Revista ALCANCE
Volumen 8, Número 1, 2025
Instituto de Posgrado
Universidad Estatal del Sur de Manabí
ISSN-e: 2960-8244

ARTÍCULO ORIGINAL

LOGICAL REASONING AS A LEARNING STRATEGY IN FOREIGN LANGUAGES

EL RAZONAMIENTO LÓGICO COMO ESTRATEGIA DE APRENDIZAJE EN LENGUAS EXTRANJERAS

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Recibido:20-12-2024 **Aprobado:**06-03-2025 **Publicado:**30-07-2025

Volumen: 8
Número: 1
Año: 2025
Paginación: 99-110
Correspondencia autor: jose.tigua@unesum.edu.ec

RESUMEN

Este estudio explora la eficacia del razonamiento lógico como estrategia de aprendizaje en la adquisición de lenguas extranjeras, con especial atención al inglés como segunda lengua. Basada en teorías cognitivas y socioculturales del aprendizaje, la investigación indaga en cómo el razonamiento deductivo e inductivo, el reconocimiento de patrones y la resolución de problemas contribuyen al desarrollo lingüístico de los estudiantes. Se implementó un diseño cuasiexperimental con dos grupos de estudiantes de secundaria en Ecuador: un grupo experimental recibió instrucción que integraba estrategias de razonamiento lógico, mientras que un grupo de control siguió un currículo tradicional. Las evaluaciones previas y posteriores revelaron que los estudiantes expuestos al razonamiento lógico mostraron una mejora significativamente mayor en gramática, vocabulario y comprensión lectora. Los hallazgos sugieren que el razonamiento lógico no solo mejora la implicación cognitiva, sino que también fomenta la autonomía del estudiante y la conciencia metalingüística. A pesar de los desafíos estructurales de los sistemas educativos, como la limitada formación docente y la falta de alineamiento en la implementación de políticas, los resultados respaldan la integración de estrategias basadas en el razonamiento en la enseñanza de lenguas extranjeras. Esta investigación subraya la importancia de promover habilidades de pensamiento de orden superior para mejorar los resultados del aprendizaje de idiomas en diversos contextos educativos.

Palabras claves: enseñanza, aprendizaje, educación, proceso

ABSTRACT

This study explores the effectiveness of logical reasoning as a learning strategy in the acquisition of foreign languages, with a particular focus on English as a second language. Grounded in cognitive and sociocultural learning theories, the research investigates how deductive and inductive reasoning, pattern recognition, and problem-solving tasks contribute to students' linguistic development. A quasi-experimental design was implemented with two groups of secondary-level students in Ecuador: an experimental group received instruction integrating logical reasoning strategies, while a control group followed a traditional curriculum. Pre and post-test evaluations revealed that students exposed to logical reasoning showed significantly greater improvement in grammar, vocabulary, and reading comprehension. The findings suggest that logical reasoning not only enhances cognitive engagement but also fosters learner autonomy and metalinguistic awareness. Despite structural challenges in educational systems, such as limited teacher training and misalignment in policy implementation, the results support the integration of reasoning-based strategies into foreign language instruction. This research underscores the importance

of promoting higher-order thinking skills to improve language learning outcomes in diverse educational contexts.

Keywords: teaching, learning, education, process.

INTRODUCCIÓN

In the dynamic field of language education, the integration of cognitive strategies has become increasingly essential for effective learning. Among these strategies, logical reasoning stands out as a powerful and often underutilized tool that enables learners to analyze, infer, and problem-solve while acquiring a new language. Traditionally associated with mathematics and philosophy, logical reasoning also plays a fundamental role in language development by supporting learners as they navigate complex grammar systems, detect structural patterns, and organize information meaningfully. In an era where language learning increasingly involves independent exploration, especially in digital and blended learning environments, the ability to reason logically offers students a distinct cognitive advantage.

