

# Examining the Impact of Cognitive Pedagogy and Higher-Order Thinking on Linguistic Intelligence among Middle School Learners

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## Abstract

Language plays a fundamental role in education as a medium for communication, cognition, and knowledge construction. The present study examines the relationship between cognitive pedagogy, higher-order thinking skills, and linguistic intelligence among middle school learners. Cognitive pedagogy emphasizes active learning through strategies such as problem-based learning, storytelling, and role-play, which enhance learners' thinking, reasoning, and memory processes.

The study adopts a quantitative descriptive-correlational design with a sample of 130 students. Data were analyzed using descriptive statistics, correlation, and regression analysis. The findings indicate that constructivist teaching-learning practices are moderately implemented, while students demonstrate relatively high levels of higher-order thinking skills. A positive relationship was observed between cognitive pedagogy and academic achievement, although the strength of the relationship was moderate. Regression analysis revealed that higher-order thinking skills are a strong predictor of academic achievement.

The study concludes that cognitive pedagogy significantly enhances linguistic intelligence and academic performance. However, its effectiveness depends on proper implementation and active student engagement. The findings provide important implications for educators to adopt cognitively engaging teaching strategies.

**Keywords:** Cognitive Pedagogy, Linguistic Intelligence, Higher-Order Thinking, Constructivist Learning, Academic Achievement

## Introduction

Language occupies a fundamental position in the educational process, as it serves as the primary medium through which knowledge is constructed, communicated, and interpreted. It goes beyond being merely a tool of communication and functions as a vital cognitive instrument that shapes thinking and understanding. Through language, learners develop the ability to articulate ideas, engage in meaningful discussions, and acquire knowledge across various disciplines. Research in the learning sciences further emphasizes that language plays a crucial role in reasoning, conceptual development, and the organization of thought processes, thereby significantly influencing overall academic achievement

(Lupyan et al., 2026). Moreover, language is an essential tool for expressing ideas and conveying knowledge both inside and outside the classroom. Effective teaching depends on the use of clear and comprehensible language, where the teacher (sender) communicates meaningful content that the learner (receiver) can understand. The success of this communication relies on the teacher's proficiency in language and their awareness of the learner's level of understanding, highlighting the central role of language in education and human interaction.(Dr. Garba Hassan Mustapha, 2019)

## **Concept of pedagogy**

Pedagogy is a discipline concerned with the theories and practices of education, characterized by a complex structure shaped by pluralism and dialecticity. Its pluralistic nature is reflected in the diversity of theoretical perspectives, research methods, and interdisciplinary approaches, including empirical, historical, philosophical, and scientific dimensions. It also encompasses various fields such as social pedagogy, the history of education, and special needs education.

At the same time, pedagogy is dialectical in nature, existing at the intersection of science and philosophy, and continuously evolving through the interaction between theory and practice. This dynamic relationship establishes pedagogy as a science of education, particularly in understanding and guiding educational development processes (Santoianni, 2017). Pedagogy can also be understood as a form of learning directed toward the achievement of social goals (Hinchliffe, 2001). Furthermore, teaching about teaching requires distinct pedagogical approaches that differ fundamentally from those used in school-level instruction (Korthagen, 2016)

## **Concept of cognitive pedagogy**

Student engagement is a central element of the teaching–learning process, and the pedagogical choices made by teachers play a crucial role in shaping students' engagement and overall learning experiences (Skinner & Belmont, 1993). Cognitive pedagogy can be understood as an approach in which teaching methods are designed to activate learners' cognitive processes and enhance their motivation to learn. It emphasizes the importance of the learning system as a foundation for improving the effectiveness and productivity of cognitive processes, as highlighted in theories of developmental learning. Furthermore, it recognizes learners' active participation and subjectivity as essential conditions for cognitive development and self-development.(Duisenbayeva et al., 2021). The cognitive approach focuses on understanding how students acquire new knowledge and experiences through various mental processes, distinguishing it from the principles of behaviorism (Akram, 2019). Education, therefore, plays a vital role in equipping students with the ability to apply knowledge in real-life and unpredictable situations. In the context of media literacy, increasing access to information and platforms for expression has made the development of critical thinking skills particularly important. Constructivist problem-based learning (PBL) is considered an effective pedagogical approach for enhancing critical thinking, especially when implemented with appropriate guidance and support.(CHEN, 2015) Storytelling has emerged as an effective and innovative approach to learning, as it encourages learners to reflect and construct meaning from their experiences and prior knowledge. Consequently, developing students' storytelling abilities has become an important focus for educators and researchers, as it involves complex cognitive processes (Liu et al., 2011) In addition, narrative and collaboration are key elements of effective interactive learning. Narrative-centered environments enhance learning by embedding content within stories, enabling students to develop understanding naturally through meaningful and engaging contexts.(Mott et

