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IMPLEMENTATION OF PLAY-BASED LEARNING NEUROSCIENCE TO IMPROVE LEARNING FOCUS OF 5-6 YEAR OLD CHILDREN AT MUSLIMAT NU 57 WULUHAN

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ABSTRAK

Fokus belajar merupakan aspek penting dalam kesiapan anak usia 5–6 tahun untuk mengikuti proses pembelajaran, tetapi karakteristik perkembangan anak yang aktif dan mudah terdistraksi dapat menjadi tantangan dalam mempertahankan perhatian selama kegiatan kelas. Oleh karena itu, diperlukan pendekatan pembelajaran yang sesuai dengan karakteristik perkembangan anak sekaligus memberikan pengalaman belajar yang aktif dan menyenangkan. Penelitian ini bertujuan untuk mendeskripsikan implementasi *Play-Based Neuroscience Learning* dalam mendukung fokus belajar anak usia 5–6 tahun di TK Muslimat NU 57. Penelitian ini menggunakan pendekatan deskriptif kualitatif dengan desain studi kasus. Subjek penelitian terdiri atas 12 anak Kelompok B berusia 5–6 tahun, dengan tujuh informan pendukung yang terdiri atas satu kepala sekolah, dua guru, dan empat orang tua. Data dikumpulkan melalui observasi kelas, wawancara semi-terstruktur, dan dokumentasi, kemudian dianalisis menggunakan model interaktif yang meliputi reduksi data, penyajian data, serta penarikan dan verifikasi kesimpulan. Hasil penelitian menunjukkan adanya perubahan positif pada fokus belajar anak setelah penerapan pembelajaran yang mengintegrasikan gerakan, musik, warna, stimulasi sensorik, dan permainan kolaboratif. Sebanyak 92% anak mampu mengikuti instruksi guru dengan baik, 83% mampu mempertahankan perhatian selama kegiatan pembelajaran, 83% aktif berpartisipasi, 75% mampu menyelesaikan kegiatan secara mandiri, dan 83% mampu mempertahankan konsentrasi tanpa mudah terdistraksi. Secara keseluruhan, *Play-Based Neuroscience Learning* memberikan pengalaman belajar yang lebih interaktif, menyenangkan, dan sesuai dengan karakteristik perkembangan anak usia dini serta mendukung fokus dan keterlibatan anak dalam pembelajaran.

Kata kunci: pendidikan anak usia dini; pembelajaran berbasis neurosains; pembelajaran berbasis bermain; fokus belajar; keterlibatan siswa.

ABSTRACT

Learning focus is an important aspect of children's readiness to participate in learning activities, yet the active and easily distracted characteristics of children aged 5–6 years can make sustained attention challenging in early childhood classrooms. Therefore, learning approaches that correspond to children's developmental characteristics while providing active and enjoyable experiences are needed. This study aimed to describe the implementation of *Play-Based Neuroscience Learning* in supporting children's learning focus at TK Muslimat NU 57. The study employed a qualitative descriptive approach with a case study design. The participants consisted of 12 children aged 5–6 years in Group B, with seven supporting informants consisting of one school principal, two classroom teachers, and four parents. Data were collected through classroom observations, semi-structured interviews, and documentation and analyzed using an interactive model involving data reduction, data display, and conclusion drawing and verification. The findings indicated positive changes in children's learning focus following the implementation of activities integrating movement, music, colors, sensory stimulation, and collaborative play. Specifically, 92% of the children were able to follow teacher instructions appropriately, 83% were able to maintain attention during learning activities, 83% actively participated, 75% were able to complete activities independently, and 83% were able to maintain concentration without being easily distracted. Overall, *Play-Based Neuroscience Learning* provided

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interactive, enjoyable, and developmentally appropriate learning experiences that supported children's learning focus and engagement in classroom activities.

