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SCHEMA-ACTIVATED MULTIMEDIA INSTRUCTION AND ITS EFFECT ON EFL STUDENTS' CRITICAL LISTENING SKILLS IN ACADEMIC DISCUSSION CONTEXTS

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Abstract: Critical listening is a higher-order academic skill that enables EFL learners to interpret implied meanings, evaluate arguments, and synthesize information in academic discussions; however, it remains underdeveloped in many higher education contexts. While previous studies have shown the benefits of schema activation and multimedia support for general listening comprehension, empirical research examining their combined effect on critical listening in discussion-based contexts remains limited. Grounded in schema theory and multimedia learning theory, this study investigated the effectiveness of schema-activated multimedia instruction on EFL students' critical listening performance in academic discussion settings. Employing a quantitative quasi-experimental design, the study involved 60 EFL students divided into an experimental group and a control group. Data were collected through pre-test and post-test measures of critical listening performance and analyzed using paired-sample t-tests, independent-sample t-tests, and two-way ANOVA. The results revealed a statistically significant improvement in the experimental group's critical listening performance compared to the control group ($p < .001$), with a larger mean gain observed across most critical listening indicators. The findings suggest that integrating prior knowledge activation with multimedia-supported instruction can effectively enhance EFL students' critical listening performance in academic discussions. Pedagogically, the study highlights the importance of designing listening instruction that supports higher-order cognitive processing in EFL higher education contexts.
Keywords: *critical listening; schema-activated multimedia instruction; academic discussion listening; EFL higher education*

INTRODUCTION

In the context of globalized higher education, listening has become a central skill for English as a Foreign Language (EFL) learners, particularly in academic discussion settings where comprehension, evaluation, and response are required simultaneously. Listening is no longer viewed as a passive process but as an active, meaning-making activity that involves cognitive, affective, and social dimensions (Worthington et al., 2024; Siegel & Wang, 2024). The increasing demand for critical listening, defined as the ability to analyze, evaluate, and synthesize spoken information, highlights the need for more effective instructional approaches (Gunawan et al., 2023). However, many EFL learners continue to struggle with processing authentic spoken input, especially when dealing with unfamiliar vocabulary, fast speech, and complex discourse structures (Amiruddin et al., 2025; Siregar et al., 2026). These challenges are further compounded in academic discussions that require higher-order thinking and real-time interaction (Gerald & Joseph, 2024; Loan et al., 2024). Consequently, innovative pedagogical approaches, such as schema-activated multimedia instruction, are increasingly explored to address these issues and enhance learners' critical listening performance (Rahman et al., 2025).

Recent developments in second language listening research emphasize the integration of cognitive theories and technology-enhanced learning environments. Listening comprehension is shaped by perceptual processing, strategic competence, and contextual understanding, all of which are influenced by instructional design (Levis, 2025; Hamada & Yanagawa, 2024). Studies highlight that learners' ability to activate prior knowledge, or schema, plays a crucial role in interpreting spoken texts (Hassan & Jawad, 2025; Yeh & Fu, 2025). Moreover, schema-based approaches have been shown to facilitate deeper comprehension and improve learners' engagement with listening materials (Juliana et al., 2025).

The role of multimedia in language learning has gained significant attention, particularly in enhancing listening comprehension through multimodal input. Multimedia instruction integrates visual, auditory, and textual elements, enabling learners to process information more effectively (Staneviciene & Žekienė, 2025; Wang, 2025). Empirical studies demonstrate that multimedia environments can reduce cognitive load while improving comprehension and retention (Ljubojević et al., 2025). Additionally, multimodality supports learners in constructing meaning by linking visual cues with auditory input (Fitri et al., 2025).

Technology-mediated listening instruction, including video-based learning, virtual reality, and online communication platforms, has also been widely investigated. Video creation and interaction tasks have been found to promote both language proficiency and cultural understanding through schema activation (Yeh & Fu, 2025). Similarly, virtual reality applications and video conferencing tools enhance learners' engagement and provide authentic listening experiences (Chan, 2024; Tran et al., 2024). These findings suggest that technology-rich environments can create meaningful contexts for listening development.

In addition, research on listening strategies indicates that metacognitive awareness significantly influences learners' listening performance. Metacognitive instruction helps learners plan, monitor, and evaluate their comprehension processes (Bozorgian & Shamsi, 2025; Polatcan et al., 2025). Meta-analyses further confirm that strategy instruction has a positive impact on listening outcomes (Dalman & Plonsky, 2025). However, learners' success also depends on their ability to regulate emotions, motivation, and self-efficacy (Zhang & Xu, 2025; Zhou & Thompson, 2023).

Another strand of research highlights the importance of learner engagement in listening activities. Engagement, both cognitive and emotional, mediates the effectiveness of instructional approaches (Zeng et al., 2026; Blomstrom et al., 2025). Studies reveal that students who actively engage with listening tasks demonstrate higher levels of comprehension and critical thinking (Song et al., 2024; Budiyanto et al., 2024). This aligns with the growing emphasis on 21st-century skills, including critical thinking and communication.

Authentic materials and real-world listening contexts are also recognized as essential for developing academic listening skills. The use of podcasts, talk shows, and YouTube videos has been shown to improve learners' listening proficiency and critical thinking abilities (Harida, 2023; Khikmatulloevna, 2025). However, these materials also present challenges related to linguistic complexity and learner readiness (Alamri, 2025; Permatasari & Purwanti, 2025). Therefore, instructional scaffolding is necessary to maximize their effectiveness.

Research also points to the role of instructional techniques such as dictogloss, mind mapping, and project-based learning in enhancing listening comprehension. These approaches encourage active processing and collaborative learning (Endriati et al., 2024; Liyan, 2025). Project-based learning, in particular, fosters critical thinking and integrates multiple language skills (Song et al., 2024). Such methods align with constructivist principles that emphasize learner-centered instruction.

Furthermore, the integration of audio-visual materials and multimedia tools has been shown to support both listening and writing development in academic contexts (Miholjančan et al., 2024). Studies indicate that multimedia-assisted instruction can improve learners' comprehension and engagement, although challenges related to implementation and accessibility remain (Daulay, 2025; Kazu & Kuvvetli, 2025). These findings underscore the potential of multimedia approaches in language education.

