled support qualified by doubts about efficacy, recurred throughout the interviews and echoes the conditional attitudes reported in the wider literature.

4.2. Structural and Resource Barriers

Participants consistently attributed their difficulties to structural conditions rather than to the students themselves. Large class sizes were identified as the most pervasive obstacle, alongside a shortage of appropriate materials and, in some schools, physically inaccessible spaces. "With so many students in one room, giving individual attention is very difficult. We do not have the materials or the space that these children need." (Teacher 9)

Such accounts frame the challenge of inclusion as located in the environment surrounding the classroom, consistent with a social-model reading of disability.

4.3. Gaps in Preparation and Development

A strong and widely shared theme concerned the inadequacy of teachers' preparation. Many reported that their pre-service training had given little attention to inclusive pedagogy, and that opportunities for ongoing professional development were infrequent and often generic. "Nobody really taught us how to do this. We learn by trial and error. A few workshops are not enough to change how you teach every day." (Teacher 12)

Teachers thus experienced a mismatch between the expectations placed upon them and the preparation they had received, a gap they saw as systemic rather than personal.

Several participants contrasted the confidence of designated special educators with their own sense of improvisation, and expressed a wish for preparation that was practical and continuous rather than theoretical and occasional. The desire was not for more information in the abstract but for guidance embedded in the realities of their own classrooms. "We need someone to show us, in our own classroom, with our own students, how to do it. Reading about it in a training hall is not the same." (Teacher 6)

4.4. Curricular and Assessment Rigidity

The standardised curriculum and examination system were described as constraining inclusive practice. Teachers felt pressure to cover prescribed content at a fixed pace and to prepare all students for uniform examinations, leaving little room for differentiation. "The syllabus and the exam are the same for everyone. There is no flexibility. How can I adjust for one child when the exam will not adjust for that child?" (Teacher 2)

This rigidity was seen as undermining the very flexibility that inclusion requires, pulling practice back toward uniformity.

4.5. Sources of Support

Despite the challenges, teachers identified valuable sources of support. Informal collaboration with colleagues, access to special educators where available, and partnership with families were all described as helping them cope and improve. "When I can talk to the special educator or to the child's parents, everything becomes easier. Alone it is hard; together we manage." (Teacher 7)

These accounts point to the importance of collaborative structures and suggest that strengthening them could enhance teachers' capacity for inclusion.

Taken together, the five themes cohere around a single underlying narrative. Teachers positioned themselves as willing participants in an inclusive project whose success was largely outside their individual control, constrained by conditions they did not set and had limited power to change. Their commitment was genuine but strained, their difficulties were understood as systemic, and their coping depended on relationships and supports that were often informal and unevenly available. This

narrative of committed but under-resourced practitioners, rather than of reluctant or resistant ones, has important implications for how inclusive reform is framed and pursued, a point developed in the discussion that follows.

V. DISCUSSION

5.1. Interpreting Teachers' Perceptions

The findings portray teachers who embrace inclusion as a value while doubting their preparedness to enact it, a configuration consistent with the conditional attitudes documented across the literature (Avramidis & Norwich, 2002). The gap between principled endorsement and practical confidence is significant because attitudes alone do not secure inclusive practice when teachers feel unequipped. That participants located their difficulties in systemic conditions rather than in the students aligns with the social model of disability, which directs reform toward the removal of barriers rather than the remediation of learners (Oliver, 1996).

This principle-practice gap also carries a constructive implication. Because teachers already accept the values of inclusion, the task facing reformers is not primarily one of persuasion but of enablement. Efforts directed at changing attitudes may yield little when the attitudes are already favourable; efforts directed at building capability and improving conditions are more likely to move practice. Framing teachers as committed professionals constrained by circumstance, rather than as obstacles to be convinced, reorients reform toward the supports and structures that would allow existing goodwill to be expressed in the classroom.

5.2. Systemic Barriers and Their Interpretation

The prominence of structural and curricular barriers echoes findings from Indian and international research alike (Das et al., 2013; Kalyanpur, 2008). Viewed through an ecological lens, the teacher's classroom is embedded within institutional and policy systems whose features, from class size to examination design, powerfully shape what is possible (Bronfenbrenner, 1979). The tension teachers described between a standardised system and the flexibility inclusion demands suggests that inclusive reform cannot be achieved at the level of the individual teacher alone but requires coordinated change across these nested systems, in keeping with Ainscow's (2005) view of inclusion as whole-system reform.

5.3. The Centrality of Preparation and Collaboration

The strong theme of inadequate preparation reinforces arguments that teacher education must be reoriented to equip all teachers for diversity (Forlin, 2010; Sharma et al., 2008). The value teachers placed on collaboration further suggests that inclusive pedagogy is a collective as much as an individual accomplishment, developed through shared expertise and partnership (Florian & Black-Hawkins, 2011; Loreman et al., 2010). Support structures that connect teachers with specialists and families appear to function as practical enablers of the participation that inclusion seeks (Booth & Ainscow, 2002).

5.4. Implications

Several implications follow. Teacher education programmes should embed inclusive pedagogy throughout rather than confining it to a single course, and sustained, practice-based professional development should replace occasional generic workshops. School leaders can foster collaborative structures, protect time for planning, and interpret curricular and assessment requirements flexibly where possible. At the policy level, the inclusive aspirations of the National Education Policy 2020 (Ministry of Human Resource Development, 2020) will require attention to the enabling conditions, class sizes, materials, accessible environments, and assessment flexibility, without which teachers' commitment cannot be translated into practice.

5.5. Limitations and Future Research

As a qualitative study of fifteen teachers in one district, the research offers depth rather than statistical generalisability, and its findings should be read as context-grounded insights rather than universal claims. Reliance on self-report through interviews means that reported practice may differ from observed practice. Future research could combine interviews with classroom observation, incorporate the perspectives of students, families, and school leaders, and extend the inquiry across regions to examine how context shapes inclusive practice. Studies evaluating specific preparation and support interventions would also be valuable.

