

The Temporal Ecology of ESL Instruction: Deconstructing the Impact of Timetable Allocation on Pedagogical Dynamics and Learner Receptivity in Secondary Education

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ABSTRACT

This study investigates the structural allocation of time in daily school timetables and its impact on the teaching and learning of English as a Second Language (ESL) in Malaysian secondary schools. Grounded in Eisner's Ecology of Schooling (Structural Dimension) and Goodlad's resource allocation framework, this qualitative explanatory case study examines how time-of-day variations influence teacher operational states, learner cognitive-affective receptivity, and pedagogical decision-making. Data were collected at a suburban secondary school in Sabah through semi-structured interviews, dual-period classroom observations (morning vs. late morning/afternoon), and document analysis involving three experienced ESL teachers. Qualitative content analysis revealed two primary emergent themes: Diurnal Operational States and Affective-Cognitive Receptivity and Pedagogical Adaptations and Structural Timetabling Mismatch. Findings demonstrate that early-morning periods (7:00 AM–10:00 AM) constitute optimal “teachable” and “learnable” windows, characterized by high teacher vitality, learner alertness, active engagement, and superior writing productivity. Conversely, late-morning and late-afternoon allocations (10:30 AM–2:00 PM) lead to severe cognitive fatigue, passive resistance, reduced idea generation, and teacher burnout. The study highlights the mismatch between administrative scheduling practices and pedagogical realities, offering practical recommendations for chronobiology-informed timetabling, flexible curriculum planning, and educational administration.

Keywords: chronobiology, ESL pedagogy, learnable periods, school timetabling, structural dimension, temporal ecology.

INTRODUCTION

In the contemporary globalized era, English language proficiency is a cornerstone of human capital development, business, science, and diplomacy. In Malaysia, the Ministry of Education (MOE) has implemented continuous systemic reforms, curriculum reviews, and professional development initiatives to bolster English as a Second Language (ESL) acquisition. Despite these macro-level interventions, a persistent issue facing language educators is the inconsistency in classroom outcomes. While pedagogical strategies and student personality traits are frequently scrutinised, practitioners argue that external structural parameters within the school operating environment exert a profound, often overlooked, influence on classroom success.

Schooling operates within complex organisational structures comprising teaching practices, physical environments, instructional materials, administrative controls, and resource allocation. Goodlad (2004) identifies time as virtually the most precious learning resource available to educational institutions, noting that school-to-school and schedule-to-schedule variations in time deployment create systemic inequities in learning opportunities. In many Malaysian secondary schools, the daily schedule is organized mechanically into uniform time blocks, with little regard for the physiological and psychological readiness of teachers and students across different periods of the day. ESL instruction is routinely scattered across early-morning, late-

morning, and afternoon slots without strategic prioritisation, treating a high-stakes, cognitively demanding subject as any routine administrative block.

Although informal observations among ESL educators suggest that late-morning and late-afternoon periods are associated with greater learner fatigue and reduced instructional efficacy, empirical research specifically addressing time-of-day dynamics in language learning remains sparse. To address this gap, this study examines the temporal ecology of ESL classrooms in a Malaysian secondary school setting. Grounded in Goodlad's (2004) resource framework and Eisner's (1998) structural dimension, this investigation explores how timetable scheduling affects teachers' conditions, student behavior, and pedagogical practice.

This study addresses the following research questions:

1. How do English language teachers describe their operational conditions when teaching at different periods of the day?
2. How do English language teachers describe student engagement, affective states, and task performance across different periods of the day?
3. How do English language teachers adapt their instructional strategies and pedagogical manoeuvres when teaching at different times of the day?

LITERATURE REVIEW

Time as a Distributed Educational Resource

In educational research, time is frequently operationalized as allocated time, time-on-task, engaged time, or academic learning time. However, the temporal placement of instruction—specifically, time-of-day allocation—receives significantly less systematic attention. Anderson (1985, 2004) defines timing as the degree to which an instructional task is aligned with the learner's current physiological and cognitive state. Effective instruction requires not merely spending time on a task, but synchronizing learning demands with optimal human receptivity. Goodlad (2004) notes that administrators frequently treat time as an infinite or neutral container, failing to recognize that misallocated time diminishes learning opportunities.

