Vol. 15, No. 04, pp. 2423-2442, 2025 DOI: 10.23960/jpp.v15i4.pp2423-2442

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jpp.fkip.unila.ac.id/index.php/jpp/

Developing And Evaluating ASMR-Based Digital Media To Enhance English Vocabulary Retention Among Indonesian High School Students: A Cognitive Approach

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Received: 27 September 2025 *Accepted: 31 October 2025* *Published: 15 November 2025*

Abstract: Developing and Evaluating ASMR-Based Digital Media to Enhance English Vocabulary Retention Among Indonesian High School Students: A Cognitive Approach. **Objective:** This study addresses the persistent challenge of English vocabulary retention among Indonesian high school students. Traditional rote memorization techniques remain inadequate in promoting long-term recall because they limit cognitive and sensory engagement. To overcome this issue, this research aimed to develop and evaluate an Autonomous Sensory Meridian Response (ASMR)-based digital media that leverages both cognitive and affective mechanisms to enhance vocabulary learning. Grounded in Cognitive Load Theory and Dual Coding Theory, the study sought to design an interactive platform that stimulates multisensory engagement, fosters focus, and reduces learning anxiety. **Methods:** A Research and Development (R&D) design, guided by the ADDIE model, was implemented with 90 Indonesian students from various public high schools in East Java. The study employed a mixed-methods approach involving pre-test and post-test vocabulary assessments, Likert-scale questionnaires on learner engagement, and semi-structured interviews. Quantitative data were analyzed using paired-sample t-tests and descriptive statistics, while qualitative data underwent thematic analysis to explore students' experiences and perceptions. **Findings:** The results revealed a significant improvement in learners' vocabulary retention ($t(89) = 4.56$, $p < .001$). Results revealed a significant improvement in learners' vocabulary retention ($t(89) = 4.56$, $p < .001$) with a large effect size (Cohen's $d = 1.40$), indicating strong practical significance. Students in the ASMR-based learning condition reported high levels of motivation, attention, and enjoyment throughout the sessions, reflecting the intervention's positive impact on cognitive and emotional engagement. Thematic findings highlighted enhanced focus, emotional relaxation, and metacognitive awareness of recall. Students with lower initial proficiency exhibited the greatest gains, indicating the intervention's inclusive potential. **Conclusion:** The study concludes that a theory-driven, ASMR-based medium appears to be an engaging and promising approach for improving vocabulary acquisition. Integrating multisensory, affectively positive content transforms vocabulary learning into an immersive and emotionally safe experience. These findings provide both theoretical and practical evidence supporting ASMR as an innovative, low-cost pedagogical tool that can enhance language learning in diverse and resource-limited educational contexts.

Keywords: ASMR-Based digital media, vocabulary retention, cognitive approach, research and development (R&D), transform vocabulary instruction.

To cite this article:

Ibad, A. I., Maruf, N., & Kuchakovska, H. (2025). Developing And Evaluating ASMR-Based Digital Media To Enhance English Vocabulary Retention Among Indonesian High School Students: A Cognitive Approach. *Jurnal Pendidikan Progresif*, *15*(4), 2423-2442. doi: 10.23960/jpp.v15i4.pp2423-2442.

INTRODUCTION

A substantial share of secondary students reported as high as 60% still struggle to retain new English vocabulary after a month of instruction, an enduring issue that undermines both communicative competence and academic achievement in contexts where English is not the primary language (Huang, 2021; Phoeun & Sengsri, 2021; Santos, 2020; Zarrinabadi et al., 2021). This concern is particularly acute in Indonesia, where traditional techniques such as rote learning and flashcards are prevalent yet often fail to promote deep, long-term retention due to limited multimodal input and low cognitive engagement (Arifin et al., 2022; Baanqud et al., 2020; Peng et al., 2022). With digital media increasingly embedded in daily routines, scholars and practitioners are asking how novel technologies might be harnessed to make vocabulary instruction more effective, motivating, and durable for today's learners (Avance, 2013; Martzoukou et al., 2020; Pothong, 2018; Bateman, 2021; Boulianne & Theocharis, 2020)

This study addressed a practical gap: the lack of empirically validated, multisensory digital resources specifically designed to improve vocabulary retention among secondary school learners. Although prior research highlights the advantages of multimodal, cognitively engaging instruction for vocabulary acquisition (Qushem et al., 2021; Ramezanali et al., 2021; Si et al., 2022), our classroom observations and informal pilot sessions indicate that practice remains dominated by unimodal, teacher-centered techniques that appear insufficient to active deeper cognitive processing or sustain student attention (August et al., 2021; Kim & Belcher, 2020; Li & Lan, 2022; Mirzayev Bahtiyorjon O'g'li et al., 2022). Recent neuroscientific findings point to Autonomous Sensory Meridian Response (ASMR)-triggered by particular audio-visual stimuli such as whispering, gently tapping, or soft-spoken prompts- as a candidate for promoting relaxation, sharpening focus, and supporting memory encoding (Fredborg et al., 2021; Poerio et al., 2022, 2023; Smith et al., 2020). Despite ASMR's widespread presence on platforms like YouTube, its classroom applicability and potential role in language learning remain largely under-theorized and empirically underexamined (Harper, 2020; Lewkowich, 2022; Kohler & Dietrich, 2021; Swart et al., 2022).

As classroom researchers, we build on recent work examining the cognitive mechanisms of Autonomous Sensory Meridian Response (ASMR), which suggests that the sustained attentional states and reduced arousal it elicits may be relevant to learning (Kovacevich & Huron, 2019). Neurophysiological evidence further suggests that ASMR triggers, such as whispered speech, can modulate the brain's default mode network (DMN), a system implicated in memory consolidation. The DMN is most active during relaxed wakeful rest, meditation, or daydreaming, states that promote reduced external sensory input and increased internal cognitive processing. This modulation promotes a relaxed state conducive to memory consolidation by facilitating neural replay and hippocampal engagement, which are crucial for transferring newly learned vocabulary from short-term to long-term memory storage (Lochte et al., 2018). Although scholars have conducted empirical research that has so far emphasized mechanism characterization rather than tests of instructional efficacy. The present study addresses this gap by systematically integrating ASMR's cognitive and affective components into an instructional medium and empirically evaluating its potential to enhance English vocabulary retention among high school students.

Toleuzhan et al. (2023) demonstrated that YouTube can be an effective multimedia resource for enhancing English skills, including listening, vocabulary, and pronunciation, among university

learners. However, based on our review and classroom observations, much of the platform's educational material remains passive and lacks deliberate instructional design informed by cognitive or affective learning theories. The ASMR materials primarily originate from informal digital content, featuring triggers such as whispering and tapping, designed mainly to induce relaxation rather than facilitate purposeful learning. These sounds create a calming, multisensory experience but often lack structured pedagogical elements necessary to actively support vocabulary acquisition and cognitive engagement (Maziriri et al., 2020). By doing so, we aim to convert commonplace passive digital content into an active, multisensory learning experience grounded in established educational theory and supported by neurophysiological evidence of ASMR's cognitive and emotional engagement (Lochte et al., 2018).

As classroom researchers, we aim to develop an innovative English vocabulary learning medium that leverages ASMR YouTube content within a cognitive-theoretical framework. The study has two objectives: (1) to design and implement ASMR-based instructional media tailored to support vocabulary retention, and (2) to assess its effectiveness with Indonesian secondary school students using cognitive-based instructional models.