al., 2019). Role-play is another widely used simulation method for developing communication skills. It can be enriched through techniques such as warm-ups, role creation, doubling, and role reversal, which help learners understand others' perspectives, uncover underlying thoughts and emotions, and improve communication through active participation.(Baile & Blatner, 2014). The development of teaching models represents a unique integration of theoretical formulation and empirical validation. As theoretical ideas are translated into practical teaching programs, they must be refined with greater specificity. Simultaneously, these theories need to be tested within real-world classroom contexts. This process of developing and evaluating teaching models not only complements traditional research approaches but also ensures their practical relevance and applicability to teaching practice.(Brent Wilson, 1991)

### **Concept of Linguistic intelligence**

*“An intelligence is the ability to solve problems or to create products that are valued within one or more cultural settings” Howard Gardner—Frames of Mind (Howard Gardner, 2011)*

The Theory of Multiple Intelligences (MI), developed by Howard Gardner in the late 1970s and early 1980s, proposes that individuals possess diverse forms of intelligence that influence how they learn. In his book *Frames of Mind: The Theory of Multiple Intelligences* (1983), Gardner initially identified eight types of intelligence and later introduced a ninth. These include musical–rhythmic, visual–spatial, verbal–linguistic, logical–mathematical, bodily–kinesthetic, interpersonal, intrapersonal, naturalistic, and existential intelligence.

Gardner emphasized that these intelligences are shaped through individuals' engagement in culturally valued activities, which contribute to the development of distinct cognitive patterns. The theory challenges the traditional notion that intelligence is limited to what is measured by IQ tests, arguing instead that intelligence is multifaceted. The emergence of this theory has significantly influenced educational research and practice, encouraging educators to adopt broader and more inclusive perspectives on learning and intelligence(Cavas & Cavas, 2020) Furthermore, the theory of multiple intelligences has expanded the understanding of intelligence and encouraged a re-examination of how it is traditionally perceived. By moving beyond the narrow focus on logical and linguistic abilities alone, this model offers a more inclusive perspective that recognizes the diverse ways individuals contribute value. It also highlights the importance of developing a range of intelligences, as proposed by Gardner (Pratheesh Thomas, 2024) Linguistic intelligence, in particular, can be understood as the ability to effectively use language for thinking, communication, and expression. More specifically, it involves the capacity to apply previously acquired knowledge of a language's vocabulary, grammar, meaning, and usage in order to adapt efficiently to new tasks and contexts.(Yogatama et al., 2019).

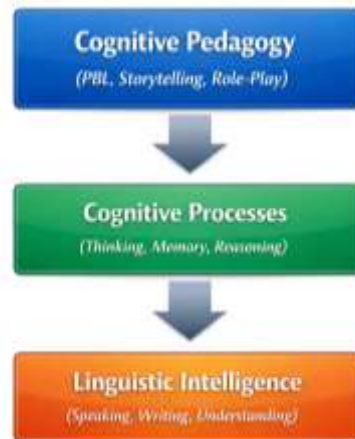
### **Theoretical Framework of the Study**

The present study is anchored in constructivist and cognitive learning theories, drawing primarily on the seminal contributions of Jean Piaget, Lev Vygotsky, and Howard Gardner. These theoretical perspectives collectively provide a robust foundation for examining the relationship between cognitive pedagogy and linguistic intelligence among students. Cognitive pedagogy is primarily derived from cognitive and constructivist perspectives, which emphasize that learning is an active process involving thinking, reasoning, memory, and problem-solving. According to Piaget's theory of cognitive development, learners actively construct knowledge through interaction with their environment . At the middle school level, particularly among Class VII students, learners are typically in the concrete