Finally, recent research highlights the importance of affective and psychological factors in listening development. Learners' self-efficacy, attitudes, and emotional responses significantly influence their performance (Giovanelli et al., 2026; Harris, 2025). Positive listening experiences and supportive learning environments contribute to improved outcomes (Petkou et al., 2025; Kluger et al., 2024). These insights suggest that effective

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listening instruction must address both cognitive and affective dimensions.

Despite extensive research on multimedia learning, listening strategies, and schema activation, limited studies have specifically examined the integration of schema-activated multimedia instruction in fostering critical listening skills within academic discussion contexts. Existing studies often focus on general listening comprehension rather than higher-order critical listening abilities (Arbain et al., 2025; Nurhayati et al., 2024). Moreover, few studies investigate how multimedia-supported schema activation can facilitate real-time analytical listening in interactive academic settings (Rahman et al., 2025; Hui & Godfroid, 2026). Therefore, this study addresses the following research question: *To what extent does schema-activated multimedia instruction affect EFL students' critical listening performance in academic discussion contexts?*

This study offers a novel contribution by integrating schema activation theory with multimedia instruction to specifically target critical listening skills in academic discussions. Unlike previous research that examines these components separately, this study proposes a combined instructional framework that leverages multimodal input and prior knowledge activation simultaneously (Hassan & Jawad, 2025; Staneviciene & Žekienė, 2025). Additionally, it focuses on critical listening as an outcome, rather than general comprehension, thereby addressing a less explored area in EFL research (Gunawan et al., 2023; Polatcan et al., 2025). This integrative approach provides new insights into how instructional design can support higher-order listening processes.

The findings of this study are expected to contribute to both theoretical and pedagogical domains of EFL instruction. Theoretically, it enriches the understanding of how schema activation and multimedia learning interact to influence critical listening development (Rahman et al., 2025; Ljubojević et al., 2025). Pedagogically, it offers practical implications for designing effective listening instruction that aligns with the demands of academic communication (Siegel & Wang, 2024; Tran et al., 2024). Furthermore, the study provides guidance for educators in integrating technology and cognitive strategies to enhance learner engagement and performance (Zeng et al., 2026; Budiyanto et al., 2024). Ultimately, it supports the advancement of innovative teaching practices that prepare EFL learners for complex academic listening tasks.

METHOD

This study employed a quantitative quasi-experimental design with a pre-test and post-test control group. The participants were undergraduate EFL students enrolled in a listening course at an Indonesian university. Two intact classes were selected, with one assigned as the experimental group and the other as the control group.

The experimental group received schema-activated multimedia instruction integrating structured prior knowledge activation, multimedia-supported discussion materials, and metacognitive listening guidance. The control group received conventional listening instruction emphasizing audio-based materials and comprehension-focused tasks. The instructional treatment was implemented over one academic semester. Critical listening performance was measured using a standardized test developed to assess five indicators: (1) main idea and overall understanding, (2) inference and implied meaning, (3) speaker's attitude, tone, and intention, (4) evaluating arguments and reasoning, and (5) synthesis and critical interpretation. Data were analyzed using descriptive statistics and inferential analyses to examine differences in critical listening performance between groups.

The respondents of this study were undergraduate students enrolled in the English Education Study Program at Universitas Muhammadiyah Palembang, Indonesia. The participants were selected from intact classes due to institutional constraints that prevented random assignment, a condition commonly encountered in classroom-based quasi-experimental research. A total of 60 students participated in the study and were assigned to either the experimental group or the control group. To ensure comparability between groups, respondents were selected based on their listening proficiency levels. Prior to the instructional treatment, all potential participants completed a TOEFL Listening test, which served as the basis for categorizing students into high and low listening proficiency groups. This classification followed commonly used raw-score interpretations in EFL listening research, whereby students with higher scores demonstrated greater listening proficiency, while those with lower scores were categorized accordingly. Listening proficiency was used solely as an attribute grouping variable for analytical purposes and was not treated as a manipulated variable in the experimental design.

Each group consisted of 30 respondents, with an equal distribution of listening proficiency levels. The experimental group included 15 high-proficiency and 15 low-proficiency listeners, while the control group comprised the same composition. This balanced distribution was intended to minimize proficiency-related bias and to allow meaningful comparison between instructional conditions. The assignment of respondents to experimental and control groups followed a lottery procedure within each proficiency level to maintain group equivalence. All respondents shared similar academic backgrounds, having been enrolled in the same study program and exposed to comparable English language instruction prior to the study. This homogeneity strengthened the internal validity of the research by reducing the influence of extraneous variables related to instructional exposure. Participation was limited to students who were actively attending the listening course during the semester in which the study was conducted.

Critical listening performance was measured using a researcher-developed critical listening test adapted from standardized academic listening assessments, particularly TOEFL and IELTS listening formats, which are widely used to assess higher-order listening comprehension in academic contexts (Buck, 2001). The instrument was systematically developed to measure five theoretically grounded indicators of critical listening: (1) main idea and overall understanding, (2) inference and implied meaning, (3) speaker's attitude, tone, and intention, (4) evaluating arguments and reasoning, and (5) synthesis and critical interpretation. These indicators represent core components of academic and critical listening as described in previous listening and discourse research (Buck, 2001).

The listening tasks consisted of multiple-choice items based on academic discussion excerpts involving multiple speakers. The discussion-based listening materials and academic themes were adapted from *Advanced Listening Comprehension: Developing Aural and Notetaking Skills* by Dunkel and Pialorsi (2005) to ensure authenticity and relevance for university-level EFL learners. Each test item required students to demonstrate higher-order listening processes beyond surface-level comprehension, including drawing inferences, evaluating spoken arguments, and synthesizing information across speakers.

To ensure content validity, all test items were reviewed by two experts in EFL listening instruction, who evaluated the alignment between the items and the targeted critical listening indicators. Prior to the main data collection, the instrument was piloted with a group of EFL students who were not included in the main study to examine item functioning. Item–total correlation analysis indicated that all items met acceptable validity criteria. The internal consistency of the instrument was established using Cronbach's alpha, which yielded a reliability coefficient of $\boldsymbol{\alpha = .87}$, indicating a high level of reliability. The same instrument was administered as both the pre-test and post-test to ensure comparability of measurement across testing occasions. Overall, these results confirm that the instrument was valid and reliable for assessing changes in EFL students' critical listening performance in academic discussion contexts.