Building on the objectives, the research addresses two central questions that delineate its scope. First, how can an ASMR-based digital learning medium be systematically designed to optimize English vocabulary retention among high-school students through the integration of auditory and visual triggers aligned with cognitive learning principles? Second, how does ASMR-based digital media influence vocabulary retention and learner engagement across participant subgroups, and how do learners' qualitative experiences explain or complement the observed quantitative outcomes?

The significance of this study is twofold. Theoretically, we seek to bridge affective neuroscience and language pedagogy by operationalizing ASMR triggers within a structured instructional context, thereby contributing to the literature on multisensory and affective approaches to learning. Practically, the project aims to deliver a scalable, low-cost, and accessible approach to vocabulary instruction, an outcome particularly pertinent for resource-constrained schools. By systematically examining the cognitive and affective mechanisms that underlie ASMR-based learning, we aim to both extend the boundaries of digital language pedagogy and address pressing educational needs in the digital era.

METHOD

Participants

The study involved 90 Indonesian high school students from multiple secondary schools in Gresik, East Java, selected through purposive sampling. This sampling technique was chosen to target students who met specific characteristics relevant to the study objectives, including regular enrollment in formal English classes and availability to participate throughout the intervention period. Schools were selected to represent diverse educational contexts within the region, thereby enhancing the applicability of the findings. Purposive sampling allowed for focused data collection from participants most likely to provide relevant insights into the effectiveness of ASMR-based vocabulary instruction. However, this non-random approach limits the broad generalization of results to all Indonesian high school students, as the sample may not fully capture variations across other regions or school types.

Participants were divided into two groups: the experimental group, which received the ASMR-based vocabulary instruction, and the control group. The control group consisted of students matched by grade level and English

proficiency who received traditional vocabulary instruction, utilizing rote memorization and flashcards, in accordance with the existing curriculum. Control group sessions were designed to mirror the frequency and duration of the intervention (twice weekly, 45 minutes per session, over eight weeks) to control for time-on-task effects. Observations ensured standard delivery across sites, thereby supporting internal validity and facilitating a clear comparison of outcomes. The multi-site design and controlled classroom environment further improved consistency of intervention delivery and data collection while balancing practical research constraints.

Research Design

This study employed a quasi-experimental, non-equivalent control group design. Both experimental and control classes were included to ensure procedural balance and minimize potential bias. However, the primary statistical emphasis was placed on within-group changes in the experimental class to examine the internal effectiveness of the ASMR-based intervention. The control group functioned mainly to maintain baseline equivalence and ecological validity, serving as a descriptive reference rather than an inferentially analyzed comparison group.

Inferential tests were not applied to the control group, as the study focused on internal effectiveness within the ASMR condition. The control group served as a descriptive benchmark, ensuring instructional stability and validating that observed gains were attributable t the intervention.

Research Procedures

The research follows these sequential stages: (1) Analysis: Needs assessment through surveys and interviews to identify vocabulary retention challenges. (2) Design and Development: Creation of ASMR-based learning media incorporating cognitive theories such as dual coding and cognitive load management. (3) Pilot Testing: Small-scale testing with a subgroup to refine media and instruments. (4) Implementation: Deployment of the finalized media in classroom settings over a defined period. (5) Evaluation: Collection and analysis of quantitative and qualitative data to assess effectiveness. The overview of research procedures is presented in Table 1.

Table 1. Overview of research procedures

STAGE	KEY STEPS	TOOLS/RUBRICS	OUTPUT
1. Analysis	✓ Conduct surveys and interviews. ✓ Identify vocabulary retention challenges. ✓ Determine learner needs and context.	✓ Survey questionnaires ✓ Interview guides	✓ Needs assessment report. ✓ List of vocabulary retention challenges.
2. Design	✓ Define learning objectives ✓ Plan ASMR media content and instructional strategies ✓ Develop storyboards and prototypes	✓ Instructional design frameworks. ✓ Storyboard templates.	✓ ASMR media design plan. ✓ Storyboards and prototypes
3. Development	✓ Create ASMR-based digital media. ✓ Incorporate cognitive theories (dual coding, cognitive load).	✓ Multimedia authoring tools. ✓ Expert review checklists.	✓ Functional ASMR-based learning media prototype.

	✓ Expert review and refinement.		
4. Implementation	✓ Pilot testing with a small subgroup (2 weeks). ✓ Finalize media and instruments. ✓ Deploy media in classroom settings across multiple schools (8 weeks/ meeting of treatment): each session lasting about 45 minutes. Sessions featured deliberate pacing and pauses to optimize attention and cognitive processing, ensuring effective engagement without cognitive overload.	✓ Pilot test feedback forms. ✓ Observation checklists.	✓ Refined media and instruments. ✓ Implementation report.
5. Evaluation	✓ Collect quantitative data (pretest-posttest, questionnaires). ✓ Collect qualitative data (interviews, observations). ✓ Analyze data (statistical tests, thematic analysis). ✓ Assess effectiveness and provide feedback	✓ Standardized vocabulary tests. ✓ Likert-scale questionnaires. ✓ Interview protocols Statistical software (SPSS, R). ✓ Qualitative analysis software (NVivo).	✓ Data analysis results Effectiveness evaluation report. ✓ Recommendations for improvement.

Instruments

Pilot Testing and Instrument Validation

A pilot study was conducted with 10(ten) students representative of the target population. The pilot aimed to: (1) assess the usability and accessibility of the ASMR-based learning media so students could effectively nativage and interact with it; (2) evaluate the clarity, relevance, and reliability of instruments, including questionnaires, vocabulary assessments, and observation checklists; (3) test the feasibility of research procedures, timelines, and logistics. Detailed feedback was gathered through direct observation, informal interviews, and structured feedback forms. This feedback informed revisions to the media content and instructional design, prompting modifications to the instrument to enhance validity and reliability prior to the full-scale study.

Quantitative Instruments

The quantitative data collection involved two primary instruments: (1) a standardized vocabulary retention test, and (2) a Likert-scale learner engagement questionnaire. The engagement questionnaire was adapted from validated models of student engagement research, such as those by Reeve (2013) and Dörnyei (2014), and then refined through expert review and pilot testing to fit the context of ASMR-based digital learning. It consisted of 18 items, equally divided among three dimensions: motivation (6 items), attention (6 items), and enjoyment (6 items). All items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Example items include: Motivation: ”I feel encouraged to learn more vocabulary through ASMR videos.” Attention: ”The sounds and

visuals in the ASMR media helped me concentrate on each new word." Enjoyment : "Learning vocabulary through ASMR videos made the activity relaxing and enjoyable." These items were reviewed by two language education experts and one educational psychologist to ensure contextual relevance and construct representation. The final version of the instrument aimed to capture affective, cognitive, and behavioral components of engagement within a multimodal, sensory-supported learning environment.

Qualitative Instruments

To complement the quantitative measures, we collected qualitative data through semi-structured interviews and classroom observation. Semi-structured interviews with purposively selected students and teachers produced rich descriptions of their experiences, perceptions, and emotional responses to the ASMR-based learning media, probing how students perceived the sensory and cognitive dimensions of ASMR, the difficulties they encountered, and the strategies they employed during learning. Classroom observations documented real-time interaction, engagement behaviors, and contextual factors that might influence outcomes; detailed field notes and video recording supported these observations. Together, the qualitative corpus provides depth and explanatory insight into the "how" and "why" behind the quantitative results.