Eisner's Structural Dimension and the Ecology of Schooling

Eisner (1998) proposed five operational dimensions that define the 'ecology of schooling,' the key among them being the structural dimension. The structural dimension addresses how the school day is segmented into time blocks and how subject assignments across these blocks dictate educational outcomes. Eisner argues that conventional school schedules impose rigid clock-time constraints that ignore human psychological time. Students are expected to abruptly shift cognitive gears between disparate academic subjects every 35 to 40 minutes. This mechanical organization often disregards whether students or teachers possess the physical, affective, or cognitive energy required for learning in a given domain at a given hour.

Chronobiology and Affective-Cognitive Factors in SLA

Second Language Acquisition (SLA) is a complex undertaking involving cognitive processing, physiological state, and affective variables. Brown (2000) and Ellis (1994) emphasize that affective states—including motivation, anxiety, energy levels, and emotional responsiveness—dictate the degree to which input becomes intake. Diurnal fluctuations in biological rhythm directly influence these affective states.

The Dunn and Dunn Learning Styles Model explicitly incorporates the time element within its physiological preference strand. This model posits that individual energy levels fluctuate predictably across the early-morning, late-morning, early-afternoon, and late-afternoon windows (Dunn & Griggs, 1998; Pytel, 2006). While student energy levels often spike or plummet unpredictably around mid-day, teacher vitality frequently drops post-lunch, producing an imbalance between teacher capacity and student needs. Furthermore, Kounin

and Sherman (1979) established that classroom behavior patterns (standing patterns of behaviour) are direct reactions to specific environmental and temporal settings.