VI. CONCLUSION

This study explored how secondary school teachers in Kerala perceive inclusive education and the challenges they face in implementing it. Teachers endorsed inclusion as a principle of fairness and rights yet felt insufficiently prepared and supported to realise it, attributing their difficulties chiefly to structural, curricular, and preparatory conditions rather than to students or to themselves. The findings underscore that inclusion is a whole-system endeavour whose success depends on aligning teacher preparation, school structures, and policy with the participation of every learner. Strengthening teacher education, enabling flexible curricula and assessment, and building collaborative support structures together offer a realistic path toward turning the promise of inclusive education into everyday classroom practice.

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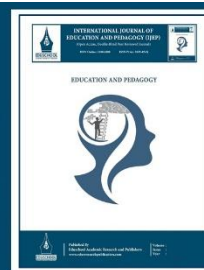


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Game-Based Learning and Student Outcomes: A Systematic Review of Academic Achievement, Motivation, and Implementation Factors

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Abstract

Game-based learning, the use of games and game elements for instructional purposes, has attracted sustained interest as a means of improving learning and motivation, yet its effectiveness and the conditions under which it works remain the subject of debate. This systematic review synthesised the empirical evidence on the effects of game-based learning on student achievement and motivation. Following an established reporting framework, the review searched major educational databases, applied predefined inclusion and exclusion criteria, screened the retrieved records, and synthesised the eligible studies narratively across outcome domains. The synthesised evidence indicates that game-based learning tends to produce small-to-moderate positive effects on achievement relative to conventional instruction, and generally favourable effects on motivation and engagement, although the magnitude of effects varies considerably. This variation is associated with features of design and implementation rather than with the presence of games as such: alignment of game mechanics with learning objectives, the integration of feedback and reflection, appropriate difficulty, and the pairing of games with teacher support emerged as recurring moderators of effectiveness. Methodological limitations across the primary studies, including short interventions and inconsistent outcome measures, temper the strength of these conclusions. The review concludes that game-based learning is a promising but design-dependent approach, and it offers implications for classroom practice, teacher education, and further research in the Indian and international contexts.

Keywords:- Game-Based Learning, Academic Achievement, Motivation, Systematic Review, Educational Technology

I. INTRODUCTION

The idea that games might serve as powerful vehicles for learning has a long history, but it has gained particular momentum with the spread of digital technologies. Games are absorbing, interactive, and responsive; they set goals, provide feedback, and adjust to the player, and these are precisely the features that theories of learning identify as conducive to understanding. Advocates have argued that well-designed games embody sound principles of learning and can engage students in ways that conventional instruction often cannot (Gee, 2003; Prensky, 2001). As schools seek approaches that motivate learners and develop skills beyond rote recall, game-based learning has moved from the margins toward the mainstream of educational innovation.

Game-based learning is commonly understood to encompass the use of games designed for instructional purposes, including serious games and educational simulations, as well as the application of game elements to non-game contexts, a practice often termed gamification (Deterting et al., 2011; Plass et al., 2015). Although these forms differ, they share the aspiration to harness the motivational and cognitive affordances of play for educational ends. The theoretical case rests partly on motivation: games can satisfy needs for autonomy, competence, and relatedness that underpin intrinsic motivation (Ryan & Deci, 2000), and partly on cognition: they can situate learning in meaningful activity and provide immediate, actionable feedback.

These theoretical claims are grounded in several traditions. Constructivist and situated views of learning hold that understanding is built through active, contextualised experience, a description that fits the problem-solving demanded by many games. Self-determination theory explains the motivational pull of games in terms of the satisfaction of basic psychological needs, while cognitive accounts point to the role of feedback, practice, and graduated challenge in consolidating skill. Foundational treatments of game-based learning have sought to integrate these strands, arguing that the affective, behavioural, and cognitive dimensions of engagement operate together in well-designed games (Plass et al., 2015). Such frameworks provide a basis for expecting positive effects while also implying that poorly designed games, which fail to engage the relevant processes, may yield little benefit.

Despite this promise, the empirical picture is mixed. Enthusiastic claims have not always been matched by evidence, and studies vary widely in quality, design, and outcomes. Several reviews and meta-analyses have sought to bring order to this literature, reaching broadly positive but qualified conclusions (Connolly et al., 2012; Clark et al., 2016; Wouters et al., 2013). Yet the field continues to grow rapidly, findings are dispersed, and questions persist about how large the effects are, for which outcomes, and under what conditions. A systematic synthesis is therefore valuable for consolidating what is known and identifying what remains uncertain. Earlier reviews, moreover, differ in scope, in the outcomes they emphasise, and in the periods they cover, and the continuing appearance of new primary studies means that syntheses require periodic updating (Boyle et al., 2016). Consolidating the evidence with explicit methods thus serves both to summarise the current state of knowledge and to expose the gaps that should guide the next phase of inquiry.

This review addressed that need by systematically synthesising the empirical evidence on the effects of game-based learning on student achievement and motivation. It was guided by three questions: what are the effects of game-based learning on academic achievement; what are its effects on motivation and engagement; and what features of design and implementation moderate these effects? By answering these questions, the review aims to inform teachers, teacher educators, and policymakers, including those pursuing the innovative pedagogies encouraged by the National Education Policy 2020 (Ministry of Human Resource Development, 2020), and to guide future research.

A systematic approach to this synthesis is important for several reasons. The volume of primary research on game-based learning is now large and continues to expand, individual studies reach divergent conclusions, and narrative accounts risk selectivity in the studies they emphasise. A transparent, criterion-based review reduces these risks by making explicit how evidence was located, selected, and interpreted, allowing readers to judge the basis of its conclusions. In a context where enthusiasm for educational technology can outpace evidence, and where investment decisions carry real costs, a careful weighing of what the research does and does not support is of practical as well as scholarly value.