Instruments for Validity and Reliability

Quantitative Validity & Reliability

To establish content validity for the quantitative instruments, we convened a panel of three experts, two experienced English language teachers and one cognitive psychologist, to review the vocabulary tests and engagement questionnaires. To ensure construct validity, the instrument underwent expert review by English language educators, who confirmed its alignment with curricular standards and the appropriateness of vocabulary difficulty for the student grade level. Pilot testing involved administering the survey to a small, representative sample of students, for which statistical analyses, including item difficulty, discrimination indices, and exploratory factor analysis, were performed. Results demonstrated satisfactory reliability (Cronbach's alpha > 0.80) and confirmed that items collectively measured the intended construct of vocabulary knowledge. This validation process supports the instrument's appropriateness for assessing vocabulary retention outcomes in the study context. We incorporated the panel's feedback into minor revisions that improved item clarity and curricular relevance.

Reliability testing was conducted using two main methods: (1) Internal consistency of the engagement questionnaire was measured using Cronbach's alpha, yielding a coefficient of 0.87, indicating good reliability and that the questionnaire items consistently reflect the underlying constructs of learner engagement. (2) The test-retest reliability of the vocabulary test was assessed by administering the same test twice to a subgroup of 15 students with a two-week interval under similar conditions. The correlation coefficient between the two test scores was 0.82, demonstrating strong stability and consistency of the vocabulary assessment over time. This confirms that the test reliably measures vocabulary knowledge, with minimal measurement error and negligible fluctuations due to external factors.

A content validation process was conducted to confirm the internal structure of the engagement questionnaire, involving three subject-matter experts in English education and cognitive psychology. Exploratory factor analysis (EFA) was then applied to establish construct validity, which confirmed a clear three-factor structure consistent with motivation, attention, and enjoyment dimensions, explaining 63.2% of total variance. Each subscale demonstrated strong internal reliability, with Cronbach's alpha coefficients ranging from 0.85 (attention) to 0.89

(enjoyment), and overall reliability á = 0.88. These results, aligned with standards reported in engagement scale literature (Vanbecelaere et al., 2020; David et al., 2020), affirm the instrument's robustness and suitability for evaluating learners' affective and cognitive responses to ASMR-mediated instruction. These validity and reliability measures align with established standards in language assessment research, ensuring that the instruments provide accurate and consistent data to evaluate the effectiveness of the ASMR-based vocabulary learning media.

Qualitative Validity and Reliability

Qualitative validity is enhanced through member checking, where interview participants review and confirm the accuracy of the transcribed data and interpretations. Peer debriefing sessions with fellow researchers provided critical feedback on the coding process and thematic development, reducing researcher bias. Dependability is maintained by keeping a detailed audit trail that documents all methodological decisions, coding iterations, and reflective notes throughout the data analysis. This transparency allows other researchers to replicate or verify the study's qualitative findings, contributing to the trustworthiness of the research.

Data Analysis

Quantitative Analysis

The quantitative analysis began with paired t-tests comparing pretest and posttest vocabulary scores to evaluate the statistical significance of improvements attributed to the ASMR intervention. Descriptive statistics were used to summarize learner engagement questionnaire responses, providing measures of central tendency and variability for motivation, attention, and enjoyment. To further refine the analysis, we conducted subgroup analyses to identify patterns and distinguish between distinct learner groups within the population. This approach helped uncover factors linked to differential learning outcomes, enabling a more nuanced understanding of which students benefited most from the ASMR media under specific conditions. Effect sizes were calculated to quantify the magnitude of changes, and assumptions of normality and homogeneity of variance were thoroughly tested to ensure the validity and robustness of statistical inferences.

Qualitative Analysis

We analyzed qualitative data from interviews and classroom observations using a thematic analysis approach. Transcripts and field notes were systemically coded to identify recurring themes and categories concerning cognitive engagement, emotional responses, and perceptions of the ASMR media's effectiveness. The coding process was iterative; initial codes were refined through constant comparison, memoing, and team discussion to enhance consistency and analytic depth. Finally, we triangulated the qualitative themes with the quantitative results to produce a comprehensive interpretation, emphasizing convergences that clarify how and why the intervention worked in different contexts.

■ RESULT AND DISCUSSION

RQ.1. How can an ASMR-based digital learning medium be systematically designed to optimize English vocabulary retention for high school students, integrating both auditory and visual triggers in line with cognitive learning principles?

Analysis Phase: Identifying Learners' Needs and Challenges

The initial needs assessment, conducted via surveys (n = 90) and semi-structured interviews with both students and English Teachers, provided critical insights that directly informed the design specifications. Thematic analysis of the responses revealed three primary challenges, as shown in the following table:

Table 2. Key challenges in traditional vocabulary learning identified in the analysis phase

Challenge Category	Key Findings
Monotony and Lack of Engagement	75% of student respondents characterized traditional methods (e.g., flashcards, word lists) as "boring" and "easily forgettable."
Lack of Multisensory Input	Teachers observed that existing methods were predominantly textual and auditory (listening to the teacher), lacking visual and tactile sensory layers that could aid deeper encoding.
Cognitive Overload	Sixty percent of students reported difficulty in retaining lists of words that felt disconnected and abstract, suggesting that the presentation of new lexicon exceeded their cognitive capacity for assimilation.

Table 2 summarizes the three primary challenges associated with traditional vocabulary learning methods, as identified through a systematic analysis phase. The data, gathered from surveys (n = 90 students) and semi-structured interviews with 6 English teachers, provide a clear rationale for the development of an alternative instructional medium. The key impediments include a pervasive sense *monotony and lack of engagemen*t, with quantitative survey results indicating that 75% of student respondent characterized traditional methods as ineffective. Furthermore, a consistent qualitative theme from teacher interviews was a *lack of multisensory input* in prevailing pedagogical practices. Finally, *cognitive overload* was a significant issue, with over 60% of surveyed student reporting difficulty in retaining abstract and disconnected word lists. These empirical findings provided the critical foundational requirements that directly informed the design objectives for the ASMR-based learning media.

Design and Development Phase: Translating Theory into Practice

Guided by the analysis, the design phase operationalized cognitive learning principles into specific media features.

Table 3. Application of dual coding theory in ASMR media design

Cognitive Code Type	Implementation in ASMR Media	Pedagogical & Affective Purpose
Verbal Code	Target vocabulary was delivered through *soft-spoken* or *whispered narration.*	To provide the auditory verbal representation while simultaneously leveraging the ASMR trigger of whispering *to promote focused attention, relaxation, and enhanced memory encoding.*
Non-Verbal Code	Each word was paired with a *semantically linked, high-definition visual stimulus*.	To create a strong mental image (visual representation) that is intrinsically connected to the word's meaning, facilitating *deeper processing and dual recall pathways.*

Table 3 delineates the operationalization of Paivio's Dual Coding Theory within the design framework of the ASMR-based learning media. The core design principle involved the deliberate pairing of each target vocabulary item with two distinct but synergistic mental representations to facilitate deeper cognitive processing and enhance long-term retention.

The Verbal Code was implemented not as a standard narration but through the specific use

of *soft-spoken* and *whispered speech*. This design choice served a dual function: first, it provided the essential auditory-verbal channel for the word's pronunciation and meaning. For instance, the word "crisp" was uttered in a slow, clear whisper. Second, it intentionally leveraged this whispering as a primary ASMR trigger to induce a state of relaxed focus in the learner, thereby reducing anxiety and potentially improving the encoding of the verbal information into memory. The same approach was applied to verbs like "polish," which was whispered softly and slowly to emphasize its meaning and create a calming effect.