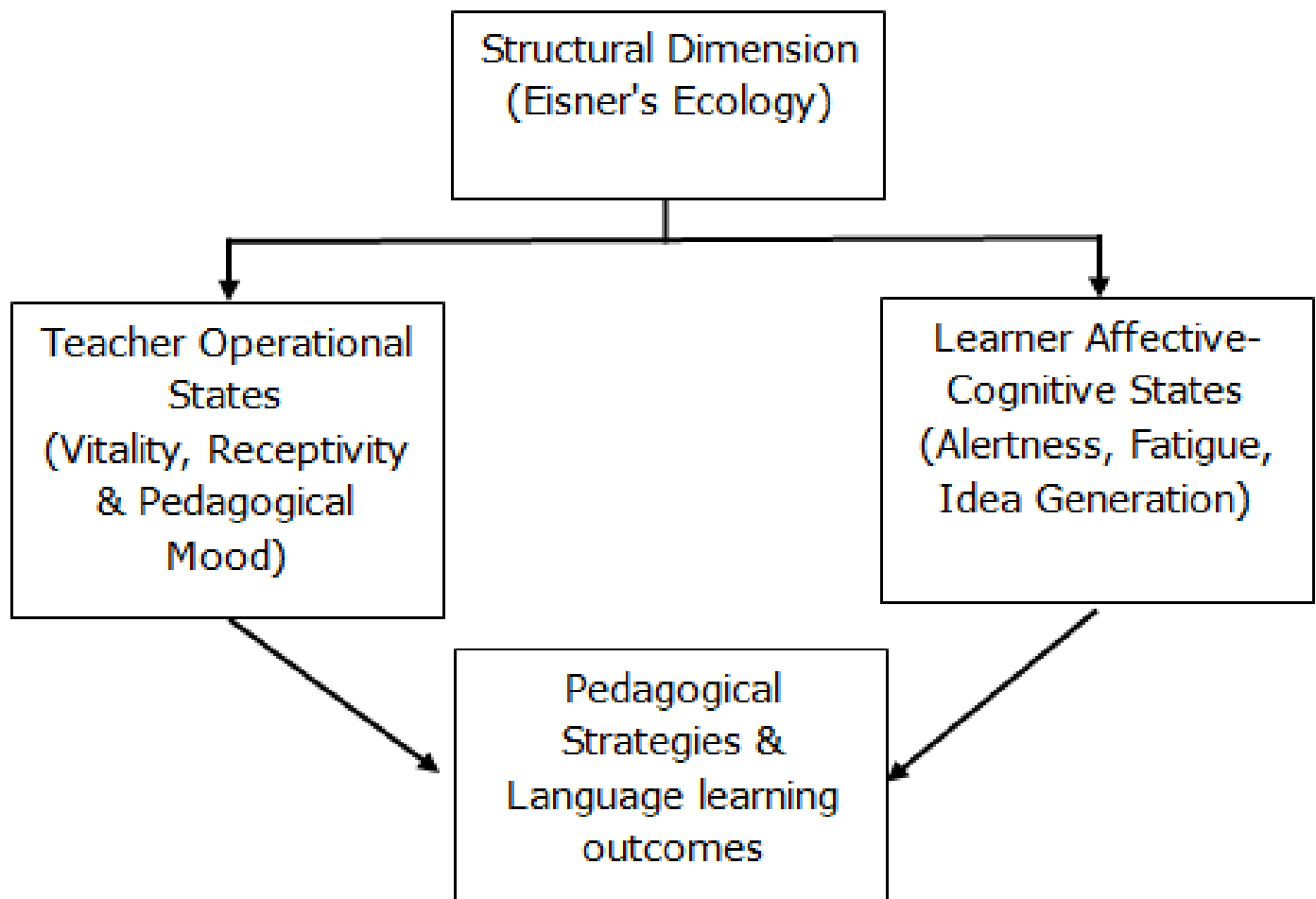


Figure 1: Conceptual Framework for Investigating Time-of-Day Dynamics in ESL Instruction (Adapted from Eisner, 1998; Goodlad, 2004).

Timetabling Realities in Malaysian Secondary Schools

In the Malaysian secondary curriculum, English is allocated five periods per week (35–40 minutes per period), typically structured in a 2-2-1 system across three days. School administrators manage schedule compilation based on teacher period counts and room availability, rather than pedagogical logic. Consequently, despite English being a critical, compulsory subject, its periods are scattered randomly throughout the school day.

METHODOLOGY

Research Design

This study employed an exploratory qualitative explanatory case study design (Hancock & Algozzine, 2006) to investigate how time-of-day allocations influence real-life ESL classroom interactions. Qualitative case study research is appropriate when the boundaries between phenomenon and context are not clearly evident, enabling an in-depth examination of contextual variables.

Setting and Context

The study was conducted at School X, a suburban secondary school in a coastal district of Sabah, Malaysia. Operating on a two-session system due to a large enrolment of 1,784 students, the school serves predominantly lower-middle to working-class families (farmers, fishermen, carpenters, hawkers). English is generally viewed

by the student population as a foreign language, with the majority demonstrating low language proficiency and limited intrinsic motivation.

Participant Profiles

Three experienced secondary ESL teachers were selected using purposive sampling. All participants had over 5 years of teaching experience with traditional timetables and carried a full teaching load of at least 24 periods per week.

Table 1: Profile Matrix of Study Participants.

Participant Pseudonym	Age	Teaching Experience	Qualifications	Classes Taught	Pedagogical Belief System
Teacher A (TA)	30	9 Years	B.Ed. TESL (Hons)	Form 4, 5, 6	Behaviourist; emphasizes drilling, structured practice, and exam preparation.
Teacher B (TB)	44	12 Years	B.Sc. Econ, Dip.Ed (TESL)	Form 3, 4	Nativist/Self-exploratory; focuses on cognitive readiness and learner autonomy.
Teacher C (TC)	29	7 Years	B.Ed. TESL (Hons)	Form 3, 6	Pragmatic; balances exam drilling with authentic real-life application.

Data Collection Procedures

Data collection spanned four sequential phases, incorporating three qualitative instruments:

1. **Semi-Structured Interviews:** Audio-recorded individual interviews conducted in English and Malay to allow participants to express complex perceptions without linguistic inhibition. Prompts focused on daily timetable structures, personal energy levels, and perceived student performance across time slots.
2. **Classroom Observations:** Each teacher was observed twice across contrasting time slots: once during **Early Morning Periods** (7:00 AM–10:00 AM; periods 1–5 before recess) and once during **Late Morning/Afternoon Periods** (10:30 AM–2:00 PM; post-recess). Detailed field notes and observer comments recorded physical energy, teacher mobility, student engagement, and task completion.
3. **Document Analysis:** Teachers' record books, annual syllabi, and daily lesson plans were analysed to cross-verify intended lesson objectives against observed classroom completion rates.

