

Designing a Blended Vocabulary Learning Model Integrating Video Slicing and Cornell Note-Taking for Chinese Language Education

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Abstract

Vocabulary retention remains a persistent challenge for beginner Chinese as a Foreign Language (CFL) learners, particularly in sustaining long-term memory of character form, pronunciation, and meaning. Grounded in Cognitive Load Theory, Multimedia Learning Theory, and Self-Regulated Learning Theory, this study developed and empirically tested a blended vocabulary learning model integrating segmented video instruction with structured Cornell note-taking. A quasi-experimental 2×3 mixed design was employed with 65 Thai secondary students (31 experimental; 34 control). The intervention lasted four weeks and was followed by a four-week delayed testing period. Vocabulary achievement was measured through pre-test, post-test, and delayed post-test assessments. Mixed-design ANOVA revealed significant time-by-group interaction effects ($p < .01$). Although both groups demonstrated immediate post-test improvement, only the experimental group maintained and slightly increased performance at the delayed stage. At the delayed post-test, the experimental group significantly outperformed the control group with a large effect size ($d = 1.03$). Repeated measures analyses further indicated significant improvements in intrinsic motivation, self-efficacy, and self-determination over time ($p < .05$). These findings suggest that coordinating regulated multimedia pacing with structured learner processing enhances both delayed vocabulary retention and motivational development. The study provides classroom-based evidence for cognitively regulated blended instructional design in secondary CFL classrooms and offers practical implications for integrating multimedia segmentation and structured note-taking in vocabulary instruction.

Keywords: Blended Vocabulary Learning, Delayed Vocabulary Retention, Chinese as a Foreign Language (CFL), Video Segmentation, Cornell Note-Taking

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■ Introduction

Vocabulary acquisition plays a central role in second language development, particularly in Chinese as a Foreign Language contexts, where learners must simultaneously master character form, pronunciation, and meaning. Unlike alphabetic writing systems, Chinese characters lack transparent form to sound correspondence, which increases cognitive demands for beginner learners (Sun et al., 2024; Zhang & Xing, 2023). Learners must process orthographic, phonological, and semantic information at the same time, placing substantial demands on working memory and often leading to cognitive overload (Chen et al., 2023; Paas & van Merriënboer, 2020). For secondary level learners who are still developing metacognitive strategies and autonomous learning skills, this complexity can hinder vocabulary acquisition and long term retention (Teng & Mizumoto, 2025; Nation, 2022). Consequently, sustaining vocabulary knowledge over time remains a persistent challenge in beginner CFL education (Nation, 2022; Webb et al., 2023).

While vocabulary acquisition in CFL presents persistent challenges, many classrooms continue to rely on word lists, rote memorization, and repetitive drills. Although these methods may support short term recall, they often fail to promote deep processing of lexical knowledge (Nation, 2022; Schmitt & Schmitt, 2020) and meaningful integration through generative learning processes (Fiorella & Mayer, 2022). In response to these limitations, recent research has explored multimedia based instruction (Mayer, 2021) and immersive or interactive learning environments. Segmented video instruction regulates information flow by dividing content into manageable units, which reduces extraneous cognitive load (Sweller, 2023) and supports comprehension (Mayer, 2021). Similarly, structured note taking approaches such as the Cornell method encourage learners to actively organize, encode, and retrieve information, thereby strengthening memory consolidation and long term retention (Jin & Webb, 2024; Seo, 2025).

Building on these instructional approaches, recent research has increasingly emphasized the importance of cognitively structured design in technology-supported environments (Mayer, 2021). Empirical studies indicate that multimedia supported vocabulary learning can enhance engagement and short term achievement when instructional pacing and task design are carefully controlled (Teng, 2023; Zou & Teng, 2023). However, emerging evidence suggests that digital input alone is insufficient for sustained learning. Instead, learning effectiveness depends on how instructional strategies guide learners attention, processing, and review over time (Agarwal et al., 2017; Webb et al., 2023).

Recent research has highlighted structured learning strategies, such as guided note taking and retrieval based activities, as effective approaches for promoting deeper processing and long term retention. These findings reflect a shift from technology driven instruction toward cognitively regulated learning design (Mayer, 2021). However, research has rarely examined how multimedia input and structured learner processing can be systematically integrated within authentic secondary CFL classrooms, particularly regarding delayed vocabulary retention (Teng & Zhang, 2023).