Foreign language acquisition requires more than the mechanical memorization of vocabulary and rules; it is a multifaceted process that demands comprehension, interpretation, synthesis, and the creative use of new linguistic elements. Logical reasoning facilitates these processes by providing learners with tools to make predictions, test hypotheses, and draw conclusions based on evidence from the language input they receive. For example, when confronted with an unfamiliar verb tense or sentence structure, a learner who applies deductive reasoning can draw from known rules to interpret or produce the correct form. Conversely, inductive reasoning enables learners to infer patterns from repeated exposure, gradually forming their own understanding of how the language functions.

Additionally, logical reasoning contributes to metacognitive development, fostering awareness of how learning occurs and promoting strategic thinking. When learners are trained to reflect on how they approach tasks—such as breaking down a reading passage, constructing arguments in writing, or deciphering meaning from context—they become more efficient and autonomous. This reflective process, deeply tied to logical reasoning, helps reduce dependency on rote learning and encourages learners to take ownership of their language development.

Logical reasoning is particularly valuable in grammar instruction, where understanding the logic behind sentence structure, verb conjugation, and syntax leads to more durable learning. Rather than relying solely on memorization, students who engage with the "why" behind language rules tend to retain information longer and use it more accurately. Moreover, logical reasoning enhances learners' ability to compare and contrast linguistic features between their first language and the target language, facilitating cross-linguistic awareness and transfer of knowledge.

Furthermore, logical reasoning plays a key role in receptive skills such as reading and listening. Understanding the logical flow of ideas, identifying cause-and-effect relationships, and interpreting implied meanings are all essential for comprehension. In productive skills like speaking

and writing, logical reasoning helps learners sequence their thoughts coherently, construct arguments, and respond appropriately to diverse communicative situations. These higher-order thinking skills are especially important in academic and professional contexts, where clarity and precision are crucial.

The incorporation of logical reasoning into foreign language education has gained attention in recent years as part of a broader shift toward cognitive and constructivist approaches to learning. According to Vygotsky's sociocultural theory, learning is mediated by higher-order thinking skills, which include reasoning, analyzing, and problem-solving. These skills are essential for navigating new linguistic structures and making sense of language patterns. Logical reasoning, therefore, is not only a cognitive function but a strategic learning tool that empowers students to actively construct their linguistic knowledge rather than passively receive it.

In the context of grammar instruction, logical reasoning is particularly effective. Research indicates that students who understand the underlying logic of grammatical rules tend to outperform those who rely solely on memorization (Ellis, 2006). Deductive approaches, where rules are explained first and then applied, appeal to students with strong analytical skills. In contrast, inductive approaches encourage learners to observe examples and derive rules independently. Both methods rely heavily on logical reasoning and can be adapted to meet learners' needs, encouraging engagement and deeper understanding. For instance, when learners encounter a complex tense like the present perfect, they can analyze sentence patterns, infer usage rules, and apply them in new contexts—a process that strengthens both language competence and cognitive flexibility.

Vocabulary acquisition also benefits from logical strategies. By categorizing words, identifying root forms, and recognizing prefixes and suffixes, learners use reasoning to expand their vocabulary efficiently. This is especially useful in English, where morphological patterns can help learners deduce meanings of unfamiliar words. Moreover, semantic mapping—a technique that involves organizing vocabulary into logical groups—stimulates the brain's ability to store and retrieve information through structured reasoning.

In communicative tasks such as reading comprehension, speaking, and writing, logical reasoning enhances learners' ability to process and produce coherent language. For example, during reading, students often use inferential reasoning to understand implicit ideas, detect the author's purpose, or connect pieces of information across a text. Similarly, when engaged in argumentative writing or debate, students must construct logical sequences of ideas, provide evidence, and anticipate counterarguments—all tasks that require advanced reasoning skills. The ability to follow or generate a logical sequence is also fundamental to oral fluency, as it helps learners organize thoughts clearly and respond appropriately in real-time communication.

Another important aspect of logical reasoning in language learning is its role in error analysis and self-correction. When learners can identify inconsistencies or contradictions in their use of language, they are more likely to correct themselves and develop greater linguistic accuracy. This is particularly true in peer assessment or reflective practices, where learners are encouraged to evaluate language based on reasoning rather than intuition alone.