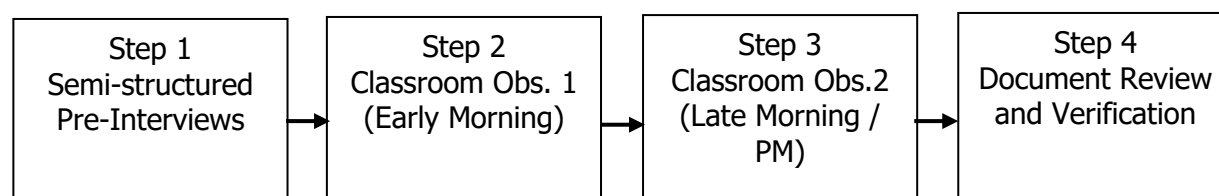


Figure 2: Data Collection Sequence.

Data Analysis and Trustworthiness

Data were analysed using an emergent 7-step qualitative content analysis procedure (Zhang & Wildemuth,

2009). Interview audio was transcribed verbatim, combined with observation field notes, and unitized into meaningful thematic codes through iterative de-contextualization and re-contextualization.

To establish trustworthiness, member checking was conducted; all three participants reviewed, modified, and formally signed off on the final interpreted transcriptions and category systems. An audit trail of coding decisions and triangulation across interviews, observations, and document analysis ensured analytical rigor.

RESULTS AND FINDINGS

Qualitative analysis yielded two primary emergent themes: **Diurnal Operational States and Affective-Cognitive Receptivity** and **Pedagogical Adaptations and Structural Timetabling Mismatch**.

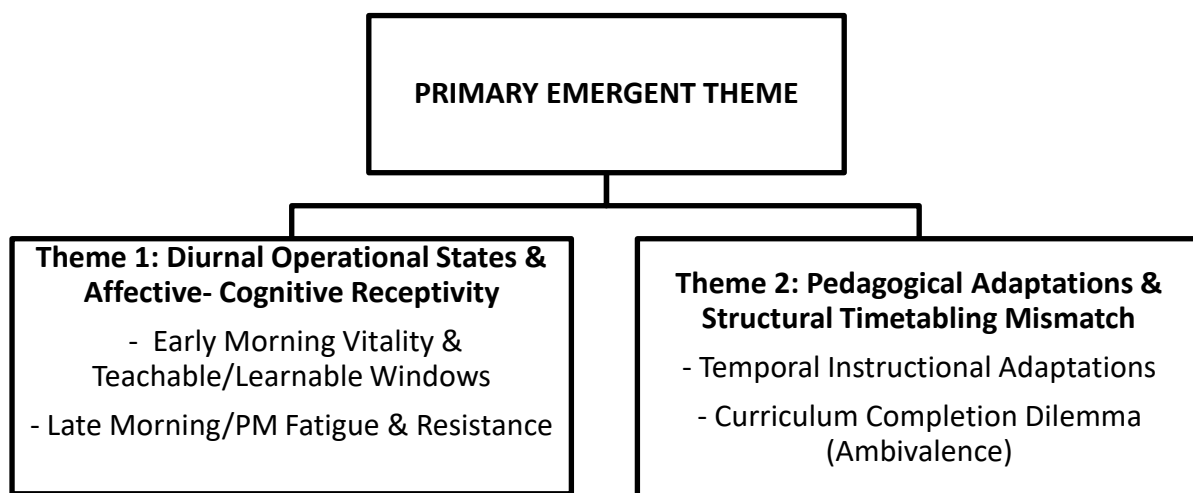


Figure 3: Overview of Emergent Themes and Sub-Categories.

Theme 1: Diurnal Operational States and Affective-Cognitive Receptivity

Early Morning Vitality and “Teachable/Learnable” Windows

All three teachers demonstrated a pronounced contrast in physical vitality, instructional enthusiasm, and affective readiness between morning and afternoon slots. Early morning periods (7:00 AM–10:00 AM) were consistently characterized as optimal “teachable” and “learnable” windows. Teachers reported high energy levels, allowing them to deliver active instruction, monitor student progress, and maintain upbeat classroom environments.

“When you teach in the morning, let’s say early in the morning... You’re in the mood of course and it’s still early and you’ll be more energetic, and your students are supposed to be energetic.”