The code was created by pairing each target lexical item with a semantically congruent high-definition visual scene and corresponding ambient audio. The visuals were designed to be immersive rather than merely illustrative, with the explicit aim of eliciting sensory or affective associations relevant to meaning. Illustrative pairings include "crisp" (visual and crunching sound of dry autumn leaves), "polish" (hand-brushing footage accompanied by a soft, rhythmic brushing sound), and "viscous" (a close-up of honey slowly pouring from a spoon). Such multisensory coupling was employed to reinforce memory traces through coordinated auditory and visual stimulation.

Table 4. Application of cognitive load theory in ASMR media design

Design Principle	Implementation Strategy	Purpose
Segmenting	Vocabulary was organized into thematically coherent sets (e.g., "Materials," "Nature Sounds"). Each video module focused on a single theme, containing only 8-10 target words.	To manage intrinsic load by chunking information into manageable, semantically related units, preventing overwhelming the learner's working memory.
Pacing	A slow, deliberate pace was maintained, with significant pauses (3-5 seconds) between words (Sweller,2008, in Sun, 2023).	To reduce extraneous load by eliminating rushed presentation, and to optimize germane load by allowing time for cognitive processing, rehearsal, and encoding into long-term memory.
Signaling	Gentle visual cues (e.g., a soft glow around an object) and auditory cues (a slight change in whispering tone or volume) were used to introduce a new word.	To direct learner attention efficiently to the most relevant information, reducing the extraneous load associated with searching for key elements.

Table 4 summarizes the principal instructional-design strategies, drawn from Cognitive Load Theory (CLT), that were implemented to optimize the learning efficiency of the ASMR-based media. The primary aim was to reduce extraneous cognitive load, which is mental effort that does not support learning, while appropriately managing intrinsic load and enhancing germane load, i.e., the cognitive effort devoted to schema construction and automation.

Segmenting was implemented by organizing vocabulary into thematically coherent micro-lessons, with each micro-lesson targeting 8-10 words. This chunking reduced the intrinsic load by preventing working memory from being overwhelmed by disorganized or excessive information. *Pacing* was deliberately controlled with extended pauses between lexical items. This design provided crucial time for cognitive processing, rehearsal, and encoding, thereby

reducing the extraneous load caused by a rushed presentation and freeing up resources for germane processing. Signaling was implemented using subtle auditory and visual cues to direct learners' attention to essential information. This approach mitigated attention dispersion and reduced extraneous cognitive load by allowing students to locate and focus on target vocabulary without unnecessary cognitive effort. Collectively, the CLT-based strategies ensured that the media's design was cognitively efficient and aligned to foster durable vocabulary acquisition.

The results demonstrate that the ADDIE model provides a robust framework for designing pedagogically effective products. The needs analysis was critical in identifying the limitations of traditional methods, such as monotony, lack of multisensory, and cognitive overload, which informed our design decisions.

The successful application of Dual Coding Theory and Cognitive Load Theory was crucial (Liu et al., 2020; Luo, 2022; Sujatha & Rajasekaran, 2024; Wong, 2022). By pairing whispered verbal codes (ASMR triggers) with high-definition non-verbal visual and sound codes, we created two distinct but associated mental representations for each vocabulary item, directly aligning with Paivio's theory (Paivio, 1986, 1988, 2007; Sadoski & Paivio, 2004). This approach posits that information coded in both verbal and imaginal forms is recalled better than information coded in a single modality. We also effectively operationalized segmenting, pacing, and signaling to manage cognitive load (Sweller, 1988), ensuring that working memory resources were allocated to schema acquisition (germane load) rather than being overwhelmed by disorganized information (intrinsic load) or inefficient processing (extraneous load). This systematic, theory-guided design provides a replicable framework for instructional design, moving beyond anecdotal ASMR use.

RQ.2. How does ASMR-based digital media influence vocabulary retention and learner engagement across participant subgroups, and how do learners' qualitative experiences explain or complement the observed quantitative outcomes?

Quantitative Analysis of Vocabulary Retention

Although both experimental and control groups participated in the study, the quantitative analysis concentrated on the ASMR group to observe internal learning gains. This emphasis aligns with the study's developmental research orientation, which aimed to evaluate the implementation and immediate effects of the ASMR-based medium, rather than comparing its efficacy with that of a comparative group.

The primary quantitative measure of effectiveness was the change in participants' vocabulary knowledge, assessed using standardized pre-test and post-test instruments. Mean scores from the pre-test and post-test were compared using a paired-samples t-test, as both measurements involved the same group of students. This analysis captured the significance of vocabulary improvements within the ASMR group, providing direct evidence of learning enhancement following the intervention. Results are presented in Table 5 and detailed below:

Table 5. Pre-test and post-test vocabulary score comparison for the ASMR Group (n=90)

Assessment	Mean Score	Standard Deviation (SD)	Mean Gain
Pre-test	65.2	10.3	+13.7
Post-test	78.9	9.1	

The analysis revealed a statistically significant improvement in vocabulary scores following the intervention. Initially, the mean pretest score was 65.2 (SD = 10.3), rising to 78.9 (SD = 9.1) on the posttest, representing a mean improvement of 13.7 points. The paired t-test result was highly significant ($t = 4.56$, $p < .001$), confirming that ASMR-based media has a substantial positive effect on vocabulary retention. Additionally, the effect size for this improvement was large, with Cohen's $d = 1.40$, indicating a substantial practical impact of the ASMR-based digital medium on vocabulary retention. This improvement is practically meaningful. Representing a relative gain of approximtely 21% over the pretest mean, suggesting that the intervention had a notable impact on students' vocabulary knowledge.

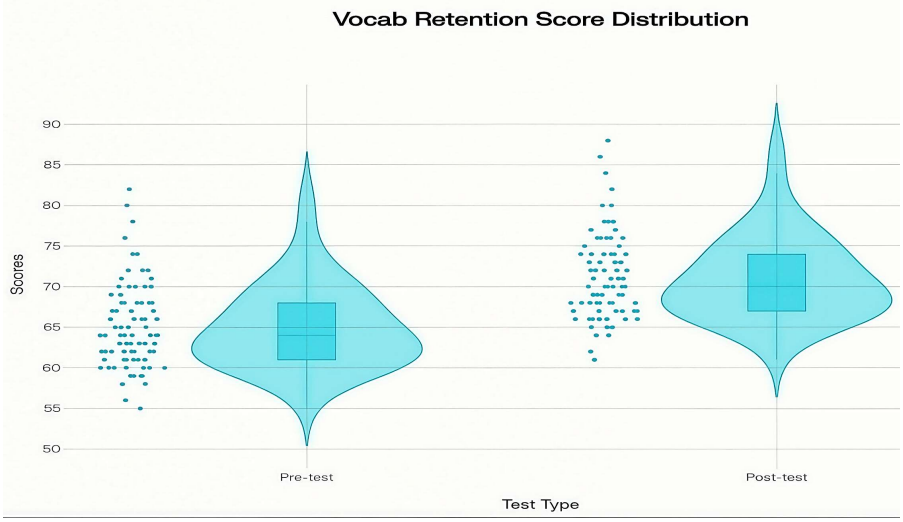

Figure 1. Vocab retention score distribution (pre-test and post-test) of the score distribution for students

Quantitative Analysis of Learner Engagement

The descriptive statistical analysis of the learner engagement questionnaire revealed positive responses across the dimensions of motivation, attention, and enjoyment. Mean scores were as follows: motivation (M=4.3, SD=0.6), attention (M=4.1, SD=0.7), and enjoyment (M=4.5, SD=0.5). These findings indicate that students generally found the ASMR-based media engaging and enjoyable, suggesting that the intervention was effective not only in improving vocabulary retention but also in fostering a positive learning experience. The learner engagement questionnaire was administered exclusively to the ASMR group. The purpose of this analysis was to evaluate participants' motivational and attitudinal responses to the ASMR media rather than to establish inferential differences with the control group. This focus aligns with the study's developmental objective of exploring internal learner experience within the intervention. The results of this analysis are summarized in Table 6.

