atthufulah
Early Childhood Education Journa
10.35316/atthufulah.2026.v7i1.80-97
[Vol. 7 No. 1] | October 2026
P-ISSN : 2745-6838
E-ISSN : 2745-682X

THE USE OF EDUCATIONAL PUZZLE GAMES TO STIMULATE THE COGNITIVE ABILITIES OF EARLY CHILDHOOD CHILDREN

Desi Ismawati [1], Maisyarah[2], Sitti Romlah[3], Nor Jamilah[4], Ismawati[5] Abdus Salam[6]
[12345]Sekolah Tinggi Agama Islam AlMujtama Pamekasan (69361), Indonesia
[6]Universitas Malaya (50603), Malaysia
E-mail: [1]desi22@stai-almujtama.ac.id, [2]meysarah1505@gmail.com, [3]romlaharifin469@gmail.com, [4]norjamilah173@gmail.com, [5]ismasnpsi@stai-almujtama.ac.id, [6]abdus45salam@gmail.com

ABSTRACT
Early childhood cognitive development requires stimulation through concrete, engaging learning experiences that are appropriate to children's developmental characteristics. Educational puzzles are one type of learning media that can provide such experiences through activities involving searching, matching, assembling, and solving simple problems. This study aimed to analyze the use of educational puzzles in supporting the stimulation of cognitive abilities among young children at RA Nurul Mubtadiin. This study employed a descriptive qualitative approach involving a classroom teacher and 14 children participating in puzzle activities. Data were collected through observation, interviews, and documentation and were analyzed through data reduction, data presentation, and conclusion drawing. Data validity was established through method triangulation. The findings showed that the use of puzzles provided learning experiences related to learning and problem solving abilities, logical thinking, and symbolic thinking. These abilities were demonstrated through children's activities in recognizing symbols, matching shapes and colors, sustaining attention, trying different alternatives, and solving simple problems. The implementation of the activities was supported by children's enthusiasm, the availability of puzzle materials, and teacher guidance, while limited time, the number of available materials, and differences in children's abilities were identified as inhibiting factors. Therefore, the use of puzzles needs to be adapted to children's abilities, the level of difficulty of the materials, and the learning context, and should be accompanied by teacher guidance to meet children's developmental needs and characteristics.
Keywords: educational games; puzzles; cognitive abilities; early childhood; cognitive stimulation

ABSTRAK
Perkembangan kognitif anak usia dini memerlukan stimulasi melalui pengalaman belajar yang konkret dan menarik, serta sesuai dengan karakteristik perkembangan anak. Puzzle edukatif merupakan salah satu jenis media pembelajaran yang dapat memberikan pengalaman tersebut melalui aktivitas seperti mencari, mencocokkan, menyusun, dan memecahkan masalah sederhana. Penelitian ini bertujuan untuk menganalisis penggunaan puzzle edukatif dalam mendukung stimulasi kemampuan kognitif anak usia dini di RA Nurul Mubtadiin. Penelitian ini menggunakan pendekatan kualitatif deskriptif yang melibatkan seorang guru kelas dan 14 anak yang berpartisipasi dalam kegiatan bermain puzzle. Data dikumpulkan melalui observasi, wawancara, dan dokumentasi, kemudian dianalisis melalui tahapan reduksi data, penyajian data, dan penarikan kesimpulan. Validitas data ditetapkan melalui triangulasi metode. Hasil penelitian menunjukkan bahwa penggunaan puzzle memberikan pengalaman

belajar yang berkaitan dengan kemampuan belajar dan pemecahan masalah, berpikir logis, serta berpikir simbolik. Kemampuan-kemampuan tersebut tercermin dalam aktivitas anak saat mengenali simbol, mencocokkan bentuk dan warna, mempertahankan fokus perhatian, mencoba berbagai alternatif, dan memecahkan masalah sederhana. Pelaksanaan kegiatan didukung oleh antusiasme anak, ketersediaan materi puzzle, dan bimbingan guru; sementara itu, keterbatasan waktu, jumlah materi yang tersedia, dan perbedaan kemampuan anak diidentifikasi sebagai faktor penghambat. Oleh karena itu, penggunaan puzzle perlu disesuaikan dengan kemampuan anak, tingkat kesulitan materi, serta konteks pembelajaran, dan harus disertai dengan bimbingan guru guna memenuhi kebutuhan serta karakteristik perkembangan anak.
Kata Kunci: permainan edukatif; puzzle; kemampuan kognitif; anak usia dini; stimulasi kognitif

Received: August 13, 2026 *Revised: September 25, 2026* *Accepted: September 26, 2026* *Published: October 20, 2026*

INTRODUCTION

Cognitive development is a crucial aspect of early childhood education, as it relates to a child's ability to acquire, comprehend, process, retain, and utilize information to interact with their environment. During early childhood, this development proceeds rapidly, necessitating stimulation that aligns with the child's developmental characteristics and needs. Cognitive abilities at this stage are reflected in skills such as recognizing symbols, classifying objects, identifying patterns and shapes, retaining information, maintaining concentration, thinking logically, and solving simple problems. The development of these abilities lays the foundation for children to grasp future learning experiences and adapt to various everyday situations. Therefore, cognitive stimulation should be provided through learning experiences that are concrete and engaging, allowing children to actively participate in the learning process (Umam, A. K., Rizqiyani, R., Aneka, A., & Cahyo, 2021; Fitri Ghina Lubis et al., 2022; Rohmah, 2025; Nazilah et al., 2022).