II. METHOD

2.1. Review Design and Protocol

The review followed the principles of systematic reviewing, adopting a transparent, replicable procedure defined in advance and reported in accordance with an established framework for the reporting of systematic reviews (Page et al., 2021). A protocol specifying the review questions, search strategy, eligibility criteria, and synthesis approach was prepared before the search was conducted, in order to reduce bias and enhance reproducibility. Because the primary studies were expected to be heterogeneous in design and outcome measurement, a narrative synthesis was planned rather than a statistical meta-analysis.

2.2. Search Strategy

A systematic search of major educational and multidisciplinary databases was undertaken, combining terms related to games, such as game-based learning, serious games, educational games, simulation, and gamification, with terms related to outcomes, such as achievement, learning, attainment, motivation, and engagement, and with terms restricting the population to students. Boolean operators and truncation were used to maximise sensitivity, and the reference lists of relevant reviews were hand-searched to identify additional studies. The search was restricted to peer-reviewed publications in English.

The search strategy was designed to balance sensitivity and specificity, aiming to capture the breadth of relevant work without returning an unmanageable volume of irrelevant records. Search terms were piloted and refined iteratively, and the final strings were adapted to the syntax of each database. To reduce the chance of omitting pertinent studies, the searching of databases was supplemented by examining the reference lists of key reviews and by forward citation searching of seminal works, a combination that improves the comprehensiveness of retrieval in a dispersed field.

2.3. Eligibility Criteria

Predefined inclusion and exclusion criteria, summarised in Table 1, determined the eligibility of studies. Studies were included if they involved students, examined an intervention centred on game-based learning, measured achievement or motivation, employed an empirical comparative or pre-post design, and were published in peer-reviewed English-language outlets. Studies were excluded if they used non-student samples, employed games solely for entertainment, reported no measured learning outcome, or were non-empirical.

Table 1. Inclusion and Exclusion Criteria for the Review

Criterion	Inclusion	Exclusion
Population	School or higher-education students	Non-student or clinical samples
Intervention	Digital or non-digital game-based learning	Games for pure entertainment only
Outcomes	Achievement and/or motivation measures	No measured learning outcome

Design	Empirical, comparative or pre-post	Opinion pieces; non-empirical
Publication	Peer-reviewed, English language	Grey literature; non-English

Note. Criteria were defined a priori in the review protocol.

2.4. Study Selection

The selection proceeded in stages consistent with standard practice. Records identified through the searches were compiled and duplicates removed. Titles and abstracts were then screened against the eligibility criteria, and the full texts of potentially relevant records were retrieved and assessed in detail. Studies meeting all criteria were retained for synthesis, and reasons for exclusion at the full-text stage were recorded. The numbers of records identified, screened, excluded, and included are reported in the results and would ordinarily be depicted in a flow diagram.

To enhance the reliability of selection, screening decisions were guided by the explicit criteria rather than by impression, and ambiguous cases were resolved by returning to the protocol and, where appropriate, by discussion. Maintaining a record of decisions and of the reasons for exclusion at the full-text stage supports the transparency and reproducibility that distinguish systematic from narrative reviewing, and allows the boundaries of the evidence base to be clearly understood.

2.5. Data Extraction and Quality Appraisal

From each included study, information was extracted on the sample, educational level, subject area, type of game and its implementation, study design, outcome measures, and reported effects. The methodological quality of the studies was appraised with attention to features such as the presence of a comparison group, random or matched assignment, sample size, and the validity of outcome measures, so that the strength of the evidence could be weighed in the synthesis. This appraisal informed the interpretation of findings rather than serving as a threshold for inclusion.

Extracting information in a structured and consistent manner served two purposes. It ensured that the same categories of information were considered for every study, guarding against selective attention to particular findings, and it created an organised basis from which patterns across studies could be discerned. Where studies reported effects in different metrics, these were interpreted in terms of their direction and approximate magnitude rather than forced into a common statistic, in keeping with the narrative synthesis adopted.

2.6. Synthesis Approach

Given the heterogeneity of the studies, the findings were synthesised narratively and organised by outcome domain, namely achievement, motivation, and engagement, and by the moderating features associated with variation in effects. Within each domain, the direction and consistency of the evidence were summarised, and patterns across studies were identified inductively. This approach preserved the nuance of diverse studies while allowing overarching conclusions to be drawn.

III. RESULTS

3.1. Overview of Included Studies

The searches yielded a large body of records, which after the removal of duplicates and the screening of titles, abstracts, and full texts against the eligibility criteria were reduced to a set of empirical studies eligible for synthesis. The specific counts at each stage are reported in the review's flow of information and are treated here as placeholders to be completed with the results of the executed search. The included studies spanned a range of educational levels, subject areas, game types, and countries, and employed designs ranging from randomised experiments to pre-post comparisons, a heterogeneity that shaped the narrative approach to synthesis.

This diversity, while complicating direct comparison, is a strength as well as a challenge, for it allows the synthesis to examine whether findings hold across varied conditions rather than in a single narrow context. The included studies also varied in the role assigned to the teacher, in whether the game supplemented or replaced conventional instruction, and in the duration of exposure, factors that proved relevant to interpreting the pattern of effects reported in the following sections.

3.2. Effects on Academic Achievement

Across the included studies, the balance of evidence indicated that game-based learning was associated with small-to-moderate positive effects on achievement relative to conventional instruction, consistent with the conclusions of major meta-analyses in the field (Vogel et al., 2006; Sitzmann, 2011; Wouters et al., 2013; Clark et al., 2016). The effects were not uniform, however, and a minority of studies reported negligible or negative differences. This variability suggests that games do not improve learning by their mere presence but depend on how they are designed and used, a theme developed below.