The study employed a quasi-experimental pre-test–post-test design involving an experimental group and a control group. Both groups were taught by the same lecturer, followed the same course objectives, and received equal instructional time to ensure procedural consistency. Prior to the instructional intervention, all respondents completed a critical listening pre-test to establish baseline performance.

The instructional treatment was conducted over six instructional sessions, which were scheduled as part of the regular listening course. This duration was selected to align with the course syllabus and institutional scheduling constraints, while allowing sufficient exposure to the instructional model to examine short-term instructional effects. The limited duration of the intervention is acknowledged as a potential limitation of the study.

In the experimental group, instruction was delivered through schema-activated multimedia instruction within a structured listening sequence. Each session began with explicit prior knowledge activation activities, including guided questions, brainstorming, and keyword exploration, designed to activate relevant schemata related to the discussion topic. During the listening phase, students engaged with multimedia-supported academic discussion materials that combined audio input with visual cues, such as speaker images and contextual prompts. Students were guided to monitor their comprehension by identifying main ideas, interpreting speaker stance, and evaluating arguments presented in the discussion. Following the listening phase, post-listening activities were conducted to encourage reflection, synthesis of ideas across speakers, and evaluation of comprehension.

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In contrast, the control group received conventional listening instruction using the same discussion topics but without explicit schema activation or multimedia scaffolding. Instruction primarily relied on audio-based materials accompanied by comprehension questions focusing on factual information and surface-level understanding. Classroom interaction in the control group was largely teacher-directed, with limited emphasis on inference, evaluation, or synthesis. At the end of the instructional period, both groups completed the post-test under the same testing conditions.

To ensure instructional fidelity, the implementation of the instructional treatment was standardized across all sessions. Both groups were taught by the same lecturer using predetermined lesson objectives and a consistent instructional sequence. A structured lesson outline was followed in each session to maintain consistency in the stages of instruction, including pre-listening, while-listening, and post-listening activities. Instructional time and learning materials were kept equivalent across sessions to minimize variability in treatment delivery.

Table 1. *Instructional model of schema-activated multimedia instruction*

Phase	Instructional Focus	Learning Activities
Pre-listening	Schema activation	Guided questions, brainstorming, keyword preview, topic familiarization
While-listening	Multimedia-supported listening	Audio–visual academic discussion, visual cues, speaker stance identification
Post-listening	Reflection & synthesis	Evaluating arguments, integrating viewpoints, guided discussion

The quantitative data were analyzed using IBM SPSS Statistics. Prior to hypothesis testing, descriptive statistics were computed to examine the distribution of scores and overall performance patterns. Normality assumptions were assessed using the Kolmogorov–Smirnov test, and the results indicated that the data were normally distributed, allowing for the use of parametric statistical procedures. To examine within-group improvement, paired-sample *t*-tests were conducted to compare pre-test and post-test scores for both the experimental and control groups. Independent-sample *t*-tests were then employed to compare post-test performance between the two groups. To further examine the effects of instructional treatment and listening proficiency level, a two-way analysis of variance (ANOVA) was conducted. Effect sizes were calculated using Cohen's *d* for *t*-tests and partial eta squared (η^2) for ANOVA to provide information about the magnitude of the observed effects. Statistical significance was set at $p < .05$. When analyzing the five critical listening indicators, separate statistical tests were conducted for each indicator. Given the exploratory nature of the indicator-level analysis, no formal correction for multiple comparisons was applied; therefore, the findings for individual indicators were interpreted with caution.

RESULTS AND DISCUSSION

Descriptive results of critical listening performance

Descriptive statistics were first examined to describe students' critical listening performance before and after the instructional intervention.

Table 2. *Descriptive statistics of pre-test and post-test in experimental and control groups*

		N	Min	Max	Mean	Std. Deviation
Experimental	Pre-test	30	26	42	33.27	3.768
	Post-test	30	36	46	40.57	3.158
Control	Pre-test	30	27	39	33.60	2.774
	Post-test	30	32	42	37.03	2.092
Valid N (listwise)		30				

Table 2 presents the descriptive statistics generated from the SPSS output for the pre-test and post-test mean scores and standard deviations for both the experimental and control groups. Prior to the intervention, the experimental group (M = 33.27, SD = 3.77) and the control group (M = 33.60, SD = 2.77) demonstrated comparable levels of critical listening performance. Following the intervention, both groups showed improvement; however, the experimental group exhibited a greater mean gain (post-test M = 40.57, SD = 3.16) than the control group (post-test M = 37.03, SD =

2.09). The experimental group demonstrated a mean gain of 7.30 points, whereas the control group showed a gain of 3.43 points, indicating a larger improvement in critical listening performance among students who received schema-activated multimedia instruction. *Figure 1* illustrates the comparison of pre-test and post-test mean scores between the experimental and control groups.

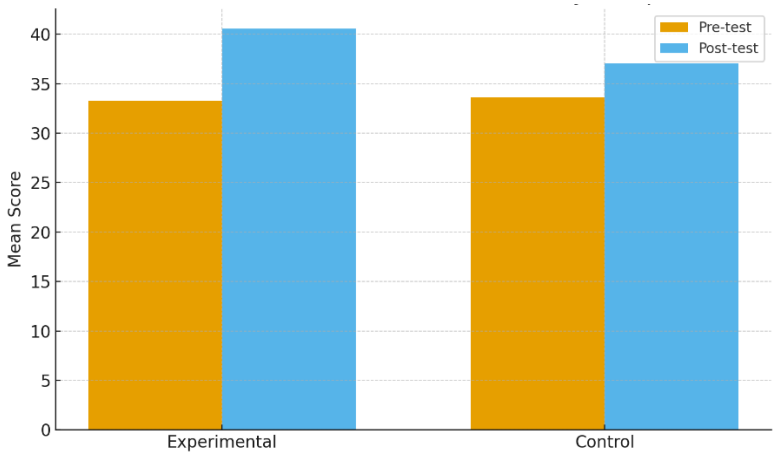


Figure 1. *Comparison of pre-test and post-test mean scores of experimental and control groups*

The bar chart visually reinforces these descriptive results by showing that both groups improved from pre-test to post-test, with the experimental group exhibiting a noticeably larger increase in mean score. Moreover, it highlights a clear difference in improvement between the two groups. The experimental group shows more than double the gain of the control group, indicating that schema activated multimedia instruction contributed substantially more to the development of students' critical listening skills than conventional instruction.