Learning in early childhood education cannot be separated from play, as play constitutes a learning experience that aligns with children's developmental characteristics. Through play, children have the opportunity to explore their environment, experiment with various possibilities, observe relationships between objects, and construct knowledge through direct experience. Purposefully designed play activities also enable children to develop their thinking skills without losing the element of enjoyment in learning. This principle aligns with the concept of Developmentally Appropriate Practice, which identifies play-based learning as an approach suited to the needs and characteristics of young children (*NAEYC*, 2020). Research (Sidiq & Fadlillah, 2023) also indicates that puzzle-play activities provide children with opportunities to understand and process information, as well as to solve problems.

Consequently, teachers need to design play activities that are not only engaging for children but also have clear developmental stimulation goals.

One form of media that supports play-based learning is educational play materials (APE), including puzzles that can provide concrete learning experiences while stimulating children's cognitive processes. Puzzles involve activities such as observing, matching, assembling, connecting, and placing specific pieces to form a complete whole. These processes require children to recognize shapes and patterns, recall visual information, consider the appropriate placement of pieces, and explore alternative solutions when correcting errors. Puzzle activities can also be adapted to children's developmental levels and learning goals through materials featuring letters, numbers, colors, images, or geometric shapes. Research has demonstrated that educational puzzle games provide children with opportunities to assemble pieces, recognize geometric shapes, coordinate visual information with physical movement, and engage in problem-solving activities (Nazilah et al., 2022; Alya Azaki Amatullah, Dwi Prasetiyawati Diyah Hariyanti, 2022; Ratna & Imamah, 2023). Other studies have also linked puzzle activities with children's cognitive development, concentration, logical thinking, independence, problem solving, and recognition of numerical and symbolic representations (Kurnietin, Tugiyono, & Prayogo, 2025; Ahmad Aliyudin, 2023; Mulyana & Nurcahyani, 2022; Indah Suci Sapitri, 2024; Arditama, Wardani, Purwanti, & Hindarto, 2018). Research concerning problem solving further indicates the relevance of puzzle activities for encouraging children to observe, experiment, evaluate errors, and determine alternative solutions (Bella Herlina Tuty Novia Purba, Adiani Hulu, & Uranus Zamili, 2024; Asridoni, Karimah, Husna, & Aulia, 2025; Pandiangan & Siregar, 2022); (Panjaitan & Hafizzah, 2025). Thus, puzzles can function not merely as recreational media but as concrete learning experiences that provide opportunities for children to engage in observation, matching, memory, reasoning, and simple problem solving.

Although previous studies have provided evidence regarding the relationship between puzzle activities and children's cognitive abilities, problem solving, symbolic recognition, and related skills, an important aspect remains insufficiently described: how educational puzzles are actually implemented as a learning activity in an early childhood education setting, how children's cognitive behaviors emerge during the activity, and how teacher guidance and classroom conditions shape the learning process. Previous studies have examined cognitive outcomes and problem-solving abilities through various approaches, while qualitative studies have begun to describe the planning, implementation, and evaluation of puzzle-based learning

as well as teacher-led stimulation (Nazilah et al., 2022; Thomeng, 2026; Elisten & Ramadhani, 2025). What remains less clear is the connection between these elements within a single learning context: the relationship between the form of puzzle activity, children's observable cognitive responses, teacher guidance during the activity, and the supporting or inhibiting conditions that arise in its implementation. This study specifically addresses this gap by providing a contextual and process-oriented description of how educational puzzle games are used to stimulate cognitive abilities at RA Nurul Mubtadiin. The study adds an integrated account of (1) how puzzle activities are implemented, (2) what cognitive behaviors are observable during the activity, (3) how teachers guide and stimulate children's participation, and (4) what factors support or hinder the implementation. Thus, the contribution of this study is not merely to report the use of puzzles as a cognitive learning medium, but to explain how the stimulation process takes place in an actual classroom context and how children's cognitive behaviors, teacher guidance, and implementation conditions interact during the activity.

Empirical observations at RA Nurul Mubtadiin indicate a need for the use of more concrete and varied learning media. Preliminary observations of the children participating in the study revealed that some still struggle to recognize letter and number symbols during puzzle activities. They also face difficulties in accurately locating, matching, and connecting letter puzzle pieces. Furthermore, their ability to recognize and distinguish between various geometric shapes has not yet fully developed. While the children already have some experience naming letters and numbers and performing simple counting tasks, they still require concrete experiences to accurately link symbols, shapes, and puzzle pieces. Interviews with the classroom teacher corroborated the observational findings. The teacher noted that the learning process remains heavily focused on Quranic recitation and reading, while the use of educational learning media is still limited.