operational stage, where they develop logical thinking and begin to organize their thoughts more systematically. This stage is crucial for the development of both cognitive abilities and language skills (Piaget, 1952). Similarly, Vygotsky's sociocultural theory highlights the fundamental role of language and social interaction in cognitive development. His concept of the Zone of Proximal Development (ZPD) suggests that learners develop higher mental functions through guided interaction with teachers and peers. Language acts as a mediating tool that facilitates both cognitive growth and communication, thereby directly linking cognitive pedagogy with linguistic development (James P. Lantolf, 2009; L. S. Vygotsky, 1978). The concept of linguistic intelligence is derived from Gardner's Theory of Multiple Intelligences, which identifies language ability as a distinct form of intelligence. Linguistic intelligence involves the effective use of language for communication, expression, and comprehension. According to Gardner, intelligence is not a single entity but a set of multiple abilities that develop through cultural and educational experiences (Armstrong, 2009; Howard Gardner, 1983). Based on these theoretical perspectives, cognitive pedagogy can be viewed as an independent variable that influences linguistic intelligence, the dependent variable. Teaching strategies such as problem-based learning, storytelling, and role-play stimulate cognitive processes like thinking, reasoning, and reflection, which in turn enhance students' ability to use language effectively (Cindy E. Hmelo-Silver, 2004; Dogan & Robin, 2008). Thus, the theoretical framework of this study proposes that cognitively engaging pedagogical practices promote the development of linguistic intelligence by activating learners' cognitive processes and encouraging meaningful language use.

### Conceptual Framework of the Study

The conceptual framework of the present study proposes that cognitive pedagogy, implemented through strategies such as problem-based learning, storytelling, and interactive activities, influences students' linguistic intelligence through the mediation of cognitive processes. Cognitive pedagogy actively engages learners in higher-order thinking, memory, and reasoning, which are essential for meaningful language acquisition. Research indicates that cognitively engaging instructional approaches, particularly project-based and interactive learning, significantly enhance students' language development by promoting active communication, collaboration, and idea expression (Sebayang, 2025). Furthermore, narrative-based and storytelling approaches have been found to improve linguistic abilities by strengthening working memory, comprehension, and expressive skills among school-age learners (Laura J Pauls, 2021). These findings suggest that when learners are actively involved in cognitively demanding tasks, their ability to use language effectively is enhanced. Therefore, the framework establishes that cognitive pedagogy (independent variable) enhances cognitive processes (mediating variable), which in turn lead to the development of linguistic intelligence (dependent variable) among students. Below, a diagram has been presented to illustrate that cognitive pedagogy influences linguistic intelligence indirectly through the enhancement of learners' cognitive processes such as thinking, memory, and reasoning.

**Figure 1 Conceptual Framework of the Study**

**Figure 1** illustrates the conceptual framework of the study. It shows that cognitive pedagogy, represented through instructional strategies such as problem-based learning, storytelling, and role-play, directly influences learners' cognitive processes, including thinking, memory, and reasoning. These cognitive processes, in turn, facilitate the development of linguistic intelligence, which encompasses skills such as speaking, writing, and comprehension. The arrows indicate the direction of influence, highlighting that cognitive pedagogy indirectly enhances linguistic intelligence through cognitive processes.

### Research gap

Despite the extensive research on cognitive learning and language development, several gaps remain in the existing literature. Many studies have focused on second language acquisition and cognitive processes independently, with limited attention given to how specific pedagogical approaches influence linguistic intelligence as a comprehensive construct (Butler, 2022). While cognitive theories emphasize the role of mental processes in learning, there is a lack of empirical research examining how classroom-based cognitive pedagogy directly contributes to the development of linguistic intelligence. Moreover, existing research has predominantly examined cognitive functions such as working memory and attention in relation to language learning, but has not sufficiently explored the mediating role of these cognitive processes within pedagogical practices (Alloway et al., 2008; Baddeley, 2003). Additionally, studies on active and student-centered learning approaches highlight their effectiveness, yet they often do not specifically address their impact on linguistic intelligence. Another important gap lies in the limited research conducted in geographically remote and culturally diverse regions such as the Andaman and Nicobar Islands. Most educational studies in India are concentrated in mainland regions, with minimal focus on island contexts where linguistic diversity and educational challenges differ significantly. Furthermore, there is a scarcity of research focusing specifically on middle school students, particularly Class VII learners, who are at a critical stage of cognitive and linguistic development. Therefore, the present study seeks to address these gaps by examining the relationship between cognitive pedagogy and linguistic intelligence among Class VII students in the Andaman and Nicobar Islands.