For the descriptive purpose, the scores of listening comprehension test from the whole sample were converted and categorized into 5 categories of achievements; ≤ 40 (failed), 40-59 (poor), 60-69 (average), 71-79 (good), 80-100 (excellent) (FKIP UMP, 2025). Table 3 presents the score distribution of the listening comprehension achievement in the pre-test and the post-test based on the five categories of achievement.

Table 3. *The score distribution of critical listening achievement in both groups*

Score Interval	Category	Experimental Group				Control Group			
		Pretest		Posttest		Pretest		Posttest	
		Freq	%	Freq	%	Freq	%	Freq	%
80- 100	Excellent	6	20%	17	56.7%	7	23.3%	7	23.3%
71- 79	Good	6	20%	13	43.3%	8	26.7%	21	70%
60- 69	Average	14	46.7%	0	-	13	43.3%	2	6.7%
40- 59	Poor	4	13.3%	0	-	2	6.7%	0	-
< 40	Failed	0	-	0	-	0	-	0	-
Total		30	100%	30	100%	30	100%	30	100%

Judging from the score categorization, both the experimental and control group showed distinct distributions of listening achievement in the pre-test and the post-test. In the pre-test of the experimental group, 6 students (20%) were categorized as excellent, 6 students (20%) were in the good category, 14 students (46.7%) belonged to the average category, and 4 students (13.3%) were in the poor category. No students were classified as failed. After the treatment, the distribution shifted notably. In the post-test, 17 students (56.7%) reached the excellent category, while 13 students (43.3%) were in the good category. None of the students fell into the average, poor, or failed categories. This indicated a strong improvement in the experimental group following the instructional intervention.

A different pattern appeared in the control group. In the pre-test, 7 students (23.3%) were categorized as excellent, 8 students (26.7%) were in the good category, 13 students (43.3%) belonged to the average category, and 2 students

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(6.7%) were in the poor category. None of the students were in the failed category. After conventional learning, the post-test results showed that 7 students (23.3%) remained in the excellent category, while 21 students (70%) moved into the good category. Two students (6.7%) stayed in the average category, and no students were classified as poor or failed. Although improvement was observed, the shift was less substantial than that of the experimental group.

Paired sample t-test results

To examine whether the observed improvements within each group were statistically significant, paired sample t-tests were conducted comparing pre-test and post-test scores for the experimental and control groups. The results indicated that both groups experienced statistically significant improvement. In the control group, the paired sample t-test revealed a significant difference between pre-test and post-test scores, $t(29) = –6.746$, $p < .001$, with a mean difference of –3.43. This result indicates that conventional instruction contributed to meaningful improvement in students' critical listening performance. In the experimental group, the improvement was substantially greater. The paired sample t-test showed a highly significant difference between pre-test and post-test scores, $t(29) = –15.214$, $p < .001$, with a mean difference of **–7.30**. The magnitude of improvement in the experimental group was more than double that of the control group, suggesting a strong effect of schema-activated multimedia instruction on students' critical listening performance.

Independent sample t-test results

To determine whether the instructional treatment produced significantly different outcomes between groups, an independent sample t-test was conducted on the post-test scores of the experimental and control groups. The results revealed a statistically significant difference in post-test critical listening performance between the two groups, $t (58) = 7.506$, $p < .001$, with a mean difference of 3.57 points in favor of the experimental group. Students who received schema-activated multimedia instruction outperformed those who received conventional listening instruction. Further analysis across the five indicators of critical listening showed a consistent pattern. Significant differences favored the experimental group in main idea and overall understanding ($p = .037$), inference and implied meaning ($p < .001$), speaker's attitude, tone, and intention ($p = .002$), and synthesis and critical interpretation ($p < .001$). No statistically significant difference was found for evaluating arguments and reasoning ($p = .336$).

Two-way ANOVA results

A two-way analysis of variance (ANOVA) was conducted to examine the effects of instructional method (schema-activated multimedia instruction vs. conventional instruction), listening proficiency level (high vs. low), and their interaction on students' critical listening performance. The results revealed a significant main effect of instructional method on overall critical listening performance, $F (1, 56) = 47.51$, $p < .001$, $\eta^2 = .459$, indicating that students in the experimental group achieved significantly higher scores than those in the control group. A significant main effect of listening proficiency level was also observed, $F (1, 56) = 22.11$, $p < .001$, $\eta^2 = .283$, showing that high-proficiency listeners outperformed low-proficiency listeners regardless of instructional method.

Regarding interaction effects, a significant interaction between instructional method and listening proficiency level was found for inference and implied meaning and for the total critical listening score ($p = .003$). This indicates that the effectiveness of schema-activated multimedia instruction varied according to students' listening proficiency, with higher-proficiency students benefiting more substantially in inferential listening. For the remaining indicators, main idea and overall understanding, speaker's attitude, tone, and intention, evaluating arguments and reasoning, and synthesis and critical interpretation, no significant interaction effects were observed ($p > .05$), suggesting that the instructional treatment benefited both proficiency levels in a relatively consistent manner.

Taken together, the descriptive and inferential analyses provide strong empirical evidence that schema-activated multimedia instruction significantly enhances EFL students' critical listening performance in academic discussion contexts. While both instructional approaches led to improvement, the experimental group demonstrated substantially greater gains, particularly in higher-order listening processes such as inference and synthesis.

The present study investigated the effectiveness of schema-activated multimedia instruction in enhancing EFL students' critical listening performance in academic discussion contexts. The findings demonstrate that students in the

experimental group showed significantly greater improvement than those in the control group, with a large effect size, indicating both statistical and educational significance. These results are consistent with the view that activating prior knowledge enhances comprehension and strategic processing in listening (Fung & Lo, 2023; González & Barreiro, 2025). In particular, structured schema activation appears to facilitate learners' ability to anticipate content and interpret meaning in complex discourse (Schmitz et al., 2024). Moreover, integrating schema activation with authentic listening practices aligns with contemporary digital listening behaviors, where multimodal exposure supports deeper engagement (Beuscart et al., 2023). This suggests that schema-based preparation is not only theoretically grounded but also contextually relevant in modern learning environments (Fitri et al., 2025).