Keywords: early childhood education; neuroscience learning; play-based learning; learning focus; classroom engagement

INTRODUCTION

Early Childhood Education (ECE) plays a fundamental role in supporting children's holistic development during a period of rapid brain and cognitive development. During early childhood, children's developing brains are highly responsive to environmental experiences and stimulation, making the quality of learning experiences important for supporting cognitive, emotional, social, and behavioral development (Susanti, 2021). Therefore, learning experiences should be carefully designed to correspond with children's developmental characteristics and provide meaningful stimulation that supports their learning potential.

Children aged 5–6 years naturally possess high curiosity, abundant energy, and a strong desire to explore their surroundings through direct experiences. Therefore, learning at the kindergarten level should prioritize active engagement rather than passive knowledge transmission. Educational activities are expected to facilitate cognitive, language, social-emotional, motor, and behavioral development simultaneously through meaningful experiences. Learning environments that encourage exploration, interaction, and enjoyment have been shown to support children's readiness to learn more effectively than conventional teacher-centered approaches.

Despite this developmental perspective, maintaining children's learning focus remains one of the most persistent challenges in early childhood classrooms. Learning focus refers to children's ability to sustain attention, follow instructions, participate actively, and complete learning tasks without being easily distracted. Numerous studies have reported that young children generally exhibit relatively short attention spans due to the ongoing maturation of executive functions responsible for attention regulation and self-control. Nafisah and Syamsudin (2023) explain that concentration is closely associated with children's readiness to receive and process learning information, while Khotimah et al. (2021) demonstrated that appropriate learning media significantly improve children's concentration during classroom activities. Likewise, Ismi et al. (2021) found that simple *ice-breaking* activities can restore children's attention and improve learning concentration.

Recent developments in neuroscience have provided valuable insights into how children's brains process learning experiences. Neuroscience emphasizes that learning becomes more effective when children are emotionally secure, physically active, and exposed to multisensory stimulation. Research by Dian et al. (2022) found that brain games and simple physical exercises significantly enhanced children's concentration compared with conventional instruction. Similarly, Nurdianingtyas and Mukminin (2026) reported that *brain gym* activities improved children's cognitive performance, including attention and concentration. These findings suggest that learning strategies grounded in neuroscience principles can optimize children's readiness to learn by stimulating multiple brain functions simultaneously.

Parallel to neuroscience, play-based learning has consistently been recognized as one of the most appropriate pedagogical approaches for early childhood education. Through play, children naturally develop cognitive abilities, language, creativity, social competence, emotional regulation, and problem-solving skills. Amir et al. (2024) reported that intentional play-based learning enhances children's participation, motivation, and exploration during classroom activities. Likewise, Apriyansyah and Kurniawaty (2022) demonstrated that well-

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designed educational games not only increase engagement but also foster collaboration and higher-order thinking skills. These findings reinforce the view that play is not merely recreational but constitutes an effective instructional medium.

Although neuroscience-based learning and play-based learning have each received considerable attention, previous studies have generally examined these approaches separately. Existing research has predominantly focused on the effectiveness of *brain gym*, sensory stimulation, movement activities, or play-based instruction independently in improving children's cognitive abilities, concentration, or developmental outcomes (Dian et al., 2022; Ashari et al., 2024; Amir et al., 2024). Consequently, limited empirical evidence is available regarding how neuroscience principles can be systematically integrated into comprehensive play-based classroom instruction to improve children's learning focus within authentic early childhood educational settings. Furthermore, most previous studies have employed quantitative or experimental designs emphasizing learning outcomes, while relatively few have explored the implementation process, classroom dynamics, teacher strategies, and children's responses through qualitative inquiry.

This research gap indicates the need for studies that examine not only whether neuroscience-informed play is effective but also how it is implemented in everyday classroom practice and why it contributes to children's learning focus. Understanding the implementation process is essential because the success of an instructional innovation depends not only on the intervention itself but also on how teachers design activities, facilitate interactions, manage children's behavior, and create emotionally supportive learning environments. Such contextual evidence remains relatively limited, particularly in Indonesian early childhood education settings.

The need for this investigation became evident during preliminary observations conducted in Group B at TK Muslimat NU 57. Several children demonstrated difficulties maintaining attention during classroom instruction, frequently becoming distracted by surrounding stimuli, talking during teacher explanations, leaving assigned activities unfinished, and requiring repeated instructions. These observations suggested that existing learning practices had not fully accommodated children's neurological and developmental characteristics, highlighting the necessity of adopting more developmentally appropriate learning approaches.