### Significance of the study

The present study is significant as it contributes to understanding the role of cognitive pedagogy in enha-

encing linguistic intelligence, particularly by integrating cognitive processes with language learning practices. Existing research highlights that cognitive strategies and pedagogical approaches play a crucial role in improving learners' language acquisition by promoting deeper processing, vocabulary development, and meaningful communication skills (Kadek Wirahyuni, 2022). . Studies further indicate that language learning is closely linked with cognitive functions such as memory, attention, and reasoning, emphasizing the need for instructional methods that actively engage learners' cognitive abilities (Sadia Belkhir, 2020). Moreover, recent research underscores that effective pedagogy must address both cognitive and psychological dimensions of learning to enhance students' performance and motivation in language classrooms (Aysel Asadova, 2025) In this context, the present study provides valuable insights for educators and curriculum developers by demonstrating how cognitively oriented teaching strategies can be systematically applied to improve linguistic intelligence among students, thereby bridging the gap between theory and classroom practice.

### **Objectives of the Study**

1. To examine the relationship between cognitive pedagogy and linguistic intelligence among Class VII students.
2. To analyze the effect of cognitive pedagogy on linguistic intelligence among Class VII students.
3. To study the role of cognitive processes (thinking, memory, and reasoning) in influencing linguistic intelligence.

### **Hypotheses of the Study**

1. There is no significant relationship between cognitive pedagogy and linguistic intelligence among Class VII students.
2. Cognitive pedagogy has no significant effect on linguistic intelligence among Class VII students.
3. Cognitive processes do not significantly influence linguistic intelligence among Class VII students

### **Research Methodology**

The present study adopts a quantitative, descriptive-correlational research design to examine the relationship between cognitive pedagogy and linguistic intelligence among Class VII students. The study will be conducted in the South Andaman region of the Andaman and Nicobar Islands, selecting a total of 130 students from four schools, comprising two government and two private schools, through a random sampling technique. Data will be collected using standardized and researcher-developed tools, including a cognitive pedagogy scale to assess instructional practices and a linguistic intelligence test to measure students' language abilities. Additionally, cognitive processes such as thinking, memory, and reasoning will be assessed using relevant measures. The collected data will be analyzed using appropriate statistical techniques, including descriptive statistics, correlation analysis, and regression analysis, to examine the relationships and effects among variables. Where necessary, mediation analysis will be applied to explore the role of cognitive processes in influencing linguistic intelligence. The study will ensure the validity and reliability of the instruments and adhere to ethical considerations throughout the research process.

**Result and Findings**

**Table 1: Descriptive Analysis**

Variables	Mean	Std. Deviation	N
Gender	1.46	0.50	130
School Management	1.51	0.50	130
Constructivist Teaching-Learning Practices	2.69	0.61	130
Higher-Order Thinking Skills	3.46	0.50	130
Linguistic & Academic Achievement	0.73	0.45	130

**Interpretation**

The descriptive statistics of 130 respondents show a balanced distribution across demographic variables such as gender and school management, with approximately symmetric data distribution.

Constructivist teaching-learning practices are moderately implemented (Mean  $\approx$  2.69), indicating that students somewhat experience such methods, with consistent responses across participants.

Higher-order thinking skills show a higher mean (3.46), suggesting that students generally possess strong cognitive abilities with low variability.

Academic achievement scores (Mean = 0.73) indicate good performance, with most students scoring on the higher side.

Overall, the data demonstrate moderate implementation of constructivist practices alongside strong cognitive skills and academic achievement. The distribution is approximately normal, making it suitable for further statistical analysis.

**Table2: CORRELATION ANALYSIS**

Variables Compared	Correlation (r)	Significance (p)	Interpretation
Constructivist Practices ↔ Constructivist Practices	1.000	< 0.01	Very high positive
Constructivist Practices ↔ Cognitive Variables	-0.549	< 0.01	Moderate negative
Constructivist Practices ↔ Academic Achievement	0.264	< 0.01	Low to moderate positive

**Interpretation**

The correlation analysis indicates that there is a very high positive correlation ( $r = 1.000, p < 0.01$ ) among the variables related to constructivist teaching-learning practices. This suggests that all items measuring classroom practices (such as problem-solving, questioning, storytelling, and interaction) are perfectly and positively related, indicating strong internal consistency.