The significant within-group improvement observed in the experimental group further confirms the role of multimedia support in enhancing comprehension and reducing cognitive load. Multimedia-assisted instruction enables learners to process information through multiple channels, thereby improving retention and meaning construction (Ljubojević et al., 2025). In this study, the integration of visual cues, contextual prompts, and structured previews likely supported learners in organizing incoming information more effectively (Coleman et al., 2025; Hamedi & Arabpour, 2025). These findings are also in line with research showing that multimodal input enhances listening engagement and comprehension in EFL contexts (Kong-in et al., 2025). Furthermore, multimodality in listening environments has been shown to support discourse-level understanding and learner interaction with content (Fitri et al., 2025). Such improvements reflect broader shifts toward multimedia-rich instructional practices that mirror real-world listening experiences (Vitis & Ryan, 2023).

In contrast, although the control group demonstrated some improvement, the magnitude of the effect was considerably smaller. This indicates that conventional audio-based instruction may support basic comprehension but provides limited scaffolding for higher-order listening processes (González & Barreiro, 2025). Traditional approaches often emphasize surface-level understanding without sufficiently engaging learners in critical or evaluative listening tasks (Fung & Lo, 2023; Schmitz et al., 2024). As a result, learners may struggle to interpret implicit meanings or evaluate arguments within academic discussions. The comparatively modest gains in the control group highlight the limitations of relying solely on audio input without multimodal or schema-based support (Sengul, 2026). These findings reinforce the importance of integrating innovative instructional strategies to foster deeper listening engagement (Lee & Ko, 2025).

Indicator-level analysis revealed that the most substantial improvements occurred in identifying main ideas, making inferences, and recognizing speaker attitudes. These gains suggest that schema activation combined with multimedia scaffolding enhances learners' ability to process both explicit and implicit information (Fung & Lo, 2023). Visual and contextual supports likely enabled students to track discourse structure and interpret speaker intentions more effectively (Schmitz et al., 2024; Fitri et al., 2025). Additionally, exposure to varied listening formats may have strengthened learners' inferential skills and discourse awareness (Vitis & Ryan, 2023). Previous studies also confirm that strategic listening instruction contributes to improved comprehension and interpretive accuracy (González & Barreiro, 2025). Thus, the present findings extend prior research by demonstrating these benefits within interactive academic discussion contexts (Lee & Ko, 2025).

By contrast, improvements in evaluating arguments and reasoning were relatively limited. This finding suggests that evaluative listening requires more advanced cognitive and metacognitive processes that develop over longer periods (Stanley & Gilzene, 2023). While multimedia support can facilitate comprehension and inference, it may not be sufficient for fostering critical evaluation without explicit analytical training (González & Barreiro, 2025; Fung & Lo, 2023). Learners may need sustained exposure to argumentative discourse and guided practice in critical analysis to develop these skills effectively (Schmitz et al., 2024). Additionally, engagement with authentic and complex listening materials may gradually enhance evaluative abilities (Sengul, 2026). Therefore, the smaller gains in this area highlight the need for more targeted instructional interventions (Lee & Ko, 2025).

Metacognitive scaffolding likely contributed to the observed improvements in the experimental group. Structured listening activities encouraged learners to plan, monitor, and evaluate their comprehension, which are essential components of effective listening development (Fung & Lo, 2023; González & Barreiro, 2025). These processes were further supported by multimedia tools that helped

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learners regulate attention and manage cognitive load (Ljubojević et al., 2025). In addition, interactive and multimodal learning environments promote active engagement and self-regulated learning behaviors (Hamedi & Arabpour, 2025). Such integration aligns with contemporary models of learner-centered instruction that emphasize strategic and reflective learning (Kong-in et al., 2025). Consequently, the combination of metacognitive and multimedia scaffolding appears to create a more effective learning environment (Fitri et al., 2025).

It is also important to consider contextual factors that may have influenced the results. Students' familiarity with multimedia tools and prior exposure to academic discussions may have affected their ability to benefit from the intervention (Lee & Ko, 2025). Learners with greater experience in digital learning environments may adapt more quickly to multimedia-supported instruction (Beuscart et al., 2023; Vitis & Ryan, 2023). Conversely, those with limited exposure may require additional time and support to fully engage with the instructional model (Sengul, 2026). Furthermore, differences in listening habits and preferences could influence learning outcomes (Fung & Lo, 2023). Future research should therefore examine how individual differences interact with multimedia and schema-based instruction (González & Barreiro, 2025).

The absence of significant interaction effects between instructional method and proficiency level suggests that the intervention was effective across different learner groups. This finding indicates that multimedia and schema-based scaffolding can provide accessible support for diverse learners (Coleman et al., 2025). By reducing cognitive load and enhancing comprehension, such approaches create inclusive learning environments that benefit both lower- and higher-proficiency students (Ljubojević et al., 2025; Hamedi & Arabpour, 2025). Moreover, multimedia instruction has been shown to improve learner attitudes and engagement regardless of proficiency level (Kong-in et al., 2025). These results highlight the potential of integrated instructional models to address varied learner needs (Fitri et al., 2025). Thus, the approach appears to be both effective and adaptable in heterogeneous classrooms (Lee & Ko, 2025).

Taken together, these findings extend schema theory and multimedia learning principles into the domain of critical listening in academic discussions. The integration of schema activation and multimedia scaffolding provides a comprehensive framework for enhancing higher-order listening skills (González & Barreiro, 2025; Fung & Lo, 2023). This approach aligns with evolving digital listening practices and the increasing use of multimodal resources in education (Beuscart et al., 2023). Furthermore, the findings emphasize the importance of designing listening instruction that goes beyond audio-based input to include interactive and visually supported materials (Coleman et al., 2025; Fitri et al., 2025). By fostering deeper engagement and critical thinking, such instructional innovations offer valuable implications for EFL pedagogy (Ljubojević et al., 2025). Overall, the study provides strong empirical support for the effectiveness of schema-activated multimedia instruction in promoting critical listening development (Lee & Ko, 2025).