Table 6. Descriptive statistics for learner engagement dimensions (n=90)

Engagement Dimension	Mean Score (M)	Standard Deviation (SD)
Enjoyment	4.5	0.5
Motivation	4.3	0.6
Attention	4.1	0.7

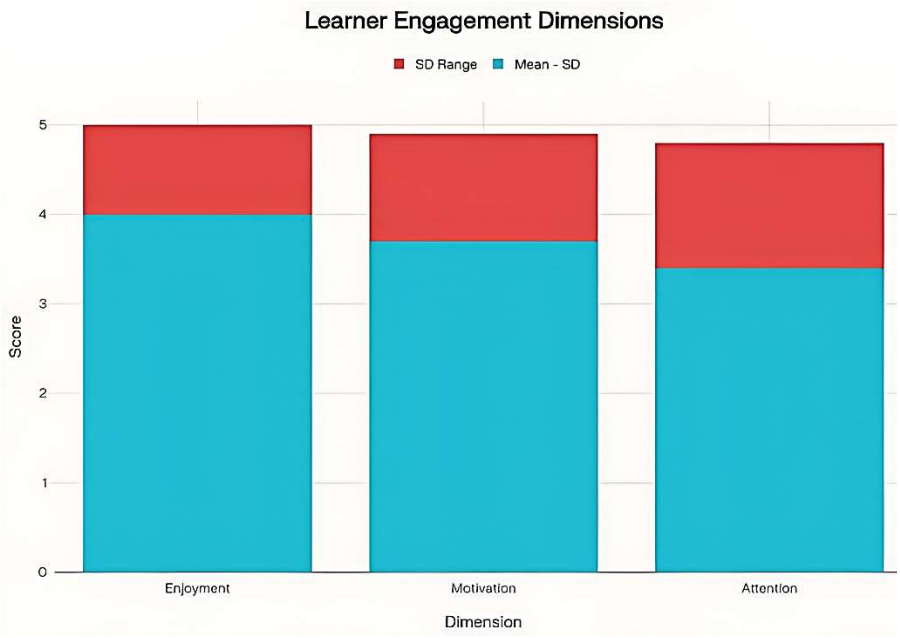

Figure 2. Diverging stacked bar chart of learner engagement dimensions

Differential Effectiveness and Learner Subgroups

The cluster analysis utilized Ward's hierarchical agglomerative method to group learners based on post-intervention vocabulary retention scores and engagement variables, including motivation, attention, and enjoyment. This multivariate clustering approach allowed identification of coherent subgroups reflecting differential learning responses to the ASMR media. The "high responders" cluster had a mean pretest score of 52.4 (SD = 7.3), while the "low responders" cluster had a significantly higher mean pretest score of 65.8 (SD = 6.9). An independent samples t-test confirmed this difference was statistically significant, t(88) = "9.18,p <0.001*t* (88)="9.18,*p*<0.001, indicating that learners with initially lower vocabulary knowledge showed the greatest gains following the ASMR intervention. This supports the interpretation that baseline proficiency influenced responsiveness to the treatment effect.

To further substantiate the claim of differential effectiveness between the identified learner clusters, a supplementary statistical test was conducted comparing the gain scores (post-test minus pre-test) of the two groups. An independent-samples t-test revealed that the mean gain score of the high responder cluster was significantly higher than that of the moderate responder cluster ($t(88) = 2.74$, $p < 0.01$). This indicates that learners in the high-responder group, who initially exhibited lower vocabulary proficiency, experienced substantially greater improvement following the ASMR-based intervention. These results reinforce the interpretation that the differential responsiveness was rooted in variations in treatment gains rather than initial ability differences.

The statistically significant improvement in vocabulary retention $t(89) = 4.56$, $p<.001$) supports our primary hypothesis that ASMR-based media enhances learning. This finding offers crucial applied evidence for a neurocognitive model of ASMR's efficacy, corroborating Lochte et al.'s (2018) work on ASMR's modulation of the brain's default mode network (DMN). It aligns with the established understanding of the DMN's role in memory consolidation, providing a neuroscientific basis for the effectiveness of

Table 7. Characteristics of learner subgroups identified through cluster analysis

Cluster Name	Subgroup Size (n)	Percentage of Cohort
Cluster 1: High Responders	62	69%
Cluster 2: Moderate Responders	28	31%

ASMR in vocabulary retention. Our study effectively translates this neurological mechanism into a demonstrable educational outcome. These findings are consistent with the hypothesis that the relaxed, focused state induced by ASMR, which is characterized by DMN activation, creates neurocognitive conditions conducive to encoding new lexical information into long-term memory. This supports extending theoretical neurophysiological insights toward validated pedagogical applications, bridging brain network dynamics and practical vocabulary learning strategies.

Moreover, the high levels of reported engagement, particularly in enjoyment (M-4.5), motivation (M=4.3), and attention (M=4.1), are key findings. They show that our intervention effectively addressed the affective barriers to learning we identified during the analysis phase. These results align with the concept of "flow" (Csikszentmihalyi, 1990; Toleuzhan et al., 2003) and cognitive absorption, where the immersive, pleasurable nature of the task enhances engagement and performance. The qualitative data provide rich insights into these metrics: students reported feeling calm, curious, and deeply focused, a stark contrast to the anxiety and boredom often associated with traditional methods. This suggests that the effectiveness of the ASMR media is not just cognitive but also profoundly affective by reducing anxiety and increasing enjoyment.

Qualitative Analysis on Engagement and Retention

Our thematic analysis highlighted several key themes that captured the essence of participants' experiences with the ASMR-based media. The main themes were: (1) Elevated Focus and Immersive Experience, (2) Positive Emotional and Affective Response, and (3) Perceived Effectiveness and Metacognitive Awareness of Recall. These themes, derived from detailed participant accounts and classroom observations, provided a rich understanding of how ASMR media influenced their learning.

Theme 1: Elevated Focus and Immersive Experience

Our qualitative data, including interviews and classroom observations, provided strong evidence that ASMR-based media induced a state of heightened concentration and deep immersion, directly supporting the cognitive conditions necessary for effective vocabulary encoding. These findings stand in contrast to our observations of the control group, where we frequently noted off-task behaviors, such as fidgeting, side conversations, and distracted gazes, highlighting the distinct impact of ASMR media on learned engagement.

Students consistently described an unusual ability to maintain sustained attention. For instance, one student remarked:

Excerpt 1: *"Biasanya pas lagi kelas, pikiranku langsung kabur ke mana-mana dalam hitungan menit. Tapi pas nonton videonya, bisikan-bisikan dan suara-suara kecilnya bikin aku otomatis fokus. Nggak cuma denger kata-kata; aku malah berasa ada di dalamnya. (*Usually in class, my mind drifts to other things after a few minutes. However, with the videos, the whispering, and the sounds, it made me feel like I had to listen carefully. I was not just hearing the words; I felt like I was inside them*)(S5).*

This sentiment of being "inside" the learning activity was a recurrent motif. Observational checklists provided quantitative support for these claims, noting a significant reduction in off-task behaviors approximately 70% lower in the ASMR group compared to the control group during vocabulary sessions.