Despite increasing interest in multimedia and note taking interventions (Mayer, 2021; Agarwal et al., 2021), prior research has largely examined these approaches in isolation, with limited attention to their

potential interaction in classroom settings. In addition, most studies have focused on immediate learning outcomes, leaving delayed vocabulary retention underexplored (Karpicke & Blunt, 2011; Zhu et al., 2024).

To address these gaps, the present study develops and empirically tests a blended vocabulary learning model that integrates segmented video instruction with structured Cornell note taking. The model is designed to coordinate instructional pacing with learner mediated processing to enhance both vocabulary retention and motivational development in an authentic classroom context. The instructional approach is implemented as an integrated model rather than as separate experimental components, and the study therefore focuses on its overall effectiveness.

Within this model, segmented video instruction and structured Cornell note taking are conceptualized as complementary mechanisms that operate at different levels of the learning process. Segmentation regulates the temporal flow of input and helps manage cognitive load, while structured note taking supports active encoding, organization, and retrieval. These processes are expected to function together in a coordinated manner during instruction. Accordingly, the study does not aim to isolate the individual effects of each component. Instead, the findings are interpreted at the level of the integrated instructional approach, which reflects typical classroom practice where multiple strategies are implemented in combination.

■ Research questions

The study was guided by the following research questions:

- 1) How can segmented video instruction and structured Cornell note-taking be integrated into a blended vocabulary learning model for beginner CFL learners?
- 2) To what extent does the proposed model influence learners' intrinsic motivation, self-efficacy, and self-determination during the intervention?
- 3) To what extent does the proposed model improve vocabulary achievement and delayed retention compared with conventional instruction?

■ Literature Review

Multimedia Segmentation and Cognitive Processing in Vocabulary Learning

Multimedia instruction has been widely applied in second language learning, particularly in technology-supported environments. It is commonly explained by Multimedia Learning Theory, which proposes that learners process information through visual and auditory channels (Mayer, 2021; Fiorella & Mayer, 2022). When these channels are effectively coordinated, learning can be enhanced. However, continuous multimedia input may overload working memory, especially in Chinese as a Foreign Language contexts where learners must process character form, pronunciation, and meaning simultaneously (Sweller et al., 2019; Plass & Kalyuga, 2019).

Cognitive Load Theory provides a useful framework for understanding this issue. It suggests that learning becomes more effective when instructional design manages intrinsic and extraneous cognitive load (Sweller et al., 2019; Sweller, 2020). In vocabulary learning, the high interactivity among orthographic, phonological, and semantic elements increases cognitive demand and may limit deep processing. To address this problem, segmented video instruction has been proposed as a way to regulate information flow. By dividing content into smaller units, segmentation allows learners to process information step by step (Mayer, 2021).

Recent empirical studies support the effectiveness of segmentation in reducing cognitive load and improving learning outcomes (Liu, 2024; Zheng et al., 2022). These studies indicate that segmentation helps learners allocate attention more efficiently and supports incremental understanding. However, its effectiveness appears to depend on instructional context and task complexity. While positive results have been reported in general multimedia learning environments, evidence in second language vocabulary learning remains limited. In particular, few classroom-based studies have examined whether segmentation supports delayed vocabulary retention in secondary CFL settings.

Taken together, segmentation can be understood as an input-level instructional mechanism. Its primary function is to regulate the presentation of information, thereby facilitating incremental processing that supports subsequent encoding.

Structured Note-Taking and Retrieval-Based Encoding

While segmentation regulates the pacing of input, learning outcomes also depend on how learners process information after exposure. From a generative learning perspective, note-taking is not merely a recording activity. It is a meaning-making process through which learners transform incoming information into coherent mental representations. Generative learning is most effective when learners actively organize and integrate new information rather than passively receive it (Fiorella & Mayer, 2016). In this sense, structured note-taking can function as a guided form of generative processing by directing attention to key content and supporting systematic organization of form and meaning.

Recent evidence from second language research supports this view. A meta-analysis shows that note-taking facilitates learning, although its effectiveness varies across instructional conditions (Jin & Webb, 2024). Vocabulary-focused studies further indicate that recording lexical items helps learners connect spoken input with written form and meaning (Jin & Webb, 2025). Classroom research also shows that both conventional and guided note-taking improve learning outcomes, with guided formats producing stronger gains in some cases (Fiorella & Mayer, 2016; Jin & Webb, 2025). In addition, reviewing notes further enhances learning, which highlights the role of note-taking beyond initial encoding (Roelle et al., 2023).