CONCLUSION

This study examined the effectiveness of schema-activated multimedia instruction in enhancing EFL students' critical listening performance in academic discussion contexts. The findings demonstrate that students who received schema-activated multimedia instruction showed significantly greater improvement than those who received conventional audio-based listening instruction, with a large and educationally meaningful effect size. These results indicate that the instructional approach was not only statistically effective but also pedagogically meaningful in supporting the higher-order listening processes required for academic engagement.

At the indicator level, the intervention was particularly effective in improving students' ability to identify main ideas, draw inferences, and recognize speaker attitude and intention. These gains suggest that activating learners' prior knowledge and providing multimedia-supported input facilitate deeper comprehension and interpretive listening in discussion-based contexts. In contrast, improvements in evaluating arguments and reasoning were more modest, indicating that evaluative listening skills may require longer instructional duration and more explicit pedagogical scaffolding. This finding is consistent with previous research suggesting that evaluative judgment develops gradually and is sensitive to instructional intensity and sustained engagement.

From a theoretical perspective, the findings extend schema theory and multimedia learning theory into the domain of critical listening in interactive academic discourse. The results suggest that the instructional model supports critical

listening development through three interrelated mechanisms: (1) activating relevant schemata to enhance cognitive readiness, (2) reducing cognitive load through multimodal scaffolding, and (3) facilitating metacognitive regulation through structured listening procedures. By integrating these cognitively grounded principles, the instructional approach enables learners to allocate cognitive resources more efficiently and engage more deeply in evaluative and interpretive listening processes. Furthermore, the differential responsiveness observed across critical listening indicators highlights the importance of conceptualizing critical listening as a multidimensional construct rather than a unitary skill.

Importantly, the absence of significant interaction effects across proficiency levels suggests that schema-activated multimedia instruction benefits learners with varying levels of listening ability. The approach appears to provide equitable cognitive support for complex academic listening tasks by reducing processing demands and offering structured entry points for engagement. This inclusivity strengthens the pedagogical value of the instructional model in diverse EFL higher education settings.

Pedagogically, the study underscores the need to move beyond surface-level comprehension and audio-only listening instruction toward systematically designed listening experiences that activate prior knowledge, integrate visual and contextual support, and guide metacognitive engagement. Listening instruction in higher education should incorporate structured pre-listening schema activation, multimedia-supported discussion materials, and reflective activities that encourage inference, synthesis, and argument evaluation. At the same time, instructors should provide sustained opportunities for learners to practice evaluative listening, particularly argument assessment and reasoning, through extended discussion tasks and analytical exercises.

Despite its contributions, this study has several limitations. The instructional intervention was implemented over a relatively short period, which may have constrained the development of more demanding evaluative listening skills. In addition, potential confounding variables, such as students' prior exposure to academic discussions and familiarity with multimedia learning environments, were not controlled. Future research should explore longer-term implementations, incorporate qualitative measures of listening processes, and examine how learner characteristics mediate the effectiveness of schema-activated multimedia instruction. Longitudinal designs may also provide deeper insight into how sustained exposure influences the development of evaluative reasoning in listening.

In conclusion, schema-activated multimedia instruction represents a promising and theoretically grounded approach for developing EFL students' critical listening performance in academic discussion contexts. By integrating prior knowledge activation, multimodal scaffolding, and structured metacognitive support, the instructional model offers a pedagogically viable framework for fostering higher-order academic listening in EFL higher education.

REFERENCE

Alamri, W. (2025, August). Evaluating the benefits and challenges of using authentic materials in EFL context for listening purpose. In *Frontiers in Education* (Vol. 10, p. 1611308). Frontiers Media SA. https://doi.org/10.3389/feduc.2025.1611308

Amiruddin, A., Satriani, S., Bahri, S., & Muslaini, F. (2025). Exploring students' strategies in dealing with unfamiliar vocabulary during a listening task in higher education. *ETDC: Indonesian Journal of Research and Educational Review, 5*(1), 347–358. https://doi.org/10.51574/ijrer.v5i1.4177

Arbain, M., Rafliyanda, Z. W., Lingga, M., & Rehan, M. S. (2025). Challenges and solutions in academic listening: A focus on conversation videos for English language education students. *PEEL (Paser English Education and Linguistic), 4*(2), 73–89. https://doi.org/10.56489/ydz6rd52

Beuscart, J. S., Coavoux, S., & Garrocq, J. B. (2023). Listening to music videos on YouTube: Digital consumption practices and the environmental impact of streaming. *Journal of Consumer Culture, 23*(3), 654–671. https://doi.org/10.1177/14695405221133266

Blomstrom, S., Hayford, B., & DeTore, J. L. (2025). Student engagement in listening strategies impacts self-evaluation of academic achievement and personal life. *International Journal of Listening*, 1–12. https://doi.org/10.1080/10904018.2025.2491306

Bozorgian, H., & Shamsi, E. (2025). A review of research on metacognitive instruction for listening development. *International Journal of Listening, 39*(1), 1–16. https://doi.org/10.1080/10904018.2023.2197008

Buck, G. (2001). *Assessing listening*. Cambridge University Press.

Budiyanto, K. K., Harapan, E., Purwanto, M. B., & Smaratungga, S. T. I. A. B. (2024). 21st century

English learning: A revolution in skills, critical thinking, creativity, and visual communication. *Asian Journal of Applied Education, 3*(1), 43–54. https://doi.org/10.55927/ajae.v2i4.6456

Chan, V. (2024). Using a virtual reality mobile application for interpreting learning: Listening to the students' voice. *Interactive Learning Environments, 32*(6), 2438–2451. https://doi.org/10.1080/10494820.2022.2147958

Coleman, O. F., Kunemund, R. L., Waterfield, D. A., McClain, S., McDonald, S. D., Welker, N. P., & Kennedy, M. J. (2025). Using multimedia instruction to improve science vocabulary knowledge: Investigating impact of three formats. *Journal of Special Education Technology, 40*(2), 152–167. https://doi.org/10.1177/01626434251314006

Dalman, M., & Plonsky, L. (2025). The effectiveness of second-language listening strategy instruction: A meta-analysis. *Language Teaching Research, 29*(3), 1039–1068. https://doi.org/10.1177/13621688211072981

Daulay, E. (2025). A case study in the use of audio-visual media for teaching listening skills in junior high school EFL classrooms: Perceived effectiveness and challenges. *Journal on English as a Foreign Language, 15*(1), 135–159. https://doi.org/10.23971/jefl.v15i1.9432

Dunkel, P. A., & Pialorsi, F. (2005). *Advanced listening comprehension: Developing aural and notetaking skills* (3rd ed.). Thomson Heinle.