— TB (Interview 2, Line 17)

Observation field notes during early morning sessions mirrored these self-reports. In TC’s 7:00 AM Form 3 class, active interaction was continuous:

“At this point, I can see that she is very energetic, as she was moving from a place to another when students call her... The students were energetic too; they kept on asking TC, jotted down the answers. Some of the students were busy flipping their dictionaries.”

— Field Notes (23rd June 2009, Line 34)

During these early windows, student cognitive receptivity, alertness, and focus were at their peak. Teachers noted that students processed complex language input efficiently, participated willingly in group tasks, and demonstrated high rates of task completion. In TB's morning literature lesson, students actively called out answers regarding novel themes and moral values without prompting.

Late Morning and Afternoon Cognitive Degradation

In stark contrast, lessons conducted post-recess (10:30 AM–2:00 PM) suffered from severe physical fatigue, affective withdrawal, and cognitive drop-off. Teachers reported feeling exhausted, sleepy, and demotivated, particularly when assigned to lower-proficiency classes.

“For the teacher, for me, I feel sleepy... If they're from a weak and naughty class, you'll feel demotivated.”

— TA (Interview 3, Line 30-33)

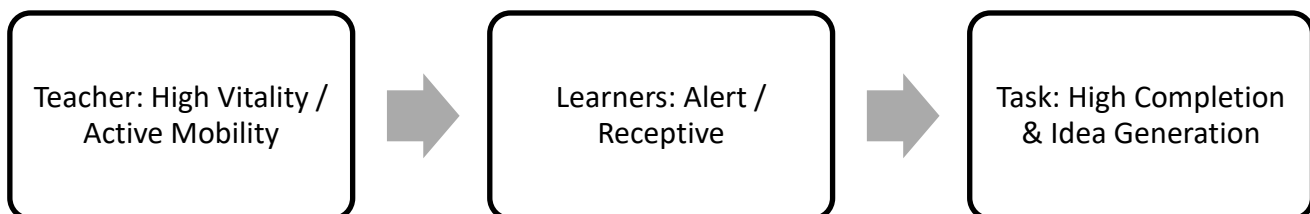
Observations of afternoon classes frequently recorded teachers sitting at their desks—a sharp departure from their active morning stance—and struggling to maintain student engagement.

“This is the first time I've seen TC sitting in her class. In the last observation... she was never sitting and always moving around her students.”

— Field Notes (1st July 2009, Line 41)

Student behaviour in afternoon slots shifted from active engagement to passive resistance, lethargy, and overt disinterest. In the TA's afternoon lesson, 13 students were observed sleeping, while others stared blankly at handouts.

EARLY MORNING (7:00 AM - 10:00 AM)



LATE MORNING / AFTERNOON (10:30 AM - 2:00 PM)

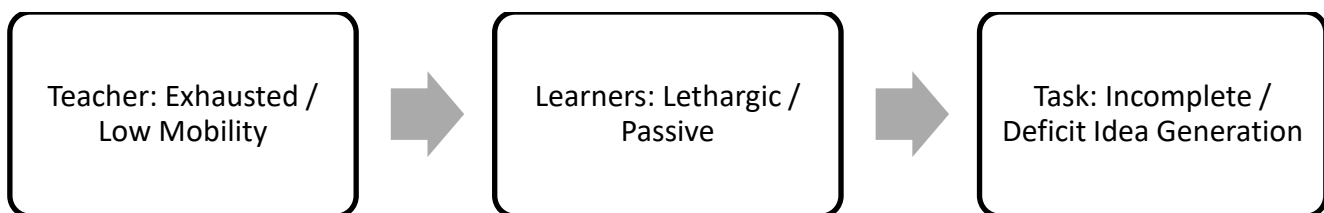


Figure 4: Behavioural and Operational Shifts across Diurnal Time Blocks.

A major cognitive deficit observed in afternoon periods was an inability to generate ideas for writing tasks. While students possessed prior knowledge, elevated fatigue impaired their ability to retrieve schemata.

“The afternoon? If it's upper form, I think it's difficult for them to think about the points that they want to write... Errors, they made a lot of mistakes. Compared to when they write in the morning, because they are still fresh.”

— TA (Interview 3, Line 23-40)

Field notes during TB's 11:20 AM writing class documented a student paralyzed by an essay prompt about beach visits, despite having relevant past experiences, and requiring extensive prompt nudging from the observer to retrieve basic ideas.