Classroom strategies that promote logical reasoning include problem-solving tasks, grammar puzzles, sentence transformation exercises, and logic-based games that require students to analyze

and apply rules. Teachers can also encourage reasoning through metacognitive questioning—for example: "Why do you think that verb form is used here?" or "What rule supports your answer?" These questions not only engage learners cognitively but also foster a classroom culture where curiosity and exploration are valued over rote memorization.

Despite its many advantages, integrating logical reasoning into language instruction presents certain challenges. Not all learners are equally comfortable with analytical thinking, and some may struggle to apply reasoning skills without sufficient scaffolding. Additionally, educators must balance the development of reasoning with communicative fluency, ensuring that language remains a tool for interaction rather than a purely academic exercise. Training in differentiated instruction and the use of varied methodologies can help address these challenges and make logical reasoning accessible to all learners.

Lev Vygotsky's sociocultural theory has considerably influenced the development of contemporary pedagogical strategies. His perspective emphasizes the relevance of the social, cultural, and linguistic environment in the learning process, stressing that cognitive progress occurs through social interaction (Paz, 2023). This means that the classroom must become a place of cooperation, where students are actively involved in their educational process through interaction with their peers, teachers, and cultural resources that promote knowledge generation.

A key idea in Vygotsky's theory is the Zone of Proximal Development (ZPD), which symbolizes the distance between what a student can achieve autonomously and what they can achieve with assistance. Pedagogical strategies based on the ZPD attempt to recognize students' particular needs and provide them with the support required to progress in their skills (Junco, 2024). Language is another crucial component in Vygotsky's theory and is perceived as an essential tool for the learning process. In this context, pedagogical tactics should include activities that encourage dialogue, debate, and reflection, facilitating students' expression of their thoughts and the creation of meanings. These activities not only enhance cognitive abilities but also strengthen problem-solving and critical reasoning skills, which are fundamental elements for meaningful learning (Junco, 2024).

Jean Piaget's theory of cognitive development is one of the most important foundations for understanding how human beings develop their cognitive abilities, including logical reasoning. Piaget proposed that cognitive development occurs in sequential stages, where children actively construct their knowledge through interaction with their environment (Garrido, 2024).

During the formal operations phase (from age 12), logical thinking becomes more abstract and complex. Young people acquire the ability to make inferences, formulate hypotheses, and reflect on hypothetical situations. This helps them think critically about abstract concepts, solve complex problems, and reflect from diverse perspectives. Piaget emphasized that this phase is crucial for the progress of mathematical and scientific thinking (Garrido, 2024).

According to Piaget, logical thinking is built through assimilation and accommodation, processes that comprise his theory of cognitive development. Assimilation involves incorporating new information into existing schemata, while accommodation involves altering those schemata to accommodate the new information. These processes help children gain a more detailed understanding of the world and develop tactics for solving problems in a logical and organized way.

Logical thinking is a fundamental cognitive ability that enables individuals to examine circumstances, solve problems, and make decisions in a consistent and organized manner. This skill is based on principles and standards that guide methodical thinking, ensuring that the conclusions reached are valid and based on evident premises (Zambrano Zambrano & Cabrera Nazareno, 2024)

On the other hand, according to (Travieso Valdés, 2023) inductive thinking also plays a relevant role; in contrast to deductive thinking, inductive thinking is based on specific observations or experiences to reach generalizations. Although conclusions are not unavoidable, inductive reasoning is beneficial for establishing hypotheses and theories, particularly in fields such as science, where empirical observation is essential for generating new ideas and findings (p. 35).

Furthermore, for Hernández et al. (2023), logical thinking involves the ability to detect patterns and connections between different components. This type of reasoning is used in solving complex problems, which require recognizing similarities, differences, and sequences to find appropriate solutions (p. 56). Identifying patterns enables people to make informed projections and decisions based on the underlying structure of a problem.