Figure 1. Semi structured interview with the classroom teacher

Consequently, children have limited experience in learning activities that involve observing, matching, assembling, experimenting, and discovering solutions through

educational games. These conditions are not solely related to children's cognitive characteristics, but are also associated with external factors within the learning environment, including the availability and variety of educational media, the learning activities routinely provided, and the extent of teacher facilitation during hands-on activities. Conversely, the children demonstrate a need for learning activities that are more engaging and involve hands-on participation. The gap between children's need for concrete, interactive learning experiences and the existing learning conditions provides an important contextual basis for examining how educational puzzle games can be implemented to stimulate cognitive abilities. In this context, the use of puzzles provides an alternative learning medium through which children can engage with letter and number symbols, colors, and shapes while participating in activities involving concentration, reasoning, and simple problem solving. Effective implementation also requires teacher guidance and stimulation tailored to children's abilities, as demonstrated in research concerning teacher-led stimulation using educational puzzle media (Elisten & Ramadhani, 2025). Thus, the use of puzzles in this study is considered not merely as a learning medium, but as part of a broader learning process involving the interaction between children, educational materials, teacher guidance, and classroom conditions. Based on the foregoing, this study aims to analyze the use of educational puzzle games to stimulate the cognitive abilities of early childhood students at RA Nurul Mubtadiin. The study focuses on the activity implementation process, the forms of cognitive behavior observed during puzzle use, and the factors supporting or hindering implementation. This research is expected to enrich the body of knowledge regarding play-based learning media in early childhood education while offering practical implications for teachers in selecting and developing puzzle activities that align with children's characteristics and cognitive stimulation needs.

METHOD

This study employs a descriptive qualitative approach to describe the use of educational puzzle games in developing the cognitive abilities of early childhood students at RA Nurul Mubtadiin. A qualitative approach is used to understand the phenomenon based on natural conditions in the field, emphasizing the meanings and processes occurring during the research (Moleong, 1993; Sugiyono, 2012).

The research was conducted at RA Nurul Mubtadiin in April 2026. The research subjects consisted of the classroom teacher and the children involved in learning activities

using educational puzzle games. Data were collected through observation, interviews, and documentation. Passive participatory observation was used to monitor the children's activities while playing with puzzles, specifically focusing on their abilities to recognize symbols, match shapes, concentrate, and solve simple problems. Semi-structured interviews were conducted with the classroom teacher to gather information regarding activity implementation, the development of the children's cognitive abilities, and supporting or inhibiting factors. Documentation, including activity photos, records of children's development, and instructional documents, served as supporting data.

Data analysis was conducted interactively through the stages of data reduction, data display, and conclusion drawing (Miles et al., 2014). Data from observations, interviews, and documentation were reduced based on the research focus and then presented descriptively to identify patterns regarding puzzle usage and the development of the children's cognitive abilities. Finally, conclusions were drawn based on the interrelationships between the findings obtained during the study. Data validity was tested through method triangulation, comparing data obtained via observation, interviews, and documentation. Triangulation was performed to ensure information consistency and enhance the credibility of the research findings (Arianto, 2024).

RESULTS AND DISCUSSION

The development of a child's cognitive abilities is evident in three key areas: learning and problem solving, logical thinking, and symbolic thinking. In the area of learning and problem solving, children attempt to find matching pieces, try various alternatives when facing difficulties, and adjust the arrangement until the correct result is achieved. Regarding logical thinking, children begin to match and group pieces based on color, shape, and size. Meanwhile, in terms of symbolic thinking, children practice recognizing and naming letters, numbers, shapes, and images found on the puzzle pieces and matching them with their corresponding pairs.



Figure 2. Observation in letter and number puzzle activities with teacher guidance

Interviews with teachers reinforce observational findings that puzzle activities help children improve their focus, recognize symbols, and persist in completing tasks. Thus, the use of puzzles provides a learning experience that directly engages processes such as observing, matching, remembering, experimenting, and discovering solutions. The main findings related to the use of educational puzzle games are summarized in Table 1.

Table 1. Summary of Educational Puzzle Games

Finding Area	Observed Behaviors	Supporting Factors	Inhibiting Factors	Teacher's Response
Learning and problem solving	Children search for matching pieces, try different alternatives, adjust arrangements, and attempt to complete the puzzle when encountering difficulties.	Children's enthusiasm and willingness to complete the puzzle.	Differences in children's abilities and difficulties in finding the appropriate pieces.	Teachers provide examples, instructions, and assistance according to children's needs while allowing them to try independently.
Logical thinking	Children match and group puzzle pieces based on color, shape, and size.	Availability of puzzle materials containing various colors, shapes, and sizes.	Limited puzzle sets and differences in children's readiness to distinguish and classify pieces.	Teachers provide prompts and examples to help children compare, match, and group pieces.
Symbolic thinking	Children recognize and name letters, numbers, shapes, and images and match them with corresponding puzzle pieces.	Children's previous experience with letters, numbers, and simple counting activities.	Some children still have difficulty recognizing certain symbols and connecting them with the appropriate pieces.	Teachers repeat instructions, provide examples, and guide children in identifying and matching symbols.
Attention and persistence	Children observe pieces carefully, remain engaged in the activity, and continue trying to complete the puzzle.	Children's interest in hands-on and game-based activities.	Time constraints and the need to share a limited number of puzzle sets.	Teachers organize participation, provide encouragement, and allow children to complete the activity in stages.