Endriati, W., Yuliana, Y. G. S., & Bunau, E. (2024). Improving students' listening comprehension in narrative text by using dictogloss technique. *Journal of English Educational Study (JEES), 7*(1), 57–65. https://doi.org/10.31932/jees.v7i1.3069

Fitri, S. A., Gunawan, M. H., & Nurlaelawati, I. (2025). Multimodality in extensive listening: A case study of Indonesian EFL students. *English Review: Journal of English Education, 13*(1), 269–278. https://doi.org/10.25134/erjee.v13i1.9706

Fung, D., & Lo, Y. Y. (2023). Listening strategies in the English Medium Instruction (EMI) classroom: How students comprehend the teacher input. *System, 113*, 103004. https://doi.org/10.1016/j.system.2023.103004

Gerald, C., & Joseph, M. (2024). Communication skills challenges experienced by first-year university students: A systematic review. *Journal of Education, Society and Behavioural Science, 37*(6), 465–477. https://doi.org/10.9734/jesbs/2024/v37i61358

Giovanelli, E., Perinelli, E., Valzolgher, C., Gessa, E., & Pavani, F. (2026). Self-efficacy and locus of control when facing listening challenges: Validation of the Listening Challenges Attitude Scale (LiCAS). *International Journal of Listening*, 1–16. https://doi.org/10.1080/10904018.2026.2636843

González, B. J. G., & Barreiro, M. P. R. (2025). Strategies for developing listening skills in the English teaching-learning process. *Revista Científica Arbitrada Multidisciplinaria PENTACIENCIAS, 7*(2), 301–319. https://doi.org/10.59169/pentaciencias.v17i2.1443

Gunawan, A. P., Gustine, G. G., & Gunawan, M. H. (2023). Critical listening in higher education: Insights from Indonesian EFL learners. *English Review: Journal of English Education, 11*(3), 675–686. https://doi.org/10.25134/erjee.v11i3.8236

Hamada, Y., & Yanagawa, K. (2024). Aural vocabulary, orthographic vocabulary, and listening comprehension. *International Review of Applied Linguistics in Language Teaching, 62*(2), 953–975. https://doi.org/10.1515/iral-2022-0100

Hamedi, S. M., & Arabpour, M. (2025). Multimedia-assisted grammar instruction: The predictive role of EFL students' perception of technology-integrated instruction, emotional responses, engagement, and grammar achievement. *Innovation in Language Learning and Teaching*, 1–21. https://doi.org/10.1080/17501229.2025.2582011

Harida, R. (2023). Youtube to promote critical thinking in critical listening course. *Journal of English Language Learning, 7*(1), 363–373. https://doi.org/10.31949/jell.v7i1.5941

Harris, J. (2025). Measuring listening and speaking self-efficacy in EFL contexts: The development of the Communicative SE Questionnaire. *Language Teaching Research, 29*(3), 1210–1234. https://doi.org/10.1177/13621688221091608

Hassan, P. R., & Jawad, H. F. (2025). An investigation into teaching English prepositions to EFL university students through image schema theory. *Aran Journal for Language and Humanities, 1*(2), 253–269. https://doi.org/10.24271/ARN.2025.01-02-15

Hui, B., & Godfroid, A. (2026). Listening, reading, or both? Rethinking the comprehension benefits of reading-while-listening. *Language Learning, 76*(1), 311–351. https://doi.org/10.1111/lang.12721

Juliana, J., Zein, T. T., Nurlela, N., Gustianingsih, G., Deliana, D., & Noor, R. (2025, December). Mapping the schematic structure of argumentative essays: A contextualized genre-based approach in EFL classrooms. In *Proceeding of Annual International Conference on Islamic Education and Language (AICIEL)* (pp. 67–78).

Kazu, İ. Y., & Kuvvetli, M. (2025). Digital language learning with Duolingo: Assessing its impact on

listening, speaking, reading, and writing skills. *Journal of Computers in Education*, 1–27. https://doi.org/10.1007/s40692-025-00355-0

Khikmatulloevna, D. F. (2025). Improving listening proficiency through podcast integration in English lessons. *Journal of New Century Innovations, 88*(1), 236–239. https://doi.org/10.64941/bsncht07

Kluger, A. N., Lehmann, M., Aguinis, H., Itzchakov, G., Gordoni, G., Zyberaj, J., & Bakac, C. (2024). A meta-analytic systematic review and theory of the effects of perceived listening on work outcomes. *Journal of Business and Psychology, 39*(2), 295–344. https://doi.org/10.1007/s10869-023-09897-5

Kong-in, W., Treesa-nga, N., Baikam, S., & Iamsa-ard, A. (2025). Leveraging multimedia and team-games tournament cooperative learning to enhance English vocabulary acquisition of EFL learners. *Anatolian Journal of Education, 10*(2), 185–202. https://doi.org/10.29333/aje.2025.10214a

Lee, J., & Ko, Y. (2025). Comparing metaverse and face-to-face instruction for enhancing English skills and attitudes among EFL adolescents. *Education and Information Technologies, 30*(6), 8215–8244. https://doi.org/10.1007/s10639-024-13162-4

Levis, J. (2025). L2 listening: How perception, strategies, technology, and assessment have reshaped the field. In *The handbook of second language listening* (pp. 3–14). Wiley. https://doi.org/10.1002/9781394312375.ch01

Liyan, S. (2025). Research on the application and role of mind mapping in college English listening teaching. *International Journal of English Language, Education and Literature Studies, 4*(4), 620595. https://doi.org/10.22161/ijeel.4.4.10