The pattern of achievement effects also appeared to differ by the kind of learning assessed. Effects tended to be more evident for the application of knowledge and for problem-solving than for the recall of isolated facts, a distinction that fits the interactive and goal-directed character of games. Where outcome measures were closely matched to the content and skills the game addressed, effects were more consistently positive, whereas mismatches between what the game taught and what the test measured tended to attenuate observed benefits. This underscores the importance of alignment not only in design but in evaluation.

3.3. Effects on Motivation and Engagement

The evidence concerning motivation and engagement was generally favourable, with many studies reporting that game-based approaches heightened interest, enjoyment, and participation (Connolly et al., 2012; Hamari et al., 2014). At the same time, motivational benefits did not always translate into achievement gains, and some engagement appeared attributable to

novelty that might diminish over time. Reviews of gamification in particular have cautioned that motivational effects are positive but context-dependent, varying with the elements employed and the setting (Hamari et al., 2014). The evidence thus supports motivational promise while counselling against assuming that engagement guarantees learning.

A recurring nuance concerned the distinction between situational interest, aroused by the immediate novelty and enjoyment of a game, and more durable individual interest in the subject matter. Several studies suggested that games are effective at generating the former, but that converting it into the latter requires deliberate design and teacher mediation that connect the enjoyable experience to the underlying content. Without this, motivational gains may prove transient, fading as the novelty of the format wears off, an interpretation consistent with cautions raised in reviews of gamification (Hamari et al., 2014).

3.4. Moderators of Effectiveness

A consistent message across the literature is that the effectiveness of game-based learning is moderated by features of design and implementation rather than determined by the medium itself. Recurring moderators included the alignment of game mechanics with the intended learning objectives, the provision of feedback and opportunities for reflection, an appropriate level of challenge, and the integration of the game with teacher guidance and follow-up (Clark et al., 2016; Girard et al., 2013; Ke, 2009). The development of higher-order and twenty-first-century skills, as opposed to factual recall, has also been associated with particular design features (Qian & Clark, 2016). These patterns are summarised in Table 2.

Table 2. Summary of Synthesised Evidence by Outcome Domain

Outcome domain	Direction of evidence	Key moderators
Academic achievement	Small-to-moderate positive	Objective alignment, feedback, teacher support
Motivation	Generally positive	Autonomy, challenge, relevance
Engagement	Positive but variable	Novelty, game quality, integration

Note. Directions reflect the balance of evidence across the included studies rather than a pooled statistical estimate.

3.5. Variation by Game Type and Educational Level

The evidence base encompassed diverse forms of game-based learning, from immersive simulations and purpose-built serious games to the application of game elements such as points and levels to conventional tasks. Although firm comparisons were limited by heterogeneity, the synthesis suggested that games modelling authentic systems and processes were particularly suited to developing conceptual understanding, whereas lighter gamification more often influenced engagement than deep learning. Effects also appeared across educational levels, but the conditions for success, especially the need for teacher framing and integration, were a consistent thread from school to higher education, indicating that the medium's benefits are mediated by pedagogy at every level.

3.6. Quality of the Evidence

The methodological quality of the primary studies was variable. Common limitations included short intervention durations, small samples, an absence of active comparison conditions, and heterogeneous or researcher-designed outcome measures, all of which complicate comparison across studies and inflate the risk of overestimating effects. More recent syntheses have noted gradual improvements in study quality alongside continuing inconsistency (Boyle et al., 2016). These limitations imply that the positive overall picture should be regarded as promising but provisional.

IV. DISCUSSION

4.1. Summary of Evidence

Taken together, the synthesised evidence supports a qualified endorsement of game-based learning. Games tend to produce modest positive effects on achievement and generally favourable effects on motivation and engagement, but these effects vary substantially and depend on how games are designed and embedded in instruction. This conclusion aligns with the broad thrust of existing meta-analyses, which report positive average effects accompanied by considerable heterogeneity (Wouters et al., 2013; Clark et al., 2016). The review therefore neither vindicates uncritical enthusiasm nor justifies dismissal, but points to a contingent effectiveness shaped by design.

4.2. Interpretation

The centrality of design and implementation is theoretically intelligible. Games are likely to support learning when their mechanics require the very cognition that the learning objectives target, when they provide feedback that guides improvement, and when a teacher helps students connect the experience of play to the concepts being learned (Plass et al., 2015). Motivational benefits, meanwhile, are consistent with accounts emphasising autonomy, competence, and challenge (Ryan & Deci, 2000), but they are fragile where novelty rather than genuine interest drives engagement. The evidence thus reframes the question from whether games work to how they must be designed and used to work.

This reframing has methodological as well as practical significance. If effectiveness is a property of the design-and-implementation package rather than of games in the abstract, then studies that compare games with non-games without specifying the relevant design features will tend to produce inconsistent results, as indeed the literature shows. Progress depends on moving beyond global comparisons toward research that isolates the active ingredients, clarifying which features

of a game, for which purposes, account for its effects. The heterogeneity that frustrates simple conclusions is therefore itself informative, pointing to design as the locus of explanation.

4.3. Implications for Practice

For practice, the review suggests that adopting games is unlikely to benefit learning unless attention is paid to alignment, feedback, challenge, and integration with teaching. Teachers are not peripheral to game-based learning but central to it, framing the activity, supporting reflection, and linking play to curricular goals. Teacher education should therefore prepare teachers to select, adapt, and orchestrate games rather than merely to deploy them. In systems such as India's, where policy encourages innovative and experiential pedagogies (Ministry of Human Resource Development, 2020), these conditions are especially important if investment in game-based approaches is to yield genuine learning gains.