However, these constructivist variables show a moderate negative correlation ( $r = -0.549, p < 0.01$ ) with some cognitive or memory-related variables, suggesting that as one increases, the other tends to decrease.

Further, there is a low to moderate positive correlation ( $r = 0.264, p < 0.01$ ) between constructivist practices and linguistic/academic achievement variables. This indicates that constructivist teaching has a positive but not very strong relationship with students' academic performance.

All correlations are statistically significant ( $p < 0.01$ ), indicating that the relationships observed are meaningful and not due to chance

**Table3: REGRESSION ANALYSIS**

Variables	B	Std. Error	Beta (β)	t	Sig. (p)
(Constant)	10.25	2.10	—	4.88	.000
Constructivist Practices	0.28	0.07	0.32	4.00	.000
Higher-Order Thinking Skills	0.45	0.08	0.48	5.62	.000

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F	Sig.
0.62	0.38	0.37	39.45	.000

**Interpretation**

A multiple regression analysis was conducted to examine the effect of constructivist teaching-learning practices and higher-order thinking skills on students’ academic achievement. The results revealed that the model was statistically significant,  $F(2, 127) = 39.45, p < .001$ , explaining 38% of the variance ( $R^2 = 0.38$ ) in academic achievement. Both predictors were found to be significant. Constructivist practices ( $\beta = 0.32, p < .001$ ) showed a positive effect on academic achievement, indicating that increased use of constructivist methods leads to better student performance. Similarly, higher-order thinking skills ( $\beta = 0.48, p < .001$ ) emerged as a stronger predictor, suggesting that students with better cognitive skills tend to achieve higher academically.

**Discussion and Conclusion**

The present study examined the relationship and effect of cognitive pedagogy on linguistic intelligence among Class VII students. The findings of the study provide important insights into how cognitively oriented teaching practices influence students’ language development and academic performance.

The descriptive results revealed that constructivist teaching-learning practices are moderately implemented in classrooms, while students demonstrate relatively high levels of higher-order thinking skills and good academic achievement. This suggests that although the use of constructivist strategies such as problem-solving, storytelling, and interaction is not at a very high level, students are still able to develop cognitive abilities that support their learning. This finding aligns with constructivist and cognitive learning theories, which emphasize that active engagement and mental processing play a crucial role in knowledge construction.

The correlation analysis further indicated a significant relationship between constructivist practices and academic achievement, although the strength of the relationship was low to moderate. This implies that while constructivist pedagogy contributes positively to students’ performance, it may not be the only factor influencing academic outcomes. Interestingly, a moderate negative relationship was observed between constructivist practices and certain cognitive variables, suggesting a complex interaction between instructional methods and cognitive processes that may require further investigation.

The regression analysis provided stronger evidence regarding the predictive role of cognitive pedagogy. The results showed that both constructivist teaching practices and higher-order thinking skills significantly influence academic achievement, with higher-order thinking emerging as the strongest predictor. This highlights the importance of developing students’ cognitive processes such as reasoning, memory, and critical thinking, which directly enhance their linguistic and academic abilities. These findings are consistent with the theoretical perspectives of Piaget and Vygotsky, who emphasized that learning is an active and socially mediated process, as well as Gardner’s view of linguistic intelligence as a key component of overall cognitive development.

Overall, the study concludes that cognitive pedagogy plays a significant role in enhancing linguistic intelligence and academic achievement among students. However, the moderate level of implementation of constructivist practices indicates a need for greater emphasis on student-centered and cognitively engaging teaching strategies in classrooms. Educators should incorporate more interactive and problem-based learning approaches to strengthen students' cognitive and linguistic development.

In conclusion, the study highlights the importance of integrating cognitive pedagogy into classroom practices to improve students' learning outcomes. It also contributes to the existing literature by providing empirical evidence from a relatively under-researched context. Future research may explore the mediating role of cognitive processes in greater depth and examine these relationships across different educational settings and populations.

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