These findings are consistent with broader cognitive research. Generative processing and retrieval practice serve complementary functions. Generative activities support the construction of meaningful representations, whereas retrieval strengthens and stabilizes these representations over time. Therefore,

structured note-taking may support delayed vocabulary retention by promoting deeper encoding and by providing organized cues for later retrieval.

Despite these advances, several limitations remain. Much of the existing research focuses on general academic learning rather than vocabulary-specific outcomes (Fiorella & Mayer, 2016; Jin & Webb, 2024). Findings across L2 studies are not always consistent. This suggests that the effects of note-taking depend on learner proficiency, instructional guidance, and opportunities for review (Jin & Webb, 2025). In addition, research on structured note-taking in authentic beginner CFL classrooms remains limited, particularly in relation to delayed vocabulary retention.

Compared with segmentation, structured note-taking operates at the learner level. It supports active organization and retrieval of information, thereby strengthening encoding and long-term memory consolidation.

Motivation and Self-Regulated Learning in Blended Vocabulary Instruction

In addition to cognitive processing, motivational and self-regulatory factors play an important role in vocabulary learning. Learners with higher intrinsic motivation and self-efficacy are more likely to engage in sustained practice and deeper processing (Chen & Sukying, 2024; Lee et al., 2022). Self-Regulated Learning Theory further explains that effective learners actively plan, monitor, and evaluate their learning processes (Panadero et al., 2025), which contributes to long-term retention.

Blended learning environments provide opportunities to support both cognitive and motivational development. By combining face-to-face instruction with digital resources, blended models can increase flexibility and learner autonomy. Research in mobile-assisted and technology-supported language learning has reported positive effects on vocabulary learning and learner engagement. However, these effects are not consistent across contexts, and outcomes appear to depend more on instructional design than on technology itself.

Despite these findings, empirical research that simultaneously examines motivation, self-regulation, and vocabulary retention remains limited. In particular, few studies have explored how cognitively structured instructional models influence both affective and cognitive outcomes in secondary CFL classrooms. In the present study, motivation is examined alongside vocabulary retention to provide a more comprehensive evaluation of the instructional model.

Research Gap

Although prior research has provided valuable insights into multimedia learning, structured note-taking, and learner motivation, several limitations remain (Liu, 2024).

Multimedia segmentation and structured note-taking have largely been examined as separate instructional strategies, with limited attention to their potential interaction within an integrated design (Liu, 2024). Existing studies have also focused primarily on immediate learning outcomes, leaving delayed

vocabulary retention relatively underexplored. In addition, classroom-based research in authentic secondary CFL contexts remains scarce, particularly in settings where learners must manage the cognitive demands of a character-based language system.

These limitations highlight the need for an integrated instructional framework that aligns segmented input with structured learner processing mechanisms, as emphasized in cognitive load theory and self-regulated learning frameworks (Sweller, 2020; Jiang & Rose, 2025).

To address these gaps, the present study proposes and evaluates a blended learning model that integrates segmented video instruction with structured Cornell note-taking. This design coordinates instructional pacing with learner-controlled encoding processes. By examining both delayed vocabulary retention and motivational development in an authentic secondary CFL context, the study aims to provide empirically grounded evidence for cognitively regulated vocabulary instruction.

■ Methods

Research Design

The experimental and control groups differed only in instructional approach, while all other conditions, including learning content, instructional time, and classroom context, were held constant. The experimental condition implemented a blended instructional model incorporating input segmentation and structured note-taking, whereas the control condition followed conventional instruction.

Given that multiple instructional elements were introduced simultaneously within the experimental condition, the findings should be interpreted as reflecting the effect of the overall instructional approach rather than any single component. The present design evaluates segmentation and structured note-taking as an integrated model, which is consistent with typical classroom practice where instructional strategies are combined.

While this design does not allow for causal attribution to individual components, it strengthens ecological validity by examining how these elements function together in an authentic learning context. Future studies may employ factorial or component-based designs to isolate and compare the specific contributions of each instructional element.

Participants

The initial sample comprised 70 Thai secondary school students enrolled in beginner HSK Level 1 Chinese classes. Participants were drawn from two intact classes in the same school. The two classes were randomly assigned as either the experimental group or the control group. During the intervention, four students in the experimental group and one in the control group did not complete all stages of data collection, including the delayed post-test, and were therefore excluded from the final analysis.

The final sample consisted of 65 students, with 31 in the experimental group and 34 in the control group. Participants ranged in age from 15 to 18 years and were all native Thai speakers. An independent samples t-test confirmed no significant difference between groups at the pre-test stage, indicating baseline equivalence.