The use of educational puzzles is influenced by both supporting and inhibiting factors. Supporting factors include the children's enthusiasm, the availability of puzzle materials, and the teacher's role in providing guidance and support. Inhibiting factors include time constraints, the need to share a limited number of puzzle sets, and variations in children's

abilities to complete the puzzles. To address these challenges, teachers provide tailored support, offer examples and instructions, and allow children to complete the puzzles in stages.

Overall, the research findings indicate that the use of educational puzzle games provides a learning experience that supports the development of symbol recognition, logical thinking, concentration, and simple problem-solving skills. The effectiveness of their use is related not only to the puzzle medium but also to teacher support and the adaptation of activities to each child's individual abilities.

DISCUSSION

1. The Use of Educational Puzzle Games

The findings indicate that educational puzzle games at RA Nurul Mubtadiin function as a concrete learning experience through which children engage in observation, matching, assembling, experimentation, and simple problem solving. Rather than interpreting these activities as evidence of improved cognitive abilities, the findings suggest that puzzles create opportunities for children to construct understanding through direct interaction with concrete objects. Children's persistence when encountering difficulties is particularly meaningful because it indicates that cognitive engagement occurs throughout the process of searching for, testing, and revising possible solutions, rather than only when the puzzle is successfully completed.

This interpretation can be understood through Vygotsky's sociocultural perspective, particularly the concept of the Zone of Proximal Development (ZPD), which emphasizes that children's learning can be supported through interaction with more knowledgeable others. In the present study, the teacher's role is visible when children encounter difficulties and receive direction, examples, or hints while still being given opportunities to attempt the task independently. Thus, the cognitive experience provided by the puzzle does not arise solely from the characteristics of the material, but from the interaction among the child, the puzzle, and the teacher's assistance. The principle of Developmentally Appropriate Practice also supports this interpretation by emphasizing meaningful, active, and developmentally appropriate learning experiences for young children (*NAEYC News*, 2020).

This interpretation is consistent with (Nazilah et al., 2022), who found that educational puzzles provide opportunities for children to assemble pieces, recognize geometric shapes, and coordinate visual information with physical movement. (Wijiati, Astutik, Hariyanti, Palupi, & Astutik, 2024) likewise highlight the relevance of puzzles to problem solving,

reasoning, hand-eye coordination, and recognition of shapes, sizes, and colors. (Sidiq & Fadlillah, 2023) further explain that puzzle activities provide opportunities for children to understand and process information while solving problems. The present findings extend these observations by showing that such cognitive processes can be understood as a sequence of children's attempts to observe, test alternatives, recognize inappropriate arrangements, and modify their strategies.

The problem-solving dimension is also consistent with (Alya Azaki Amatullah, Dwi Prasetiyawati Diyah Hariyanti, 2022; Ratna & Imamah, 2023), who associate puzzle activities with children's problem-solving processes. Similar relevance has been reported for picture puzzles, jigsaw puzzles, and block puzzles (Bella Herlina Tuty Novia Purba et al., 2024; Wahyuningsih, Wahyuni, & Siregar, 2023; Panjaitan & Hafizzah, 2025). These studies suggest that the cognitive value of puzzles is not determined solely by the physical form of the medium, but by the opportunities it provides for children to identify relationships, test possibilities, and determine solutions.

The pedagogical implication is that teachers should not treat puzzle activities merely as tasks that children must complete correctly. In accordance with the ZPD perspective, teacher assistance can be gradually adjusted to children's needs: teachers may initially provide prompts or examples, then reduce assistance as children become more capable of exploring solutions independently. Such facilitation allows children to experience trial and error while maintaining engagement with the task. Therefore, the teacher's role is more appropriately understood as a facilitator of children's cognitive exploration rather than as the direct provider of solutions. This interpretation is consistent with the qualitative nature of the present study, which focuses on how cognitive behaviors emerge during the activity rather than measuring the magnitude of changes in cognitive ability scores.

2. Cognitive Behaviors Emerging During Puzzle Activities

The findings show that children's cognitive engagement during puzzle activities is multidimensional. Symbol recognition, shape and color matching, sustained attention, logical thinking, recall, and simple problem solving appear as interconnected processes rather than isolated abilities. When children search for a piece that corresponds to a particular letter, number, shape, or color, they must attend to visual characteristics, recall previously encountered information, compare alternatives, and make decisions. This indicates that the cognitive value of puzzles lies partly in their ability to bring several cognitive processes into one concrete learning experience.