The review also implies a measured stance toward procurement and policy. Because effectiveness resides in design and use rather than in the technology itself, decisions to adopt particular games or platforms should be accompanied by attention to how they will be integrated into teaching, supported by professional development, and evaluated against learning objectives. Resources directed solely at acquiring games, without corresponding investment in teacher capacity and thoughtful implementation, are unlikely to realise the benefits the evidence suggests are possible.

4.4. Limitations of the Review

This review has limitations. The restriction to peer-reviewed, English-language publications may have introduced publication and language biases, and the heterogeneity of the primary studies precluded a statistical meta-analysis, so conclusions about the direction and consistency of evidence are necessarily qualitative. The dependence of the synthesis on the quality of the underlying studies means that its conclusions inherit their limitations. Finally, the rapid evolution of the field implies that any synthesis captures a moving target, and newer forms of game-based learning may differ from those represented in the accumulated evidence.

A further consideration concerns the decision to synthesise the evidence narratively rather than statistically. While this choice was warranted by the diversity of designs and measures, it means that the review reports the direction and consistency of findings rather than a precise pooled magnitude, and narrative synthesis, for all its transparency, involves interpretive judgement. Readers should therefore weigh the conclusions as a reasoned reading of a heterogeneous literature rather than as a single quantitative estimate, and consult the primary meta-analyses where pooled effect sizes are required.

4.5. Directions for Future Research

Future research would benefit from methodologically stronger primary studies employing randomised or well-matched designs, adequate samples, longer interventions, and validated, comparable outcome measures. Research disentangling which specific design features drive effects, and for which learners and subjects, would be especially valuable, as would studies examining the durability of motivational benefits beyond initial novelty. Given the concentration of evidence in certain contexts, studies situated in under-represented settings, including Indian schools, would strengthen the generalisability of conclusions. Consistent reporting of design features, implementation conditions, and outcome measures would further allow future syntheses to move beyond the question of overall effectiveness toward a cumulative understanding of the conditions under which game-based learning succeeds.

V. CONCLUSION

This systematic review synthesised the evidence on the effects of game-based learning on student achievement and motivation. The evidence indicates that game-based learning can produce modest gains in achievement and generally positive effects on motivation and engagement, but that its effectiveness is contingent on design and implementation rather than guaranteed by the use of games. Alignment with learning objectives, feedback and reflection, appropriate challenge, and integration with teaching emerged as the conditions under which games are most likely to support learning. Game-based learning is thus best understood as a promising and design-dependent approach, warranting thoughtful adoption, strong teacher preparation, and more rigorous research to realise its potential.

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Learning Beyond the Classroom: Examining Achievement and Engagement in Blended Learning Environments

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Abstract

Blended learning, which integrates face-to-face instruction with technology-mediated online components, has gained prominence as schools seek flexible and learner-centred pedagogies. This study examined the effect of a blended learning approach on the academic achievement and classroom engagement of secondary school students in Kerala, India. A quasi-experimental, non-equivalent control group design was employed with 120 ninth-grade students drawn from two comparable government-aided schools. The experimental group ($n = 60$) received eight weeks of blended instruction combining classroom teaching with a learning management system, interactive video lessons, and online formative quizzes, while the control group ($n = 60$) received conventional lecture-based instruction. Academic achievement was measured using a validated 40-item subject achievement test administered as pre-test and post-test, and engagement was assessed with a 20-item student engagement scale measuring behavioural, emotional, and cognitive dimensions. Analysis of covariance (ANCOVA), controlling for pre-test scores, revealed a statistically significant difference in post-test achievement favouring the experimental group ($F = 28.64, p < .001$), with a large effect size (partial eta squared = .20). The blended learning group also reported significantly higher engagement across all three dimensions, with the largest gain in cognitive engagement. Findings suggest that a well-structured blended approach can enhance both learning outcomes and engagement at the secondary level. The study recommends sustained teacher training in blended pedagogy and improved digital infrastructure, and discusses implications for classroom practice, curriculum design, and education policy.

Keywords:- Blended Learning, Academic Achievement, Student engagement, secondary education, educational technology

I. INTRODUCTION

The rapid diffusion of digital technologies into schooling has reshaped expectations about how learning is organised and delivered. Across the world, the classroom is no longer confined to physical walls or fixed timetables, and learners increasingly move between face-to-face and digital spaces in the course of a single lesson. In many education systems, however, the conventional teacher-centred lecture remains the dominant mode of instruction at the secondary level, and policymakers and practitioners increasingly question whether it adequately supports the diverse learning needs of contemporary students, many of whom have grown up immersed in digital media (Prensky, 2001). Blended learning, understood as the deliberate integration of face-to-face classroom instruction with technology-mediated online experiences, has emerged as a pragmatic response to this concern (Graham, 2006). Rather than replacing the teacher, blended learning repositions classroom time toward interaction, feedback, and higher-order thinking while shifting routine content delivery to flexible online components.

The case for blended learning in India has been strengthened by recent policy developments. The National Education Policy 2020 explicitly encourages the integration of technology into teaching and learning and promotes blended modes of instruction as a means of improving access, equity, and quality (Ministry of Human Resource Development, 2020). The disruption caused by the COVID-19 pandemic further accelerated the adoption of online and blended practices, compelling schools that had relied almost entirely on face-to-face teaching to experiment with digital delivery. As schools have returned

to in-person instruction, a central question is whether the digital capabilities developed during that period can be retained and combined with classroom teaching to produce durable improvements in learning.

In the Indian context, the expansion of internet connectivity, low-cost devices, and government initiatives promoting information and communication technology in schools has created conditions in which blended approaches are increasingly feasible, even in semi-urban and rural settings. Kerala, with its high literacy rate and relatively strong public education infrastructure, offers a particularly instructive setting for examining whether blended learning can deliver measurable benefits. The state has invested heavily in digital classrooms and teacher capacity, yet the extent to which these investments translate into improved learning outcomes at the school level has not been firmly established through controlled study.