Instructional Model Development

The blended vocabulary learning model was developed to integrate regulated multimedia input with structured cognitive processing. During the first week, the instructor explicitly modeled segmented video viewing procedures and the Cornell note-taking framework. In weeks two through four, students in the experimental group engaged in scheduled segmented video sessions, recorded vocabulary using the structured Cornell format, and submitted weekly notes for monitoring and feedback. The control group received the same vocabulary content but followed conventional instructional procedures without segmentation or structured note-taking requirements.

The model was designed to align instructional inputs with cognitive processing mechanisms. Segmented video regulated information density and pacing, while structured Cornell note-taking supported organized encoding and semantic mapping of vocabulary form and meaning. These coordinated elements aimed to reduce extraneous cognitive load, promote structured storage, and encourage self-regulated monitoring. As illustrated in Figure 1, the model conceptualizes the relationship between instructional inputs, cognitive processing mechanisms, and learning outcomes, including immediate vocabulary achievement, delayed retention, and motivational development within the context of Thai HSK Level 1 learners.

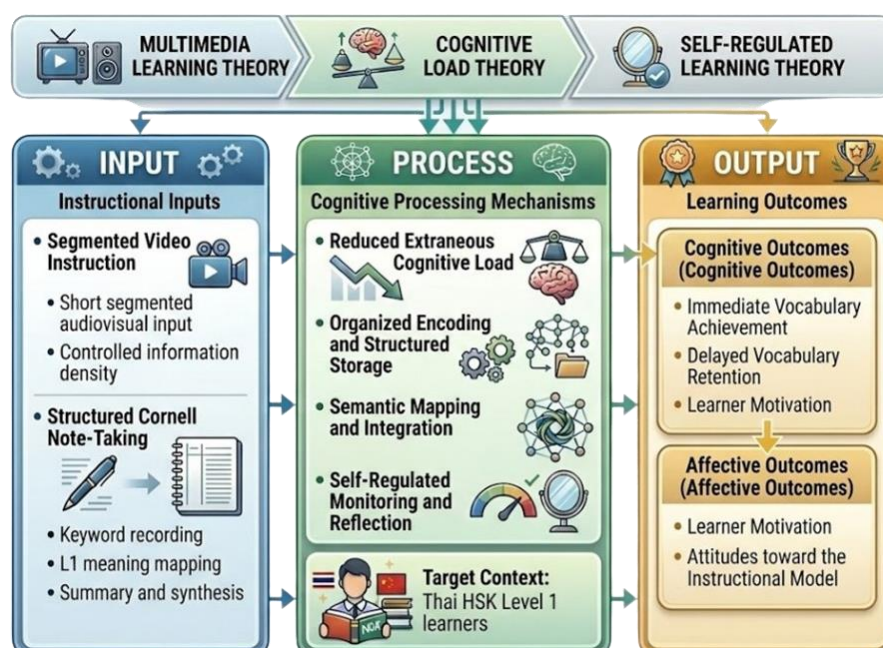


Figure 1. Conceptual Framework of the Blended Vocabulary Learning Model

Learning Process Design

The instructional procedures were organized into four sequential stages: pre-learning preparation, video slicing, structured Cornell note completion, and reflection and review. These stages were designed to regulate instructional input, support structured learner processing, and promote vocabulary retention. At the beginning of the intervention, the teacher provided explicit instruction on the segmented video procedure and the Cornell note-taking format, including a demonstration of how to record Chinese characters, pinyin, and Thai meanings. After this initial training, students followed a fixed instructional sequence in each session, including segmented video viewing, immediate note completion after each segment, and structured review activities. Vocabulary items were presented through teacher-controlled segmented video, with pauses applied at each target word to regulate pacing. Students completed Cornell notes using a standardized template, and instructional support was embedded within the video materials. In subsequent sessions, note-taking was completed independently without ongoing teacher guidance. A detailed summary of the instructional stages and classroom implementation is presented in Table 1 to enhance clarity and replicability.

Table 1.

Instructional Design and Classroom Implementation of the Blended Vocabulary Learning Model

Instructional Stage	Description	Implementation Details
Pre-learning Preparation	Students were introduced to lesson objectives and target vocabulary. The teacher explained the instructional procedure and introduced segmented video viewing together with the Cornell note-taking format.	A standardized Cornell note-taking template was provided. The teacher demonstrated how to record Chinese characters, pinyin, and Thai meanings. A sample demonstration was embedded in the instructional video. Guided practice ensured students understood the procedure before formal instruction.
Video Slicing	Target vocabulary was presented through teacher-controlled segmented video to regulate pacing and reduce cognitive load.	Each instructional video lasted no longer than one minute and included eight vocabulary items, including five core words. Each item was treated as one segment. Key vocabulary was highlighted using color coding and presented with example sentences. The video was paused immediately when each keyword appeared. Pauses were manually controlled by the teacher to ensure consistent pacing and sufficient processing time.