Ljubojević, M., Savić, M., Mijić, D., & Vico, G. (2025). Improving the efficiency of multimedia learning and the quality of experience by reducing cognitive load. *Applied Sciences, 15*(3), 1054. https://doi.org/10.3390/app15031054

Loan, T. T. T., Tuoi, P. T. K., & Hoa, H. T. M. (2024). Significance of listening skills in enhancing the communication skills. *International Journal of English Language Studies, 6*(2), 194–196. https://doi.org/10.32996/ijels.2024.6.2.28

Miholjančan, T., Jelovčić, I., & Mesić, A. P. (2024). Fostering writing proficiency in LSP courses: Integrating audio and video lectures to enhance academic listening and writing skills. *Focus on ELT Journal, 6*(1), 107–118. https://doi.org/10.14744/felt.6.1.8

Nurhayati, N., Setiawaty, P. W., & Nur, S. (2024). EFL teachers challenges in designing assessment material for students' listening skills. *ENGLISH FRANCA: Academic Journal of English Language and Education, 8*(2), 409–422. https://doi.org/10.2940/ef.v8i2.12053

Permatasari, R., & Purwanti, I. T. (2025). EFL students' perceptions and challenges in using talk shows to improve listening skills. *Lectura: Jurnal Pendidikan, 16*(2), 576–587. https://doi.org/10.31849/k8a1xv06

Petkou, D., Palioura, M., Papadopoulou, A., Pappa, M., & Aikaterini, S. (2025). Public education teachers' perspectives on the role of active listening in enhancing students' well-being in educational environments. *Research on Preschool and Primary Education*, 101–114. https://doi.org/10.55976/rppe.320251347101-114

Polatcan, F., Biçer, N., & Er, O. (2025). Metacognitive listening strategies and critical listening attitudes as predictors of teacher candidates' academic listening skills: A structural equation modeling analysis. *SAGE Open, 15*(1), 21582440251328768. https://doi.org/10.1177/21582440251328768

Rahman, A., Noni, N., Patak, A. A., Palangngan, S. T., & Akib, M. (2025). A grounded theory exploration of the cognitive effects of multimedia-based instruction on EFL learners' listening skills. *Theory and Practice in Language Studies, 15*(10), 3391–3401. https://doi.org/10.17507/tpls.1510.26

Schmitz, A., Brandt, H., & Rothstein, B. (2024). Impact of global text cohesion on students' listening comprehension of informational listening texts. *Pedagogical Linguistics, 5*(2), 137–161. https://doi.org/10.1075/pl.23002.sch

Sengul, M. (2026). The effects of podcast-based listening instruction on high school EFL students' attitudes toward English and listening skills. *International Journal of Curriculum and Instruction, 18*(2), 151–167.

Siegel, J., & Wang, L. (2024). Listening in academic contexts. In *The Routledge handbook of second language acquisition and listening* (pp. 280–291). Routledge.

Siregar, D. Y., Nadilla, S., Yulfiar, M. S., Rayani, J. R., Gayatri, A., & Arsyah, A. (2026). Indonesian EFL students' perceptions and challenges in developing academic listening competence: A mixed-method investigation. *Vision, 21*(2), 106–112. http://dx.doi.org/10.30829/vis.v21i2.5096

Song, X., Razali, A. B., Sulaiman, T., Jeyaraj, J. J., & Ds, P. (2024). Impact of project-based learning on critical thinking skills and language skills in EFL context: A review of literature. *World Journal of English Language, 14*(5), 402–412. https://doi.org/10.5430/wjel.v14n5p402

Staneviciene, E., & Žekienė, G. (2025). The use of multimedia in the teaching and learning process of higher education: A systematic review. *Sustainability, 17*(19), 8859. https://doi.org/10.3390/su17198859

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Volume 14, Issue 1, February 2026

Stanley, D. A., & Gilzene, A. (2023). Listening, engaging, advocating and partnering (LEAP): A model for responsible community engagement for educational leaders. *Journal of Research on Leadership Education, 18*(2), 253–276. https://doi.org/10.1177/19427751221076409

Tran, N., Hoang, D. T. N., Gillespie, R., Yen, T. T. H., & Phung, H. (2024). Enhancing EFL learners' speaking and listening skills through authentic online conversations with video conferencing tools. *Innovation in Language Learning and Teaching*, 1–11. https://doi.org/10.1080/17501229.2024.2334809

Vitis, L., & Ryan, V. (2023). True crime podcasts in Australia: Examining listening patterns and listener perceptions. *Journal of Radio & Audio Media, 30*(1), 291–314. https://doi.org/10.1080/19376529.2021.1974446

Wang, X. (2025). Effects evaluation of English listening comprehension in new energy majors with multimedia assistance. *International Journal of Emerging Electric Power Systems*, *26*(6), 1117–1125. https://doi.org/10.1515/ijeeps-2024-0380

Worthington, D. L., Bodie, G. D., & Fitch-Hauser, M. E. (2024). *Listening: Processes, functions, and competency*. Routledge.

Yeh, H. C., & Fu, J. S. (2025). Promoting intracultural understanding and language proficiency through video creation: A schema activation perspective. *Journal of Research on Technology in Education, 57*(2), 310–324. https://doi.org/10.1080/15391523.2023.2228941

Zeng, J., Peng, A., Huang, F., & Wu, C. (2026). Fostering engagement in EFL listening: How teacher autonomy support mediates the impact of academic emotions. *Frontiers in Psychology, 17*, 1746522. https://doi.org/10.3389/fpsyg.2026.1746522

Zhang, Y., & Xu, J. (2025). An investigation into self-efficacy, anxiety, and L2 listening comprehension: The mediation of metacognitive awareness. *International Journal of Listening, 39*(1), 83–97. https://doi.org/10.1080/10904018.2024.2386290

Zhou, S., & Thomas, N. (2025). To survive or to thrive? Synthesizing the narrative trajectories of students' self-regulated listening practice in an EMI transnational higher education context. *Language and Education, 39*(1), 270–289. https://doi.org/10.1080/09500782.2023.2260358

Zhou, S., & Thompson, G. (2023). Exploring the role of English proficiency, self-efficacy, and motivation in listening for learners transitioning to an English-medium transnational university in China. *System, 113*, 102998. https://doi.org/10.1016/j.system.2023.102998