Despite growing enthusiasm, the empirical foundation for blended learning at the secondary level in India remains limited. Much of the influential evidence derives from higher education or from Western contexts whose infrastructure, class sizes, and cultural expectations differ markedly from those of Indian secondary schools (Bernard et al., 2014; Means et al., 2013). Where technology is introduced without careful pedagogical design, it may add cost and complexity without improving outcomes (Boelens et al., 2017). There is therefore a pressing need for rigorous, context-sensitive studies that test whether blended learning delivers real benefits for school-age learners in Indian settings.

The present study addresses this need by evaluating a structured eight-week blended learning intervention with ninth-grade students in Kerala. Two research questions guided the inquiry: first, does blended learning produce greater academic achievement than conventional instruction when prior achievement is held constant; and second, does blended learning enhance student engagement across its behavioural, emotional, and cognitive dimensions? Correspondingly, the study tested the directional hypotheses that students receiving blended instruction would achieve significantly higher post-test scores and report significantly higher engagement than those receiving conventional instruction. The significance of the study lies in its provision of quasi-experimental evidence from an under-researched setting and in its practical guidance for teachers, curriculum designers, and administrators weighing the adoption of blended models.

II. LITERATURE REVIEW

2.1. Conceptualising Blended Learning

Definitions of blended learning vary, but most converge on the idea of combining physical classroom instruction with online learning in a manner that is intentional and pedagogically driven rather than incidental (Garrison & Kanuka, 2004). Graham (2006) situates blended learning on a continuum between fully face-to-face and fully online instruction, emphasising that the value lies not in the mere presence of technology but in the thoughtful design of the mix. Garrison and Vaughan (2008) argue that effective blends fundamentally rethink course design rather than simply adding digital resources to existing lessons. Halverson et al. (2014), reviewing the first decade of scholarship in the field, note a persistent emphasis on interaction, flexibility, and learning effectiveness as recurring themes. Early perspectives similarly stressed the capacity of blended designs to enrich interaction and widen access, while acknowledging the additional demands they place on teachers' time and technological fluency (Vaughan, 2007).

2.2. Models and Design of Blended Learning

Researchers have proposed several frameworks for organising blended instruction, and comprehensive treatments have mapped the field across a range of global contexts and local designs (Bonk & Graham, 2006). Staker and Horn (2012) classify K-12 blended learning into rotation, flex, self-blend, and enriched-virtual models, with the rotation model, in which students alternate between online and face-to-face modalities on a fixed schedule, being the most common in schools. Picciano (2009) advances a multimodal model that stresses matching learning objectives to appropriate media and activities. Christensen, Horn, and Staker (2013) frame blended learning as a potentially disruptive innovation capable of reshaping conventional schooling. Across these frameworks, a common insight is that design quality, rather than technology alone, determines effectiveness, a point reinforced by Boelens et al. (2017), who identify flexibility, interaction, learner support, and affective climate as key design challenges.

2.3. Blended Learning and Academic Achievement

A substantial body of meta-analytic evidence suggests that blended learning can modestly outperform both purely face-to-face and purely online instruction. Means et al. (2013), synthesising empirical studies, found that students in blended conditions tended to achieve better outcomes than those receiving conventional instruction, attributing the advantage partly to increased learning time and opportunities for practice. Bernard et al. (2014) similarly reported a small but positive average effect in higher education, while cautioning that outcomes depend heavily on implementation quality. Within Hattie's (2009) broader synthesis of influences on achievement, factors closely associated with well-designed blends, such as feedback and formative evaluation, rank among the most powerful. Studies at the secondary level remain fewer, but emerging evidence indicates that carefully designed blended interventions can support conceptual understanding and retention.

2.4. Student Engagement in Blended Environments

Engagement is widely theorised as a multidimensional construct encompassing behavioural participation, emotional investment, and cognitive effort (Fredricks et al., 2004). Because engagement predicts persistence and achievement, it is a critical outcome in its own right (Wang & Degol, 2014). Blended designs may support engagement by offering varied modalities, immediate feedback through online quizzes, and greater learner autonomy, which self-determination theory identifies as a basic psychological need underpinning intrinsic motivation (Deci & Ryan, 2000). Rovai and Jordan (2004) found that blended courses fostered a stronger sense of community than fully online formats, suggesting an affective advantage. However, the relationship is not guaranteed, and poorly integrated technology can fragment attention and reduce engagement.

2.5. Blended Learning in the Indian and Asian Context

Research on blended learning in Asian school systems is expanding but remains uneven. Studies from the region frequently highlight infrastructural constraints, large class sizes, and variable teacher readiness as moderators of success, while also noting strong student receptivity to digital tools. Reviews of the flipped classroom, a widely studied variant of blended learning, report generally positive effects on achievement and engagement across diverse subject areas, though with considerable variation attributable to design and context (Zainuddin & Halili, 2016). In India specifically, most rigorous evaluations have concentrated on higher education or professional training, leaving secondary schooling comparatively under-examined. This imbalance limits the guidance available to school leaders and teachers who are being encouraged by policy to adopt blended methods.

2.6. Theoretical Framework

This study is framed by social constructivist theory, which holds that learning is an active, socially mediated process in which learners construct understanding through interaction and guided support (Vygotsky, 1978). Within this perspective, the online components of a blended design serve as scaffolds that extend the learner's zone of proximal development, while face-to-face time provides the social interaction and expert guidance essential for consolidation. The community of inquiry framework complements this view by identifying cognitive, social, and teaching presence as interdependent conditions for meaningful learning in technology-mediated settings (Garrison et al., 2000). Together these perspectives underpin the intervention design and the interpretation of its effects on both achievement and engagement.