Instructional Stage	Description	Implementation Details
Structured Cornell Note Completion	Students completed structured notes after each segment to support organized encoding of vocabulary form and meaning.	Students used the Cornell template to record Chinese characters and pinyin in the main note section and Thai meanings in the cue column. The teacher demonstrated the procedure only in the first session. In subsequent sessions, students completed note-taking independently without ongoing teacher guidance. Instructional support was embedded in the video through highlighted keywords and example sentences. Three formal note submissions were collected from Weeks 2 to 4.
Reflection and Review	Students engaged in structured review activities to reinforce retention and support retrieval practice.	Approximately 15 minutes per session were allocated for review. Students revisited their notes, participated in small-group discussion, and completed recall activities such as retrieving vocabulary without notes, repetition, and simple sentence reconstruction. The teacher monitored classroom activity and provided general whole-class feedback without intervening in individual note-taking processes.

Experimental Procedure

The experimental procedure included three stages: baseline assessment, instructional intervention, and outcome measurement. All participants first completed a vocabulary pre-test to establish baseline equivalence. Both groups received the same instructional content, duration, and instructor throughout a four-week instructional period to ensure comparability.

The experimental group was exposed to an integrated instructional model that combined segmented video presentation, structured Cornell note-taking, and embedded multimedia support. Vocabulary items were presented through short video segments, with pauses at each target word to regulate pacing. After each segment, students completed Cornell notes and participated in structured review activities. A single training session on the Cornell note-taking method was provided at the beginning of the intervention. After this initial training, students completed the note-taking tasks independently without additional teacher guidance. Instructional support was embedded within the videos through visual highlighting and example sentences.

The control group received conventional instruction. Vocabulary was presented in a non-segmented format. Students took notes according to their usual practices without structured guidance. No explicit training in note-taking strategies was provided.

Following the intervention, all participants completed a vocabulary post-test. A delayed post-test was administered four weeks later to measure retention. In addition, both groups completed a motivation questionnaire at two time points: before the pre-test and immediately after the post-test.

It is important to note that the purpose of this study was not to isolate the individual effects of each instructional component. Instead, the study examined the effectiveness of the integrated instructional model as a whole. The combination of segmented video, structured note-taking, and multimedia support reflects typical instructional practice, where these elements function together rather than independently. Therefore, the observed effects should be interpreted as the result of the integrated intervention rather than any single component. At the same time, the design does not allow for the examination of the individual contribution of each component, which may be addressed in future research.

To ensure internal consistency across conditions, all instructional variables other than the delivery format were controlled. Both groups received identical vocabulary content, instructional duration, teacher, and learning objectives. This design minimizes confounding variables while allowing the study to focus on differences in instructional format. Nevertheless, as the intervention integrates multiple instructional features, the findings should be interpreted at the level of the overall instructional configuration rather than as evidence of isolated causal effects.