The immersive quality was frequently attributed to the synergistic effect of the auditory and visual ASMR triggers. Another student explained:

Excerpt 2: *"Bukan kayak nonton video biasa. Suara ketokan di barang-barang plus suara lembutnya bikin aku merasa deket banget, kayak guruku lagi duduk di samping aku sendirian. Aku nggak cuma tahu kata 'kasar'; aku bener-bener ngerasa gergaji kayu kasar yang lagi diamplas. Semua perhatianku langsung nyantol gitu.* (It was not like watching a normal video. The sounds of tapping on the objects and the soft voice made it feel very close and personal, as if the teacher were right there just for me. I was not just learning the word 'rough'; I was feeling the rough wood being sanded. It completely held my attention.") (S.9).

This description aligns with the principles of cognitive absorption, where the multi-sensory input created a captivating learning environment that minimized external distractions and directed the learners' entire cognitive capacity toward the target vocabulary, thereby explaining the significant retention gains quantified in the previous section.

Theme 2: Positive Emotional and Affective Response

Our data showed that the ASMR-based intervention triggered a profoundly positive emotional response, which was a key driver of engagement and, ultimately, learning. This finding underscores a significant shift in the emotional experience of vocabulary acquisition, transforming it from a state of anxiety and monotony to one characterized by curiosity, enjoyment, and psychological safety.

A notable sub-theme was *the marked reduction in foreign language anxiety,* a well-documented barrier to acquisition. Students in the experimental group often described the ASMR environment as "calming", "soothing", and "a relief." One student articulated this shift:

Excerpt 3: *"Biasanya aku deg-degan banget kalau disuruh hafalin kata baru, takut salah ngomong. Tapi bisikan lembut di videonya bikin aku tenang, nggak ada rasa dipaksa. Jadi aku bisa santai denger-dengerin aja, tanpa stres lagi.* (I always feel nervous when I have to remember new words, afraid I will pronounce them wrong. However, the whispering in the video was so gentle, and there was no pressure. It felt safe to listen and learn. I was not stressed anymore.") (S13).

This contrasts sharply with sentiments from the control group, where a student stated:

Excerpt 4: *" Hafalin dari daftar itu bikin tegang karena pasti ada tesnya, dan toh akhirnya tetap kebanyakan lupa juga.* (Memorizing from the list is stressful because you know there will be a test, and you'll forget most of it anyway.") (S11).

Moreover, the ASMR method effectively transformed feelings of monotony into genuine curiosity and enjoyment. Learners reported feeling excited and anticipatory about the sessions, often describing their experience with words like "fun", "interesting", and "unique." As one participant observed:

Excerpt 5: *"Saya merasa penasaran terhadap suara atau adegan apa yang akan muncul untuk setiap kata. Hal itu terasa seperti sebuah penemuan kecil. Tidak terasa sedang belajar* (I was curious about what sound or scene would come next for each word. It was like a little discovery. It didn't feel like studying".) (S.15).

This was corroborated by observational notes that recorded students leaning forward, *smiling*, and quietly expressing fascination (e.g., whispers of "wow" or "that is so satisfying") during the videos.

This positive emotional environment, marked by low anxiety and high enjoyment, directly supported a more receptive and open cognitive state by lowering the affective filters that often impede processing. The ASMR media enabled students to engage with the material more deeply and willingly. This, in turn, created an optimal emotional foundation for the cognitive gains in vocabulary retention that we observed in the quantitative results.

Theme 3: Perceived Effectiveness and Metacognitive Awareness of Recall

Student testimonials offered key insights into the perceived mechanisms driving the intervention's success, providing a learner-centric perspective on the robust retention results. This theme went beyond mere satisfaction, capturing students' metacognitive awareness of how and why the ASMR method supported more effective vocabulary encoding and retrieval.

A key sub-theme was the vivid and lasting sensory memory traces generated by the multisensory stimuli. Learners consistently noted that the combination of sound, image, and whispered word created a cohesive "mental package" that was remarkably easy to recall. As one student eloquently put it:

Excerpt 6: *"Ketika saya berusaha mengingat kata 'crispy', saya tidak melihat huruf-hurufnya. Saya langsung mendengar suara daun yang diremas dalam pikiran dan melihat tayangan gerak lambatnya. Seolah-olah otak saya memiliki penanda khusus untuk kata tersebut.*(When I try to remember the word 'crispy,' I don't see the letters. I immediately hear the sound of crushing leaves in my head and see the slow-motion video. It's like my brain has a bookmark for that word.") (S9).

This description aligns perfectly with the principles of Dual Coding Theory, demonstrating how the intervention created multiple, linked retrieval paths for each lexical item.

Furthermore, students highlighted the distinctiveness of the memories formed. The unique, affect-laden nature of the ASMR triggers made the memories stand out from other learned information. A participant explained:

Excerpt 7: *"Cara-cara biasa untuk mempelajari kata hanyalah membaca, menulis, dan mengulang; semuanya menjadi kabur dan menyatu. Namun, dengan metode ini, setiap kata memiliki suara serta sensasi khasnya sendiri, sehingga tidak tercampur dengan kata lainnya.* (The normal ways of learning words are all the same read, write, repeat. It all blurs together. But this way, each word has its own special sound and feeling, so it doesn't get mixed up with the others.") (S.21).

This distinctiveness reduces proactive and retroactive interference, a key challenge in vocabulary acquisition. Finally, learners expressed a newfound confidence in their recall ability. The strength of these sensory-linked memories translated into a perception of effectiveness. As one student summarized:

Excerpt 8: *"Saya kini langsung tahu kata-katanya. Tidak perlu lagi bersusah payah mengingatnya; suara dan gambar langsung muncul bersamaan, lalu kata itu menyusul dengan sendirinya.* (I just know the words now. I don't have to struggle to remember. The sound and picture pop up together, and then the word follows.") *(S.22*).

The qualitative data reveal clear patterns that align with Krashen's (1982) Affective Filter Hypothesis, particularly in relation to the variables of anxiety, self-confidence, and motivation. For instance, statements such as "*Saya tidak merasa dipaksaÿþ (I did not feel forced)*" and "*Saya merasa aman dan rileks saat belajarÿþ (I felt safe and relaxed while learning)"* illustrate how

the ASMR environment reduced learners' anxiety, thus lowering the affective filter and enabling more effective comprehension and retention of input. Expressions like "*Saya bisa fokus karena suaranya menenangkanÿþ (I could focus because the voice was soothing*)" reflect increased self-confidence and concentration, indicating that the intervention created a psychologically safe learning space where students were comfortable taking linguistic risks without fear of mistakes. Finally, comments such as "*Belajar dengan video ini membuat saya ingin tahu lebih banyak kata baruÿþ (Learning through these videos made me eager to learn more new words)"* highlight heightened intrinsic motivation fostered by the multisensory, emotionally engaging character of ASMR stimuli. Collectively, these responses provide empirical evidence that the ASMR-based medium not only enhances cognitive engagement but also cultivates the low-anxiety, high-motivation conditions central to Krashen's theory, allowing comprehensible input to be fully processed for acquisition. These affective and motivational shifts complement the cognitive mechanisms detailed earlier, illustrating that ASMR concurrently optimizes both mental focus and emotional receptivity conditions essential for vocabulary acquisition.

The cluster analysis provides a critical layer of insight, showing that our intervention was most effective for "High Responders" (69% of the cohort), who initially had lower proficiency levels. This differential effectiveness is a key finding, suggesting that ASMR-based, multisensory instruction can be particularly beneficial for reducing anxiety and supporting more equitable language acquisition outcomes among learners with varying initial proficiency levels.