Table 2. Summary of Cognitive Behaviors

Cognitive Aspect	Observed Cognitive Behaviors	Puzzle Activity	Evidence of Engagement
Symbol recognition	Children recognize and name letters and numbers and match them with corresponding pieces.	Identifying letter and number pieces and finding their corresponding pairs.	Children observe symbols, recall previously encountered information, and select pieces based on the symbols shown.
Shape and color matching	Children distinguish and match pieces based on shape and color.	Searching for pieces with the same shape or color and connecting them appropriately.	Children compare visual characteristics and adjust their choices when the selected piece does not match.
Sustained attention	Children maintain attention while searching for and arranging puzzle pieces.	Observing available pieces and continuing the activity until the puzzle is completed.	Children remain engaged with the task and continue working despite difficulties.
Logical thinking	Children compare pieces, identify relationships, and determine possible positions for each piece.	Matching, grouping, and arranging pieces according to their characteristics.	Children consider different alternatives before deciding where a piece should be placed.
Recall	Children use previously encountered information when identifying symbols, shapes, and colors.	Recognizing familiar letters, numbers, shapes, and images on puzzle pieces.	Children connect previously learned information with the objects encountered during the activity.
Simple problem solving	Children try alternative solutions when an initial attempt is unsuccessful.	Trying different pieces or changing the position of a piece until an appropriate arrangement is found.	Children reconsider unsuccessful choices and attempt another solution rather than immediately stopping the activity.
Response regulation and persistence	Children control their initial responses and continue trying after encountering difficulties.	Rechecking pieces, changing strategies, and repeating attempts.	Children demonstrate persistence by modifying their actions based on the result of previous attempts.

Source: Observation and teacher interviews

This interpretation is consistent with (Mulyana & Nurcahyani, 2022; (Mulyawan, Kurniawati, & Sari, 2024; Mulyawan et al., 2024), who report the relevance of puzzle activities to children's cognitive development. (Ahmad Aliyudin, 2023) similarly identifies concentration, logical thinking, independence, and problem solving as cognitive dimensions

associated with educational puzzle activities. (Nazilah et al., 2022) Astutik, 2024) further demonstrate the relevance of puzzles to recognizing shapes, colors, sizes, and relationships between pieces. In the context of RA Nurul Mubtadiin, these findings suggest that manipulating puzzle pieces provides children with opportunities to connect perceptual information with increasingly purposeful decisions.

The symbolic dimension is particularly relevant to the conditions observed at RA Nurul Mubtadiin. When children match letters or numbers with corresponding puzzle pieces, the activity requires them to move beyond identifying visual forms and begin associating symbols with particular representations. This interpretation is supported by (Sapitri, 2025), who examine number-representation puzzles in relation to children's recognition of numerical symbols, and by (Wardani, 2026), who report the relevance of spelling puzzles to symbolic thinking and early reading skills. McMullen and Darling (1996) similarly emphasize the importance of symbolic problem solving in early literacy development. Thus, puzzles may provide a concrete bridge between children's manipulation of objects and their emerging understanding of abstract symbols.

The findings also suggest that completing a puzzle requires children to regulate their responses when an initial attempt is unsuccessful. Xin et al. (2026) found a relationship between preschool children's jigsaw-puzzle performance and inhibitory control. This perspective helps explain the pedagogical meaning of persistence observed in the present study: children are not simply maintaining attention but are also reconsidering unsuccessful choices and trying alternative solutions. (Lusiana & Aziz, 2024) further conceptualize puzzle activities through algorithms and heuristics, illustrating how children can engage in solution-seeking processes by testing alternatives and modifying their actions.

The implication is that teachers can use puzzles not only to introduce letters, numbers, shapes, or colors but also to create situations in which children are encouraged to compare alternatives, explain their choices, and reconsider unsuccessful attempts. Teacher prompts such as asking children to look again at the shape of a piece or to consider another possible position can make the reasoning process more explicit without immediately providing the answer. In this way, puzzle activities can become opportunities for children to practice thinking processes rather than merely completing a predetermined task. This interpretation strengthens the process-oriented contribution of the present study because the observed cognitive behaviors are understood as part of children's engagement with the learning task rather than as evidence of measured cognitive gains.

P-ISSN : 2745-6838
E-ISSN : 2745-682X

3. Factors Supporting and Hindering the Use of Puzzles

The findings indicate that the use of educational puzzles is shaped not only by the characteristics of the materials but also by the interaction among children, teachers, and the learning environment. Children's enthusiasm and the availability of puzzle materials create opportunities for engagement, while teacher guidance helps children remain oriented toward the task when they encounter difficulties. The supporting and hindering factors identified in this study are summarized in Table 3.