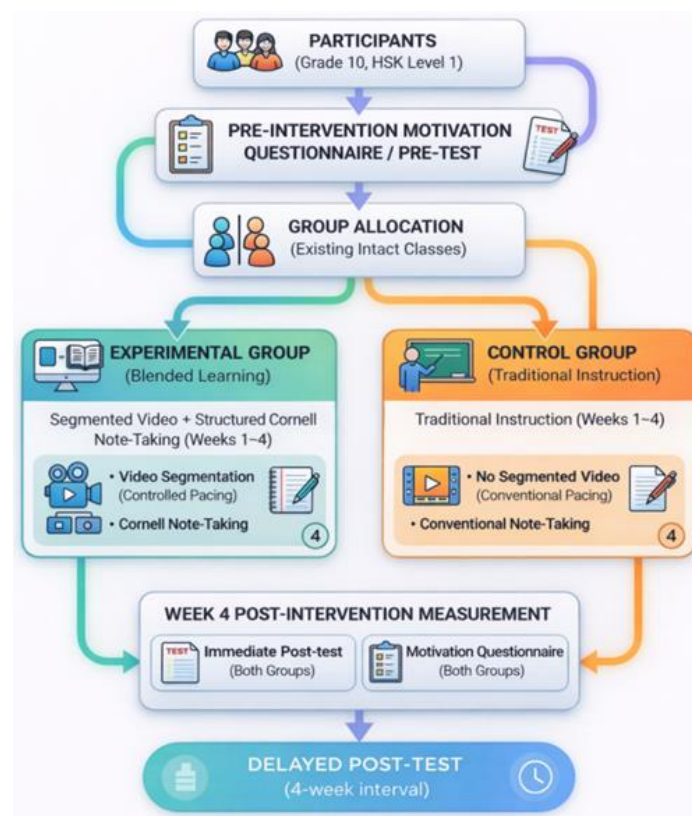


Figure 2. Experimental Procedure

Instruments and Data Collection

Three types of instruments were used in this study: vocabulary tests, Cornell note-taking assessment, and a motivation questionnaire.

Three parallel vocabulary tests were administered to assess learning outcomes across three stages. A pre-test measured baseline proficiency, a post-test examined immediate learning gains, and a delayed post-test conducted four weeks later assessed retention. All items were developed based on the official HSK vocabulary list. Each test consisted of four item types: word meaning matching, contextual fill-in-the-blank, synonym identification, and usage selection, with five items in each section. All tests were administered under identical classroom conditions. The parallel construction across forms, with comparable lexical coverage, item types, and difficulty levels, supports content validity and comparability across testing occasions. Formal reliability indices were not computed due to the parallel test design; however, consistency was ensured through standardized test construction. This is acknowledged as a limitation, and future research may incorporate expert review or pilot testing to further establish reliability.

Cornell notes produced by the experimental group were evaluated using an analytic rubric based on the Cornell note-taking framework. The rubric focused on the accuracy of recording Chinese characters and pinyin, as well as the clarity of Thai meaning mapping. The summary section was excluded due to the learners' limited proficiency. The rubric was informed by cognitive processing theory, constructivist learning theory, and self-regulated learning, supporting construct validity. All notes were scored by a single trained rater following standardized criteria, which supports intra-rater reliability.

Motivation and attitudes were measured using a five-point Likert-scale questionnaire adapted from the Science Motivation Questionnaire. The instrument assessed intrinsic motivation, self-efficacy, and self-determination. The adaptation retained the original structure while aligning items with CFL vocabulary learning, supporting construct validity. The questionnaire was administered to both the experimental and control groups at the pre-test and post-test stages, allowing both within-group and between-group comparisons. Items 1–15 were common across both groups and were used for direct comparison of motivational changes between groups. Items 16–20 were condition-specific and were analyzed separately within each group to capture learners' perceptions of the instructional approach they experienced. In addition, five items assessing grade motivation were included in the pre-test questionnaire as background information and were excluded from the formal analysis. The instrument demonstrated acceptable internal consistency, with Cronbach's alpha values ranging from .80 to .84.

Data Analysis

Data were analyzed using Jamovi software. Descriptive statistics (means and standard deviations) were computed for vocabulary achievement scores across the three testing stages for both groups. To examine differences over time and between groups, a 2×3 mixed-design ANOVA was conducted, followed

by post hoc comparisons where appropriate. Assumptions of normality, homogeneity of variance, and sphericity were examined prior to inferential testing.

Motivational variables were analyzed using repeated-measures procedures to assess time and interaction effects between groups. Finally, descriptive statistics were used to evaluate the development of Cornell note quality across submissions. Effect sizes were reported alongside significance values to support interpretation of practical significance.

Motivational data were analyzed separately for common items and condition-specific items. Common items were subjected to repeated-measures analysis to examine between-group differences over time, whereas condition-specific items were analyzed within each group using one-sample tests to examine learners' perceptions of the instructional method.

■ Results

Vocabulary Achievement and Delayed Retention

An independent samples t-test confirmed baseline equivalence between the experimental and control groups at the pre-test stage, $t(63) = 1.32, p = .191$, indicating comparable vocabulary proficiency prior to the intervention. Descriptive statistics across the three testing stages are presented in Tables 2 and 3. Both groups demonstrated improvement from pre-test to post-test; however, different retention trajectories emerged at the delayed stage. The experimental group showed a continued upward trend at delayed post-test, whereas the control group exhibited a decline.

Table 2.

Pre-test Post-test and Delayed post-test in the experimental group

Test	N	Mean	SD
Pre-test	31	10.03	4.22
Post-test	31	12.26	4.06
Delayed	31	13.06	3.08

Table 3.