These findings provide both theoretical and practical evidence that ASMR, when integrated within established cognitive and affective learning frameworks, serves as an innovative, engaging, and low-cost pedagogical tool capable of enhancing vocabulary learning across diverse and resource-limited educational contexts. Practically, our findings provide educators and curriculum developers with a scalable, low-cost model for designing engaging vocabulary lessons. Using YouTube as a platform makes this approach highly accessible, even in resource-limited settings like many Indonesian schools. The results suggest that integrating ASMR principles into existing digital learning materials may enhance their effectiveness. Crucially, the evidence showing that struggling learners benefit the most offers a compelling case for using such media as a targeted intervention to support diverse learners.

While our study yielded promising results, it has several limitations. First, our sample was limited to one region in Indonesia (Gresik, East Java), which may limit the generalizability of our findings to other cultural or linguistics contexts. Future research should replicate this study in different regions and countries to enhance external validity. Second, we focused on short-term vocabulary insights into the sustained impact of ASMR-based learning. Third, we did not isolate the effects of individual ASMR triggers, which could be explored in future studies to optimize the design of ASMR-based interventions.

Future research could also investigate the application of ASMR media to other areas of language learning, such as grammar instruction, listening comprehension, or reducing public speaking anxiety. Additionally, using neuroimaging techniques in a pretest-posttest design could offer direct evidence of the neurological changes associated with ASMR-based learning, strengthening the connection between brain activity and behavioral outcomes.

■ CONCLUSION

Our study tackled the ongoing challenge of vocabulary retention among Indonesian high school students and the limited engagement offered by traditional rote memorization methods. We aimed to develop and assess an innovative,

ASMR-based digital learning tool grounded in cognitive theory. The research aimed to systematically design such a medium and evaluate its effectiveness in enhancing vocabulary retention and learner engagement compared to conventional approaches.

Our findings show that applying the ADDIE model, guided by Dual Coding Theory and Cognitive Load Theory, provided a solid framework for creating effective ASMR learning media. By combining auditory triggers, such as whispering, with semantically linked visual stimuli, we facilitated deeper cognitive processing and memory encoding. The empirical evaluation yielded clear results: the ASMR-based intervention significantly improved vocabulary retention and increased student motivation, attention, and enjoyment. Notably, the media was especially effective for students with lower initial proficiency, underscoring its potential as a tool for inclusive pedagogy.

The implications of our findings are twofold. Theoretically, this study examines the pedagogical application of principles inspired by affective neuroscience, providing initial empirical support for the educational value of ASMR and the integration of cognitive principles into digital learning design. Practically, our findings tentatively suggest that ASMR-based, multisensory instruction may offer educators a scalable, low-cost, and engaging alternative to traditional vocabulary teaching, which could be particularly relevant for resource-limited settings. However, further research is needed to confirm its effectiveness and generalizability before recommending its broad implementation.

Despite its contributions, this study has limitations. The sample was drawn from a specific region in Indonesia, which may affect the generalizability of the findings to other cultural contexts. Furthermore, the study focused on short-term retention, leaving the long-term durability of the learning gains an open question for future investigation. Therefore, Future research should seek to replicate this study in more diverse geographical and linguistic settings. Longitudinal studies are needed to assess the long-term retention effects of ASMR-based learning. Additionally, further investigation could isolate the individual effects of specific ASMR triggers and explore the application of this approach to other aspects of language learning, such as grammar or listening comprehension. To strengthen the evidence base, a randomized controlled trial (RCT) directly comparing ASMR-based media with conventional teaching methods is recommended, as this would provide more robust conclusions about relative effectiveness and generalizability.

In conclusion, this study provides evidence that a theory-driven, ASMR-based digital learning medium is a viable alternative for vocabulary instruction, showing promising results in enhancing learner engagement and vocabulary retention compared to other media-based approaches. Further research is needed to confirm its effectiveness across broader educational contexts. By transforming a popular sensory phenomenon into a structured pedagogical strategy, this research provides an innovative and effective pathway for enhancing English language education, offering a promising model for the future of educational technology.

■ REFERENCES

Arifin, S., Arifani, Y., Maruf, N., & Helingo, A. (2022). A case study of EFL teacher scaffolding of an ASD learner's shared reading with a storybook app. *Journal of Asia TEFL*, *19*(4), 1234-1249. https://doi.org/10.18823/asiatefl.2022.19.4.6.12

August, D., Uccelli, P., Artzi, L., Barr, C., & Francis, D. J. (2021). English learners' acquisition of academic vocabulary: instruction matters, but so do word characteristics. *Reading Research Quarterly*, *56*(3). 525-544 https://doi.org/10.1002/rrq.323

Avance, R. (2013). Book review: Media, culture, and society: An introduction. *Media, War & Conflict*, *6*(2), 209-211. https://doi.org/10.1177/1750635213477573

Baanqud, N. S., Al-Samarraie, H., Alzahrani, A. I., & Alfarraj, O. (2020). Engagement in cloud-supported collaborative learning and student knowledge construction: a modeling study. *International Journal of Educational Technology in Higher Education*, *17*(1), 59. https://doi.org/10.1186/s41239-020-00232-z

Bateman, J. A. (2021). What are digital media? *Discourse, Context and Media*, *41, 100502*. https://doi.org/10.1016/j.dcm.2021.100502

Boulianne, S., & Theocharis, Y. (2020). Young people, digital media, and engagement: a meta-analysis of research. *Social Science Computer Review*, *38*(2), 103-124. https://doi.org/10.1177/0894439318814190

Chan, K. W., & Uusiautti, S. (2022). University students' Autonomous Sensory Meridian Response (ASMR) experiences in the light of a well-being theory. *Seminar.Net*, *18*(1), 74-91. https://doi.org/10.7577/seminar.4669

David, P., Laje, T., Rossana, M., & Ávila, R. (2020). *Reading comprehension using skimming and scanning strategies through collaboration facilitated by whatsapp*. Universidad Casa Grande.

Fredborg, B. K., Champagne-Jorgensen, K., Desroches, A. S., & Smith, S. D. (2021). An electroencephalographic examination of the autonomous sensory meridian response (ASMR). *Consciousness and Cognition*, *87*, 103053. https://doi.org/10.1016/j.concog.2020.103053

Harper, P. C. (2020). ASMR: bodily pleasure, online performance, digital modality. *Sound Studies*, *6*(1), 81-101. https://doi.org/10.1080/20551940.2019.1681574

Huang, L. J. D. (2021). Developing intercultural communicative competence in foreign language classrooms – A study of EFL learners in Taiwan. *International Journal of Intercultural Relations*, *83,* 1-10. https://doi.org/10.1016/j.ijintrel.2021.04.015

Kim, Y. J., & Belcher, D. (2020). Multimodal composing and traditional essays: linguistic performance and learner perceptions. *RELC Journal*, *51*(1), 86-100. https://doi.org/10.1177/0033688220906943

Kohler, S., & Dietrich, T. C. (2021). Potentials and limitations of educational videos on YouTube for science communication. *Frontiers in Communication*, *6,* 581302. https://doi.org/10.3389/fcomm.2021.581302

Kovacevich, A., & Huron, D. (2019). Two studies of autonomous sensory meridian response (ASMR): The relationship between ASMR and music-induced frisson. *Empirical Musicology Review*, *13*(1–2), 39-57. https://doi.org/10.18061/emr.v13i1-2.6012

Lewkowich, D. (2022). ASMR Literacies: Toward a posthuman structure of feeling. *Knowledge Cultures*, *10*(2), 123-144. https://doi.org/10.22381/kc10220226

Li, P., & Lan, Y. J. (2022). Digital Language Learning (DLL): Insights from Behavior, Cognition, and the Brain. *Bilingualism*, *25*(3), 596-609. https://doi.org/10.1017/S1366728921000353