2.7. Research Gap and Hypotheses

The reviewed literature establishes that blended learning holds promise but that its effects are contingent on design and context, and that rigorous secondary-level evidence from Indian settings is scarce. To address this gap, the study tested two hypotheses. The first stated that students receiving blended instruction would demonstrate significantly higher post-test academic achievement than those receiving conventional instruction, after controlling for prior achievement. The second stated that students receiving blended instruction would report significantly higher engagement, across behavioural, emotional, and cognitive dimensions, than their conventionally taught peers.

III. METHODS

3.1. Research Design

A quasi-experimental, non-equivalent control group design with pre-test and post-test measures was adopted. A true experimental design with random assignment of individual students was not feasible because intact classes had to be preserved to avoid disrupting normal school functioning. Two comparable classes were therefore assigned to the experimental and control conditions, and pre-existing differences were statistically controlled through analysis of covariance. This design is widely used in educational field research because it balances internal validity with the practical realities of school settings.

3.2. Participants and Sampling

Participants were 120 ninth-grade students, 60 in each group, from two government-aided secondary schools in the Malappuram district of Kerala. The two schools were purposively selected for their comparable socio-economic catchment, similar prior academic performance in state examinations, and equivalent access to basic digital infrastructure, including a computer laboratory and classroom projection facilities. Within each school, one intact section was assigned to the study, and the two sections were then allocated to the experimental and control conditions. The sample comprised 64 girls and 56 boys, with a mean age of 14.3 years ($SD = 0.5$). A power analysis conducted prior to data collection indicated that this sample was sufficient to detect a medium effect at the .05 significance level with adequate statistical power.

3.3. The Blended Learning Intervention

The intervention followed a rotation model in which approximately half of the instructional content was delivered online and half through face-to-face teaching. Online components were hosted on a learning management system and comprised short interactive video lessons, curated readings, and weekly formative quizzes that provided automated feedback. Classroom sessions were deliberately redesigned to capitalise on the time freed by online delivery, focusing on guided discussion, collaborative problem-solving, and clarification of misconceptions. Each week followed a consistent cycle: students engaged with online material before class, applied and extended their understanding during face-to-face sessions, and consolidated learning through an online quiz. The control condition covered identical curricular content through conventional lecture-based instruction supplemented by textbook exercises, without structured online components.

3.4. Instruments

Two instruments were used. Academic achievement was measured with a 40-item multiple-choice subject achievement test aligned to the prescribed ninth-grade science syllabus and constructed to sample knowledge, understanding, and application. Student engagement was measured with a 20-item scale assessing behavioural, emotional, and cognitive engagement on a five-point Likert format, adapted from established engagement instruments (Fredricks et al., 2004). Both instruments were administered under standardised conditions by trained invigilators to ensure comparability across the two groups.

3.5. Validity and Reliability

Content validity of the achievement test was established through review by three subject experts, who evaluated the alignment of items with syllabus objectives and the balance of cognitive demand. The engagement scale was similarly reviewed for clarity and relevance. A pilot study with 30 students from a non-participating school was conducted to refine ambiguous items and estimate reliability. The achievement test yielded a Kuder-Richardson (KR-20) reliability coefficient of .84, and the engagement scale demonstrated satisfactory internal consistency, with a Cronbach's alpha of .89 for the full scale and acceptable values for each subscale.

3.6. Procedure

The study was conducted over a ten-week period during a single academic term. In the first week, the achievement test and engagement scale were administered to both groups as pre-tests. The eight-week intervention then proceeded, with both groups taught by teachers of comparable qualifications and experience who received a common briefing to standardise content coverage and pacing. The researcher monitored implementation through periodic classroom observation to ensure fidelity to the intended design. In the final week, the achievement test and engagement scale were re-administered as post-tests under conditions identical to the pre-test.

3.7. Ethical Considerations

Ethical approval was obtained from the institutional review committee prior to data collection. Written informed consent was secured from parents or guardians, and assent was obtained from the students themselves. Participation was voluntary, confidentiality was maintained by anonymising all records, and students in the control group were assured access to the online learning materials after the study concluded, so that no participant was disadvantaged by the research.

3.8. Data Analysis

Data were analysed using descriptive statistics followed by one-way analysis of covariance (ANCOVA) for each dependent variable, with the corresponding pre-test score entered as the covariate. Prior to the main analyses, the assumptions of normality, homogeneity of variance, linearity, and homogeneity of regression slopes were examined. Partial eta squared was reported as the measure of effect size, and statistical significance was evaluated at the .05 level. Engagement subscales were analysed separately to identify the dimensions most affected by the intervention.

IV. RESULTS

4.1. Preliminary Analyses

Before conducting the main analyses, the data were screened for missing values and violations of statistical assumptions. Distributions of the dependent variables were approximately normal, Levene's test indicated homogeneity of variance, and the interaction between the covariate and the independent variable was non-significant, confirming homogeneity of regression slopes. These results supported the appropriateness of ANCOVA. At pre-test, the two groups were closely matched on both achievement and engagement, as shown in Table 1, indicating comparable starting points.

4.2. Effect on Academic Achievement

Descriptive statistics and adjusted means for both dependent variables are presented in Table 1.

Table 1. Descriptive Statistics and Adjusted Means for Achievement and Engagement by Group

Variable	Group	Pre-test M (SD)	Post-test M (SD)	Adjusted M
Academic achievement	Experimental	18.4 (4.1)	31.7 (4.6)	31.2
	Control	18.1 (3.9)	25.9 (4.8)	26.4
Student engagement	Experimental	62.3 (7.8)	81.6 (6.9)	81.1
	Control	61.9 (8.1)	70.4 (7.5)	70.9

Note. n = 60 per group. Adjusted means are estimated marginal means from ANCOVA with the corresponding pre-test as covariate.