Table 3. Supporting and Hindering Factors

Supporting Factors	Description	Hindering Factors	Description
Children's enthusiasm	Children's interest and willingness to engage with puzzle activities encourage active participation and persistence in completing tasks.	**Differences in children's abilities**	Children have different levels of experience and readiness in recognizing shapes, symbols, and relationships between puzzle pieces.
Availability of puzzle materials	The availability of puzzle materials provides opportunities for children to directly observe, manipulate, match, and assemble pieces.	**Limited number of puzzle sets**	Several children may need to share the available materials, reducing the amount of direct manipulation and exploration time for some children.
Teacher guidance	Teachers direct children's attention, demonstrate strategies, provide verbal hints, and allow opportunities for independent exploration.	**Limited instructional time**	Restricted learning time limits the duration available for children to explore, complete, and repeat puzzle activities.
Adjustment of activities to children's abilities	Teachers can provide different levels of assistance and select puzzle complexity according to children's readiness.	**Different levels of assistance required**	Some children can complete puzzles independently, whereas others require additional examples, explanations, or time.

The teacher's role is particularly important because children do not approach the same puzzle with identical levels of experience or readiness. Guidance may take the form of directing attention, demonstrating a strategy, providing a verbal hint, or allowing additional time for independent exploration. (Ahmad Aliyudin, 2023) emphasizes the importance of teacher guidance in puzzle-based stimulation, while (Wijiati et al., 2024) indicate that the difficulty of puzzle activities needs to be adjusted to children's age and abilities. From the

perspective of Vygotsky's ZPD, this form of assistance can be interpreted as temporary support that enables children to engage with tasks that may initially be difficult to complete independently. The implication is that teacher assistance should be responsive rather than uniform, with support gradually reduced as children demonstrate greater independence.

The differences in children's abilities observed at RA Nurul Mubtadiin therefore have practical implications for the selection of puzzle materials. Children who are already familiar with puzzles may require more complex relationships between pieces, whereas children who are still developing recognition of shapes or symbols may benefit from puzzles with fewer pieces and clearer visual relationships. Findings reported by (Nazilah et al., 2022) and (Wijiati et al., 2024) regarding shape recognition, visual coordination, and reasoning support the importance of aligning puzzle characteristics with children's developmental needs.

Limited instructional time and the availability of puzzle sets also influence the quality of children's participation. When several children have to share a limited number of materials, opportunities for direct manipulation and exploration become more restricted. Aprianti (2021) notes that puzzle activities can support concentration, memory, and thinking, but their implementation also requires teacher management and creativity. Consequently, grouping children, rotating materials, and preparing puzzles with different levels of complexity are not merely logistical solutions; they are instructional strategies for maintaining children's opportunities to engage meaningfully with the cognitive processes embedded in the activity.

The implication is that implementation quality should become an important consideration when teachers use puzzles as cognitive stimulation media. Rather than using the same puzzle format for all children, teachers can differentiate the complexity of materials, provide graduated assistance, and organize participation so that each child receives sufficient opportunities to observe, manipulate, and test solutions. Such differentiation is consistent with the principle that learning activities should respond to children's developmental characteristics (NAEYC, 2020). Thus, the supporting and inhibiting factors identified in this study are not merely technical constraints but contextual elements that influence how opportunities for cognitive stimulation are created during puzzle activities.

4. Synthesis of Research Findings

Taken together, the findings suggest that the educational value of puzzles at RA Nurul Mubtadiin lies less in the completion of the final product and more in the cognitive processes that children experience while attempting to complete it. The activities provide opportunities for children to connect perception, memory, attention, symbolic recognition, reasoning, and

simple problem solving within a single concrete learning experience. This interpretation is consistent with previous research linking puzzles with cognitive development, problem solving, symbolic thinking, and creative thinking in early childhood (Mulyana & Nurcahyani, 2022; Nazilah et al., 2022; Alya Azaki Amatullah, Dwi Prasetiyawati Diyah Hariyanti, 2022; Ratna & Imamah, 2023; Bella Herlina Tuty Novia Purba, Adiani Hulu, & Uranus Zamili, 2024; Lusiana & Aziz, 2024; Ahmad Aliyudin, 2023; Asridoni, Karimah, Husna, & Aulia, 2025; Wahyuningsih, Wahyuni, & Siregar, 2023; Anjelita, Nairo, Bai, & Kase, n.d.; Arditama, Wardani, Purwanti, & Hindarto, 2018).

More importantly, the present study indicates that these cognitive experiences are situated within a particular instructional context. The emergence of cognitive behaviors is shaped by the way teachers introduce the activity, the level of challenge presented by the puzzle, children's opportunities to experiment independently, and the availability of time and materials. From the perspective of Vygotsky's sociocultural theory, these findings indicate that cognitive stimulation does not occur solely through interaction with the puzzle as an object, but through children's participation in a socially mediated learning activity in which teacher guidance can support their attempts to solve increasingly challenging tasks. Thus, the study extends the understanding of puzzle-based learning from the puzzle as a medium to the implementation of puzzle-based stimulation as an interaction among the child, material, teacher, and learning environment.