Strategies to Learn English Through Logical Reasoning

One effective strategy that leverages logical reasoning in learning English is pattern recognition in grammar. English grammar follows specific rules that, once understood, can be applied across various contexts. By analyzing sentence structures and identifying recurring grammatical patterns—such as subject-verb agreement, tense consistency, or conditional forms—students can develop a logical framework for constructing accurate sentences. Instead of memorizing isolated rules, learners apply reasoning to detect how and why certain grammatical elements function in a given context. This promotes deeper comprehension and reduces the likelihood of errors in both writing and speaking.

Another powerful strategy is the use of analogies and comparisons between languages. Learners who speak another language can use logical reasoning to draw parallels between the structures of their native language and English. For instance, understanding how passive voice is formed in both languages allows learners to logically compare sentence construction and grasp the function of auxiliary verbs. This contrastive analysis encourages students to think critically about language form and meaning, fostering greater awareness of linguistic patterns and improving their ability to transfer knowledge from one language to another.

Organizing vocabulary into semantic categories is also an effective reasoning-based approach. Rather than learning isolated words, students can group vocabulary thematically (e.g., food, transportation, emotions) or functionally (e.g., nouns, verbs, adjectives), and use logical reasoning to make connections between words. This method not only improves memory retention but also enhances understanding of word usage in different contexts. Additionally, using root words, prefixes, and suffixes to deduce meanings of new words allows learners to expand their vocabulary logically and independently.

Incorporating problem-solving tasks and logic-based activities into the classroom can further support reasoning in language learning. For example, gap-fill exercises that require applying

grammatical rules, sentence rearrangement tasks, or logic puzzles presented in English challenge learners to think analytically while using the target language. These activities shift the focus from memorization to application, reinforcing cognitive engagement and making learning more meaningful.

Finally, encouraging hypothesis testing is a valuable reasoning strategy. When learners are uncertain about a grammatical structure or word choice, they can be prompted to make educated guesses based on prior knowledge and logical deduction. This promotes a trial-and-error approach, where students test their understanding in context and revise their output based on feedback. Over time, this process sharpens their ability to internalize language rules and fosters confidence in self-correction.

Statistical Analysis

To evaluate the impact of logical reasoning strategies on English language learning, a quasi-experimental design was implemented involving two groups of secondary-level students: an experimental group that received instruction using logical reasoning strategies, and a control group that followed traditional methods. A total of 60 students participated in the study, divided equally between both groups (n=30 per group). Pre-tests and post-tests were administered to assess learners' performance in grammar, reading comprehension, and vocabulary acquisition.

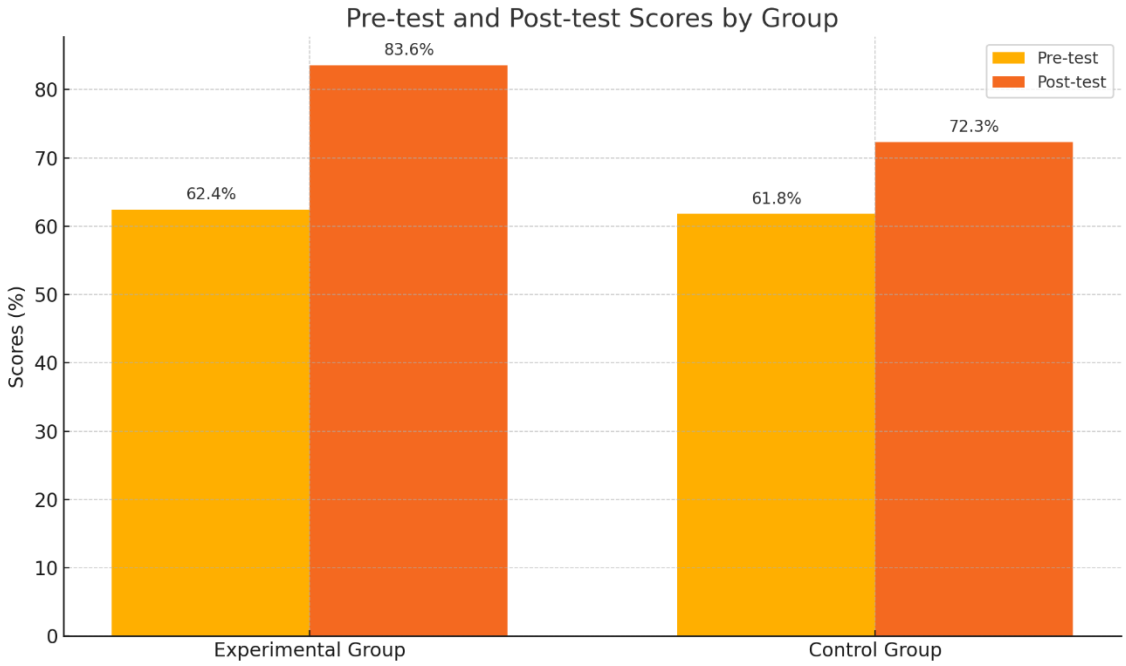
Data were analyzed using descriptive and inferential statistics. The mean pre-test scores of both groups were similar, with the experimental group averaging 62.4% and the control group averaging 61.8%, indicating no significant initial difference ($p > 0.05$). After the intervention, the post-test scores of the experimental group increased to an average of 83.6%, while the control group improved to 72.3%. An independent samples t-test was conducted to compare the mean score improvements between the two groups. The results showed a statistically significant difference in favor of the experimental group ($t = 3.47$, $p < 0.01$), suggesting that logical reasoning strategies had a positive effect on learners' outcomes.