Theme 2: Pedagogical Adaptations and Structural Timetabling Mismatch

Temporal Instructional Adaptations

Recognising diurnal shifts in students' energy levels, teachers systematically adjusted their instructional strategies by time slot. Higher-order cognitive tasks—such as essay writing, idea generation, and literature memorization—were prioritized for early morning sessions. Conversely, afternoon sessions were relegated to lower-order drills, objective worksheets, reading comprehension exercises, or kinesthetic activities designed to keep students awake.

Table 2: Temporal Matrix of Pedagogical Strategies across the School Day

Time Block	Preferred Skills Taught	Primary Instructional Activities	Rationale / Cognitive Justification
Early Morning (7:00 AM – 10:00 AM)	Guided & Free Writing, Literature, Grammar Input.	Brainstorming, memorization techniques, interactive group discussions.	High cognitive readiness, active memory retention, superior idea generation.
Late Morning & Afternoon (10:30 AM – 2:00 PM)	Reading Comprehension, Objective Practice, Syllabus Revision.	Individual worksheet completion, objective questions, kinesthetic tasks.	Low cognitive capacity; avoids open-ended generation, focuses on mechanical tasks.

TC explicitly detailed this tactical adjustment:

“If I have class in the morning, what I normally do is teach them writing... So, I'll expose them to a lot of guided writing and memorization techniques... For the afternoon timetable, I normally give them activities such as comprehension, maybe... objective questions, ok, and revision.”

— TC (Interview 1, Line 43-48)

The Curriculum Completion Dilemma (“Ambivalence”)

Despite recognising that afternoon slots were unsuitable for complex skill development, teachers were frequently forced to conduct writing lessons at late hours to fulfil rigid school syllabi. This generated pedagogical ambivalence: teachers executed required lesson plans while knowing the timing rendered the activity ineffective.

“I know it's not appropriate to teach writing at these hours, but I need to finish the syllabus.”

— TA(Field Notes, 22nd Oct 2009, Line 4)

When complex tasks were forced into afternoon blocks, the quality of student work deteriorated. Essays were drastically truncated (e.g., 100 words instead of the required 350 words), grammatical errors multiplied, and students adopted a ‘mere completion’ attitude, prioritising immediate submission over quality so they could leave class.