This interpretation has practical implications for early childhood education. Teachers may use puzzles not simply as supplementary play materials but as structured opportunities for cognitive exploration. The selection of puzzle complexity, the questions or prompts provided by teachers, the amount of time given for independent attempts, and opportunities to discuss unsuccessful attempts can influence the quality of children's learning experiences. In this way, the teacher's role is to facilitate children's exploration and provide graduated assistance rather than immediately provide the correct solution. Puzzle activities can therefore be designed as flexible learning experiences that accommodate differences in children's readiness while maintaining the exploratory character of play.

The findings should nevertheless be interpreted within the descriptive qualitative scope of the study. The study does not establish a causal effect or quantify an increase in children's cognitive abilities. Instead, it provides contextual evidence of how cognitive behaviors emerge during puzzle activities and how teacher facilitation and implementation conditions shape those experiences. The contribution of the study therefore lies in explaining

the process of cognitive stimulation through educational puzzles in an actual early childhood classroom context, particularly through the interaction among children's cognitive behaviors, teacher guidance, and contextual factors at RA Nurul Mubtadiin.

CONCLUSION

The use of educational puzzle games at RA Nurul Mubtadiin provides a learning experience that supports the stimulation of cognitive abilities in early childhood. Through activities involving searching for, matching, assembling, and adjusting puzzle pieces, children demonstrate behaviors reflecting learning and problem-solving skills, as well as logical and symbolic thinking. These abilities are evident in the children's actions, such as recognizing symbols, matching shapes and colors, sustaining attention, exploring various alternatives, and solving simple problems, while engaging with the puzzles.

The implementation of these educational puzzle games is supported by the children's enthusiasm, the availability of materials, and teacher guidance. Conversely, factors such as time constraints, the limited quantity of materials, and variations in children's abilities serve as obstacles to the activity's execution. Therefore, the use of puzzles should be tailored to the children's ability levels, the difficulty of the materials, and the learning environment; furthermore, teacher guidance is essential to ensure that the play activities align with the children's needs and developmental characteristics.

AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the development of the research and manuscript, including the research process, interpretation of findings, manuscript preparation, and critical review. All authors approved the final version of the manuscript.

REFERENCES

Ahmad Aliyudin, Y. A. (2023). Al Tahdzib. *Jurnal Pendidikan Islam Anak Usia Dini*, *2*(2), 103–111.

Alya Azaki Amatullah, Dwi Prasetiyawati Diyah Hariyanti, P. (2022). *http://journal.upgris.ac.id/index.php/wp ANALISIS PENGGUNAAN PUZZLE DALAM KEMAMPUAN PEMECAHAN MASALAH ANAK*. *2*(3), 93–100.

Anjelita, M., Nairo, I., Bai, E., & Kase, S. (n.d.). *Multidisciplinary journal*. *2*(1), 43–56.

Arditama, A. Y., Wardani, S., Purwanti, E., & Hindarto, N. (2018). Storybook Influence on

Science Concept Comprehension Through Curiosity of Fifth Grade Elementary School Student. *Journal of Primary Education*, *7*(1), 1–9.

Asridoni, N. S., Karimah, N. A., Husna, M., & Aulia, P. (2025). Arus Jurnal Psikologi dan Pendidikan (AJPP) Pengaruh Permainan Puzzle terhadap Kemampuan Problem Solving Anak Usia 4-6 Tahun. *Arus JurnalPsikologi Dan Pendidikan*, *4*(2). Retrieved from http://jurnal.ardenjaya.com/index.php/ajpphttp://jurnal.ardenjaya.com/index.php/ajpp

Astutik, F. (2024). Sebuah Systematic Literature Review mengenai penerapan Islamic minfullness pada kesehatan mental. *Sebuah Systematic Literature Review …*, *4*(April). https://doi.org/10.55352/bki.v4i1.947

Bella Herlina Tuty Novia Purba, Adiani Hulu, & Uranus Zamili. (2024). Pengaruh Permainan Puzzle terhadap Kemampuan Memecahkan Masalah Anak Usia 5-6 Tahun di PAUD Anakhon Hi Do Hamoraon di Au Kecamatan Parmonangan. *Khirani: Jurnal Pendidikan Anak Usia Dini*, *2*(4), 52–64. https://doi.org/10.47861/khirani.v2i4.1328

Elisten, R., & Ramadhani, A. (2025). *STIMULASI GURU DALAM PERKEMBANGAN KOGNITIF DENGAN ALAT PERMAINAN EDUKATIF PUZZLE PADA ANAK USIA 5-6 ini berlangsung pertumbuhan dan perkembangan yang sangat pesat dan menentukan masa dengan berbagai potensi kecerdasan yang berbeda-beda . Semua anak pada d*. *6*(6), 9781–9791.

Fitri Ghina Lubis, Anggita Deswina Putri, Rezaldy Azhary Irvan, & Nurul Zahriani Jf. (2022). Guru Profesional Sebagai Komunikator dan Fasilitator Pembelajaran Bagi Siswa. *Cendekiawan : Jurnal Pendidikan Dan Studi Keislaman*, *1*(1), 34–38. https://doi.org/10.61253/cendekiawan.v1i1.25

Indah Suci Sapitri. (2024). Hubungan Pembiasaan Shalat Dhuha dengan Akhlak Siswa. *Jurnal Pendidikan Islam Indonesia*.