For academic achievement, ANCOVA indicated a statistically significant effect of the intervention after controlling for pre-test scores, $F(1, 117) = 28.64$, $p < .001$, partial eta squared = .20. The adjusted post-test mean of the experimental group (31.2) exceeded that of the control group (26.4), reflecting a substantial advantage for blended instruction. The effect size indicates that approximately one-fifth of the variance in post-test achievement, after accounting for prior achievement, was associated with the instructional condition. The first hypothesis was therefore supported.

4.3. Effect on Student Engagement

For overall student engagement, ANCOVA likewise revealed a statistically significant effect favouring the experimental group, $F(1, 117) = 34.12$, $p < .001$, partial eta squared = .23. To locate the source of this effect, the three engagement dimensions were analysed separately, as reported in Table 2.

Table 2. Post-test Engagement Scores by Dimension and Group

Engagement dimension	Experimental M (SD)	Control M (SD)	Partial eta sq.
Behavioural	27.1 (2.6)	24.0 (2.9)	.18
Emotional	26.8 (2.8)	23.5 (3.1)	.20
Cognitive	27.7 (2.4)	22.9 (3.0)	.26

Note. Post-test means are reported. All between-group differences were significant at $p < .001$.

As Table 2 shows, the experimental group scored significantly higher than the control group on all three dimensions, with the largest difference observed for cognitive engagement (partial eta squared = .26), followed by emotional and behavioural engagement. This pattern suggests that the blended design was especially effective in encouraging deeper, effortful processing of content. The second hypothesis was therefore supported across all dimensions.

4.4. Summary of Findings

Taken together, the results indicate that the blended learning intervention produced meaningful gains in both academic achievement and engagement relative to conventional instruction. The effects were statistically significant, of substantial magnitude, and consistent across the engagement subscales, providing robust support for both hypotheses.

V. DISCUSSION

5.1. Academic Achievement

The findings offer clear support for the effectiveness of a well-structured blended learning approach at the secondary level. The significant achievement advantage aligns with prior meta-analytic evidence indicating that blended designs can outperform conventional instruction (Means et al., 2013; Bernard et al., 2014). The magnitude of the effect observed here is larger than the average reported in higher-education syntheses, which may reflect the tightly designed nature of the intervention, the close alignment of online components with classroom activity, and the salience of feedback and formative assessment, factors known to exert strong influence on achievement (Hattie, 2009).

5.2. Student Engagement

The engagement results are equally noteworthy. Consistent with the social constructivist framing (Vygotsky, 1978), shifting routine content delivery online appeared to free classroom time for interaction and guided problem-solving, thereby deepening cognitive engagement. The prominence of cognitive engagement gains is consistent with the community of inquiry emphasis on cognitive presence (Garrison et al., 2000), while the affective gains echo evidence that blended environments can strengthen emotional investment and sense of community (Rovai & Jordan, 2004). The autonomy afforded by self-paced online material may also have supported motivation, as predicted by self-determination theory (Deci & Ryan, 2000).

5.3. Theoretical Implications

Theoretically, the results reinforce the view that the benefits of blended learning derive from the redesign of learning activity rather than from technology in isolation. The convergence of achievement and engagement gains supports frameworks that treat cognitive, social, and teaching presence as interdependent, and suggests that blended designs succeed when they strengthen all three simultaneously. The findings extend social constructivist and community of inquiry perspectives from their origins in higher education to the secondary school context, indicating that these frameworks retain explanatory value for younger learners.

5.4. Practical and Policy Implications

For teachers, the study suggests that the value of blended learning lies less in technology per se than in the redesign of classroom time it enables, and that professional development should therefore focus on pedagogical design rather than on tools alone. For curriculum designers and administrators, the results underscore the importance of investing in teacher preparation and reliable digital infrastructure, without which the potential of blended models is unlikely to be realised (Boelens et al., 2017). At the policy level, the findings lend empirical weight to the encouragement of blended approaches in the National Education Policy 2020, while cautioning that implementation quality, rather than adoption alone, will determine whether such policies improve learning.

5.5. Limitations

Several limitations temper these conclusions. The quasi-experimental design, while pragmatic, does not permit the causal certainty of randomised assignment, and unmeasured differences between intact classes may have influenced outcomes. The eight-week duration limits inferences about long-term retention, and the single-district sample constrains generalisability. Reliance on self-report for engagement introduces the possibility of response bias, and the novelty of a new instructional format may have temporarily inflated engagement. Finally, the study focused on a single subject area, and effects may differ across disciplines.

5.6. Directions for Future Research

Future research should employ longer interventions with delayed post-tests to assess the durability of gains, multiple sites to strengthen generalisability, and mixed-methods designs to illuminate the mechanisms through which blended learning operates. Comparative studies across subjects and grade levels would clarify the conditions under which blended approaches

are most effective, and investigations of teacher and student perceptions would enrich understanding of implementation. Research attentive to equity, examining whether blended learning narrows or widens gaps for disadvantaged learners, is especially warranted given the policy emphasis on inclusion.

VI. CONCLUSION

This study examined whether a structured blended learning intervention could enhance the academic achievement and engagement of secondary school students in Kerala. The evidence indicates that it can: after controlling for prior achievement, students in the blended condition significantly outperformed their peers on both outcomes, with substantial effect sizes and consistent gains across all engagement dimensions. These findings contribute to a still-limited body of rigorous secondary-level research in the Indian context and reinforce the view that the benefits of blended learning depend on thoughtful pedagogical design rather than technology alone. Realising these benefits at scale will require sustained teacher training, dependable infrastructure, and genuine curricular integration. With such support, blended learning offers a promising pathway toward more engaging and effective secondary education.

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