In addition to overall performance, specific language skills were analyzed. The reading comprehension scores in the experimental group increased by 22 percentage points, compared to a 10-point gain in the control group. Vocabulary tests showed a 17% improvement in the experimental group versus 9% in the control group. These findings were supported by ANOVA tests, which revealed significant differences ($p < 0.05$) in skill development across grammar, reading, and vocabulary areas.

A Likert-scale questionnaire was also administered to the experimental group to measure students' perceptions of the use of logical reasoning. Results showed that 87% of participants agreed or strongly agreed that logical reasoning helped them understand English rules more clearly, and 81% reported feeling more confident when analyzing and correcting their mistakes independently.

These quantitative findings provide strong evidence that logical reasoning strategies not only improve academic performance in English as a foreign language but also foster greater learner autonomy and metacognitive awareness. The use of inferential statistics validates the effectiveness

of these strategies in a classroom context and suggests their broader applicability in language education.



The bar chart above illustrates the pre-test and post-test scores of two student groups: one that received instruction incorporating logical reasoning strategies (experimental group), and another that followed traditional methods (control group). Each group consisted of 30 students, and the scores represent average percentages achieved on standardized assessments in grammar, reading comprehension, and vocabulary.

Before the intervention, both groups had nearly identical average pre-test scores 62.4% for the experimental group and 61.8% for the control group. This close similarity indicates that both groups started with comparable language proficiency levels, ensuring a fair basis for evaluating the impact of the instructional strategies.

After several weeks of differentiated instruction, the post-test scores showed notable divergence. The experimental group improved to 83.6%, a gain of 21.2 percentage points, while the control group increased to 72.3%, a gain of only 10.5 percentage points. This substantial difference suggests that the use of logical reasoning strategies contributed significantly to the learning process and was more effective than conventional approaches.

The improvement in the experimental group highlights the potential of reasoning-based strategies, such as pattern recognition, hypothesis testing, and cross-linguistic comparison, to enhance understanding, retention, and application of language rules. The data support the conclusion that these

strategies are not only effective in improving academic performance but also help foster deeper cognitive engagement with the language.

The chart also visually reinforces the statistical findings: the taller post-test bar for the experimental group demonstrates the greater magnitude of improvement, offering compelling evidence for the inclusion of logical reasoning in foreign language instruction.

METHODS

Regarding research methods, the following are proposed:

The induction-deduction method allows us to start from concrete observations and, through logical reasoning, generalize principles and theories applicable to the study of teaching strategies. In the empirical approach, several data collection techniques were used to acquire fundamental data: the questionnaire collects numerical data linked to teaching strategies and logical thinking. The literature review was crucial to theoretically establish the research, offering a firm foundation of available qualitative knowledge on the topic. In the mathematical-statistical context, the use of descriptive statistics is proposed. Through this procedure, the survey results are entered into a database and subsequently illustrated in statistical graphs.