Pre-test Post-test and Delayed post-test in the control group

Test	N	Mean	SD
Pre-test	34	8.62	4.65
Post-test	34	10.82	3.88
Delayed	34	9.09	4.49

A 2×3 mixed-design ANOVA revealed a significant main effect of time, $F_{(2, 126)} = 12.58, p < .001, \eta^2 = .17$, and a significant main effect of group, $F_{(1, 63)} = 6.89, p = .011, \eta^2 = .10$. Critically, a significant time $\times$ group interaction was observed, $F_{(2, 126)} = 5.00, p = .008, \eta^2 = .07$ (Table 4), indicating that vocabulary performance changed differently across instructional conditions over time.

Table 4.

Two-Way Mixed-Design ANOVA for Vocabulary Achievement

Effect	df	<i>F</i>	<i>p</i>	η^2
Time (Pre & Post & Delayed)	2	12.58	<.001	0.17
Group	1	6.89	.011	0.10
Time*Group	2	5.00	.008	0.07

Within-group comparisons showed that the experimental group demonstrated significant gains from pre-test to post-test and from pre-test to delayed post-test (both $p < .001$, large effect sizes), with continued improvement at the delayed stage. In contrast, although the control group improved immediately after instruction, scores significantly declined from post-test to delayed post-test, and no significant difference was observed between pre-test and delayed scores (Table 5 and Table 6).

Table 5.

Pre-test Post-test and Delayed post-test in the experimental group

Test	Mean difference	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Pre & Post	-2.23	-5.71	<.001	1.03
Post & Delayed	-0.81	-2.34	.026	0.42
Pre & Delayed	-3.03	-5.70	<.001	1.02

Table 6.

Pre-test Post-test and Delayed post-test in the control group

Test	Mean difference	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Pre & Post	-2.21	-3.05	0.004	0.52
Post & Delayed	1.74	2.12	0.042	0.36
Pre & Delayed	-0.47	-0.56	0.583	0.10

Because homogeneity of variance was violated at the delayed stage, Welch's t-test was applied. The experimental group significantly outperformed the control group at delayed post-test, Welch's *t* (58.60) = 4.19, $p < .001, d = 1.03$ (Table 7), indicating a large retention advantage associated with the blended instructional model.

Table 7.

Delayed post-test between experimental group and control group

Group	Mean	SD	Mean Difference	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Experimental group	13.06	3.08	3.98	4.19	<.001	1.03
Control group	9.09	4.49				

Development of Structured Note-Taking Quality

Cornell note quality improved progressively across the three submissions. A paired samples *t*-test indicated a significant increase from the first to the third submission, $t(30) = -7.66$, $p < .001$, $d = 1.38$, reflecting a large developmental effect in structured encoding practices (Table 8).

Table 8.

Development of Cornell Note Quality across Submissions

Measure	Mean	SD	<i>t</i>	df	<i>p</i>	Cohen's <i>d</i>
Note1	8.61	2.16	-7.66	30	<.001	1.38
Note2	11.13	1.38				
Note3	11.42	1.20				
Note1 vs. Note3						

Learner Motivation and Attitudes

Repeated measures analyses based on the common items (Items 1 – 15), which were identical across groups, revealed significant main effects of time and significant time x group interaction effects for intrinsic motivation, self-efficacy, and self-determination, with moderate effect sizes (Table 9). These results indicate that motivational development differed between instructional conditions across the intervention period.

Post-test attitudes toward the instructional method were examined using condition-specific items (Items 16-20), which were analyzed separately within each group. The results indicated that learners in the experimental group reported positive perceptions of the blended model, with a large effect size ($d = 1.29$), suggesting strong affective engagement. Learners in the control group demonstrated their attitudes toward conventional instruction based on within-group analysis (Table 10).

Table 9 reports results based on the common items, which were identical across groups and used for between-group comparisons of motivational development over time. These results reflect changes in general motivational constructs shared by both groups. In contrast, the one-sample tests for Items 16-20 reflect within-group evaluations of each instructional method and do not provide a basis for direct between-group comparisons.

Table 9.

Repeated Measures ANOVA Results for Learner Motivation Dimensions

Dimension	Effect	<i>F</i>	<i>p</i>	η^2
Intrinsic Motivation	Time	11.61	.001	.16
	Time × Group	5.50	.022	.08
Self-Efficacy	Time	8.05	.006	.11
	Time × Group	8.44	.005	.12
Self-Determination	Time	17.63	<.001	.22
	Time × Group	6.11	.016	.09

Note: Time refers to pre-test and post-test; Group refers to experimental and control groups.