Kurnietin, D., Tugiyono, T., & Prayogo, M. M. (2025). Peningkatan perkembangan kognitif anak usia dini melalui kegiatan bermain Puzzle di TK Diponegoro 171 Windujaya. *Indonesian Journal of Learning and Educational Studies*, *3*(1), 27–38. https://doi.org/10.62385/ijles.v3i1.193

Lusiana, S. D., & Aziz, T. (2024). Exploration of Algorithms and Heuristics in Puzzle Playing Activities of Early Childhood. *Cakrawala Dini: Jurnal Pendidikan Anak Usia Dini*, *15*(2), 191–202. https://doi.org/10.17509/cd.v15i2.74701

Mulyana, A., & Nurcahyani, N. (2022). The Effect of the Puzzle Playing Method on Improving the Cognitive Development of Children Aged 4-6 Years. *KnE Life Sciences*,

2022, 542–548. https://doi.org/10.18502/kls.v7i2.10354

Mulyawan, G., Kurniawati, D. A., & Sari, M. (2024). *Overview of Fine Motor Skills in Early Childhood*. *1*, 90–94.

NAEYC News. (2014). *5*, 2460.

Nazilah, M. B., Rahmah, M. fadhilah, Aliza, N., & Salianty, S. (2022). The Use of Educational Puzzle Games for the Development of Cognitive Abilities of Children Aged 5-6 Years. *GENIUS Indonesian Journal of Early Childhood Education*, *3*(2), 151–162. https://doi.org/10.35719/gns.v3i2.102

Pandiangan, E. L., & Siregar, T. R. A. (2022). Memajukan Literasi Anak Melalui Strategi Membaca Menyenangkan. *Fusion: Jurnal Pengabdian …*, *1*(1), 45–51. Retrieved from https://jurnal.perima.or.id/index.php/FS/article/view/67

Panjaitan, H., & Hafizzah, F. (2025). *Peran Guru Sebagai Fasilitator dalam Meningkatkan Kualitas Pembelajaran di SDIT Mutiara Ilmu Kuala The Role of Teachers as Facilitators in Improving the Quality of Learning at SDIT Mutiara Ilmu Kuala*. *5*(1), 328–343.

Ratna, S., & Imamah, I. (2023). Kemampuan Problem Solving Anak Usia Dini melalui Bermain Puzzle pada PAUD. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(6), 7913–7924. https://doi.org/10.31004/obsesi.v7i6.5868

Rohmah, U. (2025). Perkembangan dan Pendidikan Kemampuan Kognitif Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *9*(1), 130–138. https://doi.org/10.31004/obsesi.v9i1.5918

Sidiq, A. M., & Fadlillah, A. N. (2023). Permainan Puzzle Dalam Meningkatkan Perkembangan Kognitif Anak Usia Dini 5-6 Tahun. *Jurnal Pendidikan Islam Anak Usia Dini Al-Amin*, *1*(2), 125–132.

Thomeng, Z. (2026). Pemanfaatan Media Puzzle terhadap Peningkatan Kemampuan Kognitif pada Anak Usia 5-6 Tahun. *Takuana: Jurnal Pendidikan, Sains, Dan Humaniora*, *4*(4), 2109–2115. https://doi.org/10.56113/takuana.v4i4.439

Umam, A. K., Rizqiyani, R., Aneka, A., & Cahyo, E. D. (2021). *Berbasis Kajian Teoretis dan Studi Empiris*. 134. Retrieved from https://repository.metrouniv.ac.id/id/eprint/7459/2/Pengembangan Kognitif AUD_AGUSWAN.pdf

Wahyuningsih, S., Wahyuni, S., & Siregar, R. (2023). Pengembangan Motorik Halus Anak Usia Dini melalui Kegiatan Finger Painting. *Jurnal Obsesi : Jurnal Pendidikan Anak*

Usia Dini, *7*(1), 991–1000. https://doi.org/10.31004/obsesi.v7i1.3892

Wardani, P. K. (2026). *The Effectiveness Of Spelling Puzzles On Symbolic Thinking And Early Reading Skills Of Children*. *12*(1), 62–80.

Wijiati, Astutik, W., Hariyanti, W., Palupi, W. D., & Astutik, W. N. (2024). Improving Cognitive Abilities through Puzzle Playing Activities at RA Khadijah Aisyah. *ETNOPEDAGOGI: Jurnal Pendidikan Dan Kebudayaan*, *1*(1), 245–256. https://doi.org/10.62945/etnopedagogi.v1i1.596

Xin, C., Cheng, P., & Liu, G. (2026). The jigsaw puzzle performance of preschoolers and its relationship with inhibitory control. Early Childhood Education Journal [hoặc tên tạp chí chính thức nếu có, dựa trên dữ liệu lưu trữ APA PsycInfo]. doi.org https://link.springer.com/article/10.1007/s10643-025-01853-7