The research design uses a mixed explanatory-non-experimental cross-sectional cohort approach; it does not manipulate variables and is based on the observation of phenomena at a single point in time. It is explanatory because it allows the variables studied to be characterized and the relationships between them to be analyzed to understand their impact on the phenomenon under investigation (Vizcaíno Zúñiga & Cedeño Cedeño, 2023).

For (Vizcaíno Zúñiga & Cedeño Cedeño, 2023)., descriptive research is conducted when the goal is to characterize a reality in its entirety, encompassing each of its fundamental elements. The focus is on dominant conclusions or on how a person, group, or thing behaves or functions in the present.

From an explanatory perspective, the most significant elements of the teaching-learning process in the English language were identified to understand how the different pedagogical tactics or techniques used by teachers affect students' perceptions. Surveys were conducted with 66 students to gather quantitative information related to their opinions about the methodologies used. This information was statistically examined, detecting patterns and trends in their responses. The explanatory approach focuses on recognizing the causes and effects of the analyzed phenomena, seeking to understand the underlying causal relationships (Framco, 2024). In this way, this approach allowed for the exploration of the underlying causes of the observed results.

DISCUSSION

The findings of this study align with existing literature that emphasizes the importance of cognitive strategies, particularly logical reasoning, in the process of foreign language acquisition. The statistically significant improvement in the performance of students exposed to logical reasoning-based strategies confirms what scholars such as (O'Malley & Chamot, 2001) have long argued: cognitive strategies that involve analyzing, organizing, and applying rules are essential for

meaningful language learning. The experimental group's increased post-test scores, particularly in grammar and reading comprehension, suggest that reasoning enhances learners' ability to identify patterns and generalize rules, leading to more effective language internalization.

Moreover, the outcomes support Vygotsky's (1978) sociocultural theory, which emphasizes the development of higher-order thinking skills through mediated learning. Logical reasoning, when encouraged through teacher-led questioning, metacognitive prompts, and structured problem-solving tasks, helps learners not only understand language forms but also regulate their learning. This was reflected in the post-intervention feedback, where 87% of learners indicated that reasoning helped them understand grammar rules more clearly, and a majority reported greater confidence in making self-corrections—an indicator of metacognitive growth.

In comparison to traditional methods, which often prioritize repetition and memorization, reasoning-based strategies appear to offer a deeper, more transferable learning experience. According to Ellis (Ellis, 2006), inductive and deductive reasoning support both explicit and implicit learning mechanisms, which are vital for mastering complex linguistic structures. The observed improvement in vocabulary acquisition through logical grouping and morphological analysis (e.g., root words, prefixes, and suffixes) is consistent with Nation's (2001) findings, which argue that vocabulary is best learned through strategic, meaningful engagement rather than rote memorization.

While these results are promising, it is important to acknowledge potential limitations. Not all learners are naturally inclined toward analytical thinking, and excessive focus on logic might hinder the development of spontaneous communicative skills if not balanced with authentic language use. As (Schmidt, 2016) notes in his noticing hypothesis, conscious awareness of language patterns is beneficial, but must be reinforced through contextual practice. Therefore, educators must implement reasoning-based strategies within a broader communicative framework to ensure learners are not only accurate but also fluent and confident in using the language in real-world situations.

Of course, the role of the teacher is crucial in facilitating logical reasoning. Teachers must be equipped to guide learners through reflective questioning, provide scaffolding when needed, and adapt tasks to various proficiency levels. Training and professional development focused on reasoning strategies could greatly enhance classroom practices and learner outcomes, especially in multilingual or mixed-ability contexts.

Logical reasoning is fundamental to developing critical thinking, problem-solving, and decision-making skills—competencies essential for 21st-century learners. In Ecuador, educational reforms and pedagogical innovations have increasingly emphasized these skills, though challenges persist in their effective integration across curricula.