Table 10.

Descriptive and One-Sample Test Results for Condition-Specific Items (Test Value = 3)

Group	Mean	SD	<i>t</i>	<i>p</i>	Cohen's <i>d</i>	Cronbach's α
Experimental (blended method)	3.78	0.61	7.18	<.001	1.29	0.84
Control (traditional method)	2.34	0.48	-8.13	<.001	-1.39	0.80

Note: The *t*-values were obtained using one-sample *t*-test. The items in this table were condition-specific and differed across groups; therefore, the results reflect within-group evaluations of each instructional method and are not intended for direct between-group comparisons.

■ Discussion

The findings provide empirical support for the effectiveness of integrating segmented video instruction with structured Cornell note-taking in classroom contexts. From a cognitively regulated learning perspective, the results suggest that learning outcomes are better explained by the coordination between external instructional structure and internal learner processing rather than by any single instructional component (Fiorella & Mayer, 2022).

Within this integrated approach, segmented video appears to regulate the flow of information and reduce extraneous cognitive load, thereby facilitating initial processing (Mayer, 2021). At the same time, structured Cornell note-taking may promote active engagement through organization, summarization, and retrieval, which are known to support deeper processing of learning materials (Agarwal et al., 2021).

These processes are likely to operate in coordination during instruction. Regulated input may create conditions that make information more manageable, while structured learner activity may support the organization and integration of that information into memory. This coordinated process provides a plausible explanation for the observed advantages in vocabulary retention over time.

The findings can be further interpreted through complementary theoretical perspectives. From the perspective of Cognitive Load Theory, reducing unnecessary cognitive demands may support more

efficient initial encoding (Sweller et al., 2019). From the perspective of Self-Regulated Learning, activities such as summarization and review reflect learners' active regulation of their own learning processes .

Taken together, these perspectives offer a coherent account of how the integrated instructional design may support both immediate processing and longer-term retention. However, these interpretations remain inferential. The present study does not isolate the independent effects of each instructional component. Instead, the findings should be understood at the level of the overall instructional approach, in which structured input and guided learner processing function together within an authentic classroom context.

■ Conclusion

This study examined the effects of integrating segmented video instruction with structured Cornell note taking in a blended vocabulary learning model for secondary Chinese as a Foreign Language learners. While both instructional conditions led to immediate gains, only the blended model produced sustained improvement at the delayed stage, highlighting its contribution to retention stability rather than short term performance. This finding suggests that instructional effectiveness should be evaluated not only in terms of immediate outcomes but also in terms of long term retention.

The observed retention advantage may be interpreted in terms of the interaction between regulated input and structured learner processing. Segmented instruction reduced cognitive overload by controlling the flow of information, while structured note taking supported systematic encoding and strengthened form meaning connections. Their combined effect facilitated consolidation and retrieval, leading to more durable vocabulary learning over time. These findings align with prior research on cognitive load management and active processing, while extending this work by demonstrating their coordinated effects within a blended instructional model.

In addition to cognitive outcomes, the model also enhanced learner motivation, including intrinsic motivation, self efficacy, and self determination. This indicates that instructional designs integrating input regulation with active processing can support both cognitive and affective development. From a theoretical perspective, the study provides empirical support for integrating Cognitive Load Theory, Multimedia Learning Theory, and Self Regulated Learning Theory within a unified instructional framework, highlighting the complementary roles of externally regulated input and internally guided processing.

From a pedagogical perspective, the findings offer practical guidance for vocabulary instruction in blended environments. Segmenting instructional input and adopting structured note taking formats can help learners manage cognitive load, organize lexical information, and support long term retention. These strategies are particularly relevant for beginner CFL learners, who often face high cognitive demands.

Despite these contributions, the findings should be interpreted with caution, and further research is needed to examine the applicability of this instructional model across different contexts and learner populations.

■ Limitations and Recommendations

The study employed an integrated instructional design in which segmented video instruction and structured Cornell note-taking were implemented simultaneously. As a result, it is not possible to attribute the observed effects to any single component. The findings should therefore be interpreted at the level of the overall instructional approach rather than as evidence of the effectiveness of individual elements.

The use of intact classes and class-level assignment may limit the level of experimental control. Although the two groups were equivalent in terms of learning content, instructional time, and classroom context, individual-level randomization was not feasible.

Future research may adopt factorial or component-based designs to further examine how different instructional elements function within such models. In addition, studies with more diverse samples and extended intervention periods would help to better evaluate the stability and generalizability of long-term learning outcomes.

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