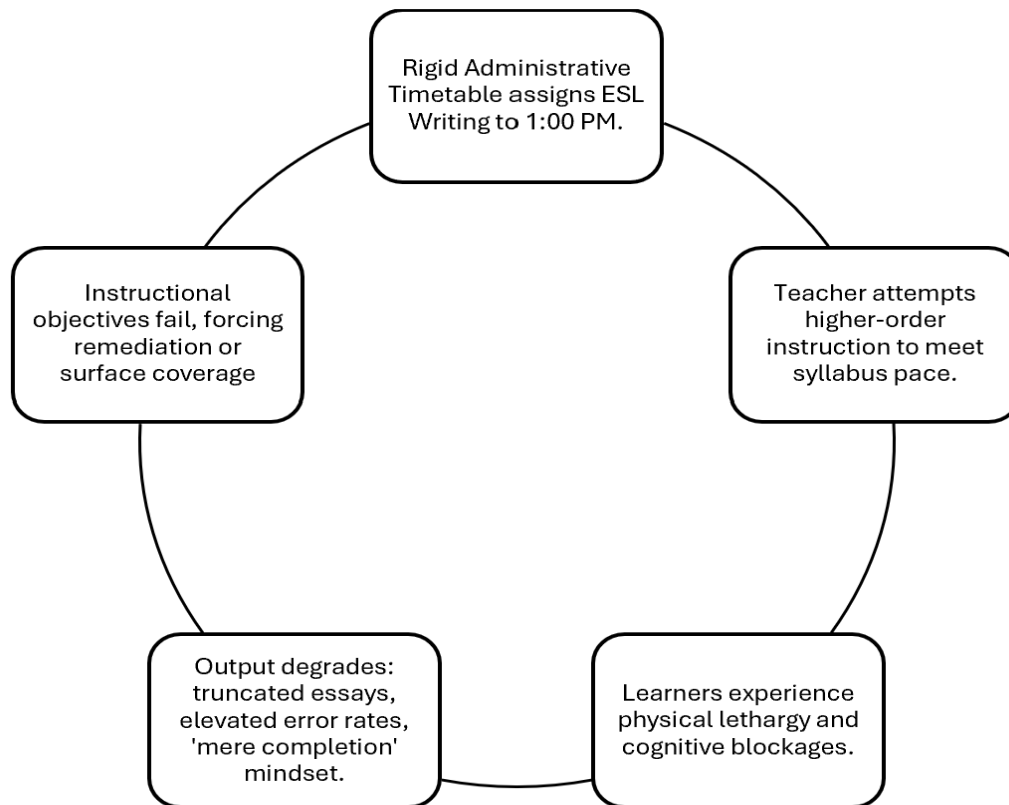


Figure 5: The Ambivalence Cycle in Misallocated ESL Time Blocks.

DISCUSSION

Although this study provides contextual qualitative evidence of three teachers' perceptions and observed classroom behaviour, the empirical findings of this study confirm that the time-of-day allocation of ESL periods is a fundamental structural variable that directly influences both instructional execution and language-learning efficacy, and it is a significant contributing factor to be taken into consideration. Rather than functioning as a neutral administrative backdrop, the temporal placement of lessons shapes the physiological, affective, and cognitive conditions of both educators and learners throughout the school day. Grounded in Eisner's (1998) structural dimension and Goodlad's (2004) framework of educational resource allocation, these findings elucidate the complex interplay among teacher self-reports, qualitative classroom observations, and reported learner performance. Second language acquisition requires intensive cognitive processing—including schema retrieval, critical thinking, syntax construction, and active idea generation—alongside substantial affective investment and emotional readiness. Consequently, ESL instruction is uniquely sensitive to diurnal fluctuations in physical energy and mental alertness.

To evaluate these temporal dynamics accurately, a clear distinction must be maintained between three distinct data streams:

- **Teacher Perceptions:** Subjective self-reports gathered during interviews regarding pedagogical mood, personal fatigue, and beliefs about student capacity.
- **Classroom Observations:** Direct contextual records of physical mobility, teacher position, interaction frequencies, and visible student engagement cues.
- **Actual Learner Performance:** Qualitative indicators of completed classroom work, task submission rates, and self-reported/observed drafting challenges (rather than standardized, quantitative measures of language acquisition).

When language lessons are scheduled during non-optimal post-recess hours, biological fatigue and

environmental stressors disrupt the synchronization between instructional delivery and student engagement. These observed temporal variations demonstrate that second-language teaching and learning cannot be analysed in isolation from the broader ecological and biological circumstances of the school day. Instead, teacher operational states and learner receptivity continually influence one another within the allocated time block, creating a dynamic feedback loop that ultimately dictates whether instructional objectives are fully realized or severely compromised. To visualize this systemic interplay, Figure 6 outlines the dual pathways through which temporal allocation conditions both teacher realities and learner readiness, shaping overall classroom learning outcomes.