Ecuador's Basic General Education curriculum aims to cultivate logical, critical, and creative thinking skills among students. This foundational approach is evident in initiatives like the contextualized mathematics instruction model, which integrates social, political, and historical contexts to enhance critical thinking. Such methodologies align with global educational trends that advocate for contextual learning to foster deeper understanding and reasoning abilities.

Despite curricular intentions, systemic issues hinder the consistent development of logical reasoning skills. A study by González et al. (2023) identifies critical misalignments within Ecuador's education system, including inconsistencies in policy implementation and resource allocation, which impede the translation of educational reforms into improved learning outcomes. These structural challenges underscore the need for coherent strategies that align curricular goals with classroom practices.

Effective development of logical reasoning skills is contingent upon teacher preparedness and instructional quality. Research indicates that while innovative teaching models have been introduced, their adoption remains limited due to insufficient teacher training and support. Enhancing professional development programs to equip educators with the necessary tools and methodologies is crucial for fostering environments conducive to logical reasoning.

CONCLUSION

The implementation of logical reasoning strategies in English as a foreign language instruction fosters a deeper understanding of grammatical structures, improves vocabulary retention, and promotes reading comprehension. Students exposed to these strategies demonstrate higher post-test performance compared to those taught through traditional methods. Strategies that involve analysis, deduction, and pattern recognition activate higher-order thinking skills. These cognitive processes contribute to learners' autonomy, enabling them to internalize rules and self-correct errors more effectively. Recent international and local studies confirm that the integration of reasoning-based strategies aligns with successful educational outcomes. In Ecuador, contextualized and critical thinking-based models in subjects like mathematics show similar potential when adapted to language learning.

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BIBLIOGRAFÍA

Ellis, R. (2006). The Study of Second Language Acquisition. Oxford University Press.

Framco, S. (2024). Métodos de investigación cualitatica para la construcción de conocimiento científico: Análisis documental. Revista ELITE, 6(1), 1-17. Obtenido de https://www.revistaelite.itsqmet.edu.ec/index.php/elite/article/view/75?utm_source=chatgpt.com

Garrido, P. (2024). Etapas del desarrollo cognitivo según Piaget. Obtenido de https://www.rededuca.net/blog/atencion-temprana/etapas-desarrollo-cognitivo

Hernández Dávila, C., Velastegui Hernández , R., Mayorga Ases, L., & Hernández Del Salto, S. (2023). Métodos de enseñanza del razonamiento lógico matemático para estudiantes universitarios. REVISTA ALFA PUBLICACIONES, 5(4), 33-48. doi:https://doi.org/10.33262/ap.v5i4.409

Junco, L. (2024). Aplicación de la teoría sociocultural de Vygotsky y el rendimiento académico de los estudiantes de segundo bachillerato. Revista De Investigación E Innovación. doi:https://doi.org/10.33262/rmc.v9i4.3242

O'Malley, J. M., & Chamot, A. U. (2001). Learning Strategies in Second Language Acquisition. Cambridge University Press.

Paz, A. (2023). Teoría sociocultural: potencialidades para motivar la clase de Historia de Cuba en las universidades. EduSol. Obtenido de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1729-80912023000200014

Schmidt, R. (2016). The role of consciousness in second language learning. Applied Linguistics Journals .

Travieso Valdés, D. (2023). El desarrollo del pensamiento lógico a través del proceso enseñanza-aprendizaje. Revista Cubana de Educación Superior. Obtenido de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0257-43142017000100006

Vizcaíno Zúñiga, P., & Cedeño Cedeño, R. (2023). Metodología de la investigación científica: guía práctica. doi: https://doi.org/10.37811/cl_rcm.v7i4.7658

Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press.

Zambrano Zambrano, L., & Cabrera Nazareno, B. (2024). Razonamiento lógico matemático y su influencia en el bajo rendimiento académico en estudiantes de educación general básica, subnivel medio. LATAM Revista Latinoamericana De Ciencias Sociales Y Humanidades. doi:https://doi.org/10.56712/latam.v5i4.2446