Liu, X., Liu, C. H., & Li, Y. (2020). The effects of computer-assisted learning based on dual coding theory. *Symmetry*, *12*(5), 701. https://doi.org/10.3390/SYM12050701

Lochte, B. C., Guillory, S. A., Richard, C. A. H., & Kelley, W. M. (2018). An fMRI investigation of the neural correlates underlying the autonomous sensory meridian response (ASMR). *BioImpacts*,

8(4), 295-304. https://doi.org/10.15171/bi.2018.32

Luo, L. (2022). A study on the application of computer-aided dual-coding theory in english vocabulary teaching. *Scientific Programming*, *2022,* 5951844. https://doi.org/10.1155/2022/5951844

Martzoukou, K., Fulton, C., Kostagiolas, P., & Lavranos, C. (2020). A study of higher education students' self-perceived digital competences for learning and everyday life online participation. *Journal of Documentation*, *76*(6), 1289-1314. https://doi.org/10.1108/JD-03-2020-0041

Maziriri, E. T., Gapa, P., & Chuchu, T. (2020). Student perceptions of using YouTube as an educational tool for learning and tutorials. *International Journal of Instruction*, *13*(2), 119-138. https://doi.org/10.29333/iji.2020.1329a

Mirzayev Bahtiyorjon O'g'li, A., Shoira, O., & Qizi, Z. (2022). Communicative method-a new approach in the practice of teaching foreign language. *Science and Innovation International Scientific Journal*, *1*(6), 480-485.

Paivio, A. (1986). *Mental Representations: A dual coding approach*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195066661.001.0001

Paivio, A. (1988). Basic puzzles in imagery research. In *Cognitive and Neuropsychological Approaches to Mental Imagery* (pp. 3-16). https://doi.org/10.1007/978-94-009-1391-2_1

Paivio, A. (2007). *Mind and its evolution: A dual coding theoretical approach*. Routledge. https://doi.org/10.4324/9781315785233

Peng, Y., Li, Y., Su, Y., Chen, K., & Jiang, S. (2022). Effects of group awareness tools on students' engagement, performance, and perceptions in online collaborative writing: Intergroup information matters. *Internet and Higher Education*, *53,* 100845. https://doi.org/10.1016/j.iheduc.2022.100845

Phoeun, M., & Sengsri, S. (2021). The effect of a flipped classroom with communicative language teaching approach on undergraduate students' English speaking ability. *International Journal of Instruction*, *14*(3), 1025-1042. https://doi.org/10.29333/iji.2021.14360a

Poerio, G. L., Succi, A., Swart, T., Romei, V., & Gillmeister, H. (2023). From touch to tingles: Assessing ASMR triggers and their consistency over time with the ASMR Trigger Checklist (ATC). *Consciousness and Cognition*, *115,* 103584. https://doi.org/10.1016/j.concog.2023.103584

Poerio, G. L., Ueda, M., & Kondo, H. M. (2022). Similar but different: High prevalence of synesthesia in autonomous sensory meridian response (ASMR). *Frontiers in Psychology*, *13,* 990565. https://doi.org/10.3389/fpsyg.2022.990565

Pothong, K. (2018). Digital media & society. *The Journal of International Communication*, *24*(1), 1-3. https://doi.org/10.1080/13216597.2017.140 6869

Priadi, R., & Thariq, M. (2023). Reconstruction of communicative rationality: a study on the digital mass media society in indonesia. *Journal of Law and Sustainable Development*, *11*(4), e579. https://doi.org/10.55908/sdgs.v11i4.579

Qushem, U. Bin, Christopoulos, A., Oyelere, S. S., Ogata, H., & Laakso, M. J. (2021). Multimodal technologies in precision education: Providing new opportunities or adding more challenges? *Education Sciences*, *11*(7), 338. https://doi.org/10.3390/educsci11070338

Ramezanali, N., Uchihara, T., & Faez, F. (2021). Efficacy of multimodal glossing on second

language vocabulary learning: a meta-analysis. *TESOL Quarterly*, *55*(1), 105-133. https://doi.org/10.1002/tesq.579

Sadoski, M., & Paivio, A. (2004). A dual coding theoretical model of reading. In R. B. Ruddell & N. J. Unrau (Eds.), *Theoretical models and processes of reading* (5th ed., pp. 1329–1346). International Reading Association. https://doi.org/10.1598/0872075028.47

Santos, L. M. Dos. (2020). The discussion of communicative language teaching approach hi language classrooms. *Journal of Education and E-Learning Research*, *7*(2), 104-109. https://doi.org/10.20448/journal.509.2020.72.104.109

Si, Q., Hodges, T. S., & Coleman, J. M. (2022). Multimodal literacies classroom instruction for K-12 students: a review of research. *Literacy Research and Instruction*, *61*(3), 244-268. https://doi.org/10.1080/19388071.2021.2008555

Smith, S. D., Fredborg, B. K., & Kornelsen, J. (2020). Functional connectivity associated with five different categories of Autonomous Sensory Meridian Response (ASMR) triggers. *Consciousness and Cognition*, *85,* 103021. https://doi.org/10.1016/j.concog.2020.103021

Srinivasacharlu, A. (2020). Using youtube in colleges of education. *Shanlax International Journal of Education*, *8*(2), 21-24. https://doi.org/10.34293/education.v8i2.1736

Sujatha, U., & Rajasekaran, V. (2024). Optimising listening skills: Analysing the effectiveness of a blended model with a top-down approach through cognitive load theory. *MethodsX*, *12,* 102630. https://doi.org/10.1016/j.mex.2024.102630

Sun, W. (2023). The impact of automatic speech recognition technology on second language pronunciation and speaking skills of EFL learners: a mixed methods investigation. *Frontiers in Psychology*, *14*(August), 1210187. https://doi.org/10.3389/fpsyg.2023.1210187

Swart, T. R., Bowling, N. C., & Banissy, M. J. (2022). ASMR-Experience questionnaire (AEQ): A data-driven step towards accurately classifying ASMR responders. *British Journal of Psychology*, *113*(1), 68-83. https://doi.org/10.1111/bjop.1251

Sweller, J. (2008). Cognitive load theory and the use of educational technology. *Educational Technology Magazine: The Magazine for Managers of Change in Education*, *48*(1), 5-10.

Toleuzhan, A., Sarzhanova, G., Romanenko, S., Uteubayeva, E., & Karbozova, G. (2023). The educational use of youtube videos in communication fluency development in english: digital learning and oral skills in secondary education. *International Journal of Education in Mathematics, Science and Technology*, *11*(1), 198–221. https://doi.org/10.46328/ijemst.2983

Vanbecelaere, S., Berghe, K. Van Den, Cornillie, F., Sasanguie, D., Reynvoet, B., & Depaepe, F. (2020). Computers & Education The effects of two digital educational games on cognitive and non-cognitive math and reading outcomes. *Computers & Education*, *143*(April 2019), 103680. https://doi.org/10.1016/j.compedu.2019.103680

Wong, K. (2022). *Technology-Based Learning Environments for Dual Language Learners: An Examination of Dual-Coding Theory for L2 Vocabulary Learning*. https://doi.org/10.3102/1439814

Zarrinabadi, N., Lou, N. M., & Shirzad, M. (2021). Autonomy support predicts language mindsets: Implications for developing communicative competence and willingness to communicate in EFL classrooms. *Learning and Individual Differences*, *86,* 101981. https://doi.org/10.1016/j.lindif.2021.101981