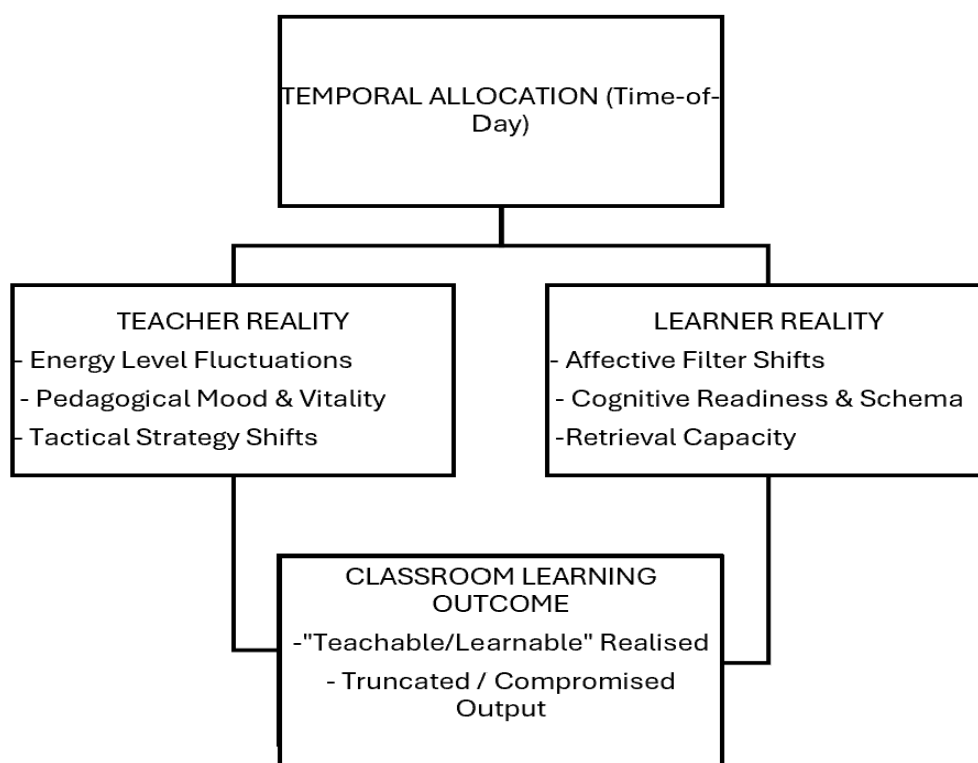


Figure 6: Ecological Model of Temporal Dynamics in ESL Instruction.

The Ecological Dynamics of “Teachable” and “Learnable” Periods

The empirical data support the concepts of **teachable periods** (time slots when teachers maintain peak instructional vitality) and **learnable periods** (time slots when learners’ cognitive receptivity and affective readiness are optimal). When ESL instruction is scheduled during early morning blocks, teachable and learnable periods align. During these windows, learners display low affective filters (Brown, 2000), allowing target language input to be processed efficiently. Furthermore, active schema retrieval enables students to perform complex tasks like narrative and report writing.

Conversely, when ESL classes are assigned to post-recess slots, a severe ecological mismatch occurs. High physical fatigue and environmental heat raise the affective filter, triggering cognitive passivity and defensive detachment. This aligns with Eisner’s (1998) critique of the structural dimension: forced clock-time scheduling ignores biological circadian rhythms, compelling students and teachers to operate against their physiological capacities.

Administrative Timetabling vs. Pedagogical Efficacy

The findings highlight a disconnect between educational administration and classroom reality. School timetables are typically compiled as administrative puzzles aimed at balancing period counts, room allocations, and teacher availability, operating under the assumption that all time blocks are pedagogically equivalent

(Goodlad, 2004). However, this study demonstrates that time is not a neutral container. Assigning complex language acquisition tasks to late afternoon slots reduces instructional effectiveness, creates teacher burnout, and fosters superficial learning behaviours.

CONCLUSION AND PRACTICAL IMPLICATIONS

This study demonstrates that time-of-day allocation is a determinant of ESL instructional quality and learning outcomes. Early-morning periods represent prime teachable and learnable windows for language acquisition, whereas late-morning and afternoon slots present significant biological and cognitive barriers to complex language tasks.

PRACTICAL RECOMMENDATIONS

1. **Chronobiology-Informed Timetabling Policy:** School administrators should prioritize core language-acquisition subjects—specifically, high-stakes ESL writing and analytical modules—during the first four periods of the daily schedule (7:00 AM–10:00 AM).
2. **Adaptive Pedagogical Planning:** When afternoon ESL scheduling is unavoidable, teachers should strategically adjust lesson designs. High-density cognitive tasks (e.g., essay drafting) should be replaced with interactive, kinesthetic, or lower-load consolidation activities to match reduced afternoon energy levels.
3. **Institutional Flexibility in Curriculum Pacing:** School leaders should grant teachers the flexibility to modify yearly scheme-of-work sequences when assigned non-optimal time slots, preventing the “ambivalence cycle” in which teachers force complex tasks during unfavorable hours simply to meet rigid pacing targets.

LIMITATIONS AND FUTURE RESEARCH

This study was conducted at a single suburban secondary school in Sabah, focusing exclusively on teacher perceptions and qualitative observations. Future research should incorporate direct student perspectives across diverse urban, rural, and multi-session school settings. Additionally, quantitative studies measuring student writing output quality and standardized test performance across controlled morning versus afternoon cohorts would provide valuable empirical data to guide educational policy.

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