Building upon these conditions, this study introduces Play-Based Neuroscience Learning as an integrated instructional approach that combines the principles of neuroscience with developmentally appropriate play experiences. Unlike previous studies that investigated neuroscience activities or play-based learning separately, this study explores their integration within regular classroom practice through movement, music, sensory stimulation, collaborative play, and positive emotional interaction designed to optimize children's attention and engagement.

The novelty of this study lies in three aspects. First, it integrates neuroscience principles with play-based pedagogy into a unified classroom learning model specifically designed to improve learning focus among children aged 5–6 years. Second, the study employs a qualitative case study approach to provide an in-depth understanding of the implementation process, teacher strategies, children's behavioral responses, and supporting contextual factors rather than merely measuring learning outcomes. Third, the study incorporates perspectives from multiple stakeholders, including teachers, school principals, parents, classroom observations, and documentation through triangulation, thereby offering a

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more comprehensive understanding of how Play-Based Neuroscience Learning influences children's learning focus both inside and beyond the classroom.

Therefore, this study aims to describe the implementation of Play-Based Neuroscience Learning at TK Muslimat NU 57, examine how neuroscience principles are integrated into play-based classroom activities, and analyze how these learning experiences contribute to improving children's learning focus, engagement, and participation. The findings are expected to contribute both theoretically by enriching the literature on neuroscience-informed early childhood pedagogy and practically by providing an alternative instructional strategy for teachers seeking to create developmentally appropriate and engaging learning environments.

RESEARCH METHOD

This study employed a qualitative approach using a descriptive case study design. A qualitative approach was selected because the research aimed to obtain an in-depth understanding of how *Play-Based Neuroscience Learning* was implemented to support children's learning focus at TK Muslimat NU 57. The descriptive case study design was considered appropriate because it enabled the researcher to examine the learning process and children's responses within their natural classroom context.

The research was conducted at TK Muslimat NU 57 during the second semester of the 2025/2026 academic year, specifically in January 2026. The research subjects consisted of 12 children aged 5–6 years in Group B, comprising six boys and six girls. In addition, seven supporting informants were involved, consisting of one school principal, two classroom teachers, and four parents. These informants were purposively selected because they had direct knowledge of or involvement in children's learning activities and development. The involvement of multiple informants enabled the researcher to obtain information from different perspectives regarding the implementation of *Play-Based Neuroscience Learning* and children's learning focus.

Data were collected through classroom observations, semi-structured interviews, and documentation. Classroom observations were conducted during learning activities to examine children's ability to maintain attention, respond to teacher instructions, participate actively, complete learning activities, and maintain concentration without being easily distracted. Semi-structured interviews were conducted with the school principal, classroom teachers, and parents to explore their experiences and perceptions regarding the implementation of *Play-Based Neuroscience Learning*, the challenges encountered during implementation, and changes observed in children's learning focus. Documentation included daily lesson plans (*Rencana Pelaksanaan Pembelajaran Harian* / RPPH), children's developmental records, photographs of learning activities, learning media, and relevant school documents.

The research instruments were developed based on theories of cognitive development and early childhood learning proposed by Piaget (1964), Vygotsky (1978), and Jensen (2007). The observation instrument focused on five indicators of children's learning focus: (1) the ability to maintain attention during learning activities, (2) the ability to follow teacher instructions appropriately, (3) active participation in learning activities, (4) the ability to complete learning activities independently, and (5) the ability to maintain concentration without being easily distracted. Children's achievement on each indicator was assessed using four developmental categories, namely *Belum Berkembang* (BB), *Mulai Berkembang* (MB), *Berkembang Sesuai Harapan* (BSH), and *Berkembang Sangat Baik* (BSB).

The developmental categories were used to describe the level of children's achievement on each observation indicator. For the presentation of the results, children who

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reached the BSH and BSB categories were classified as having achieved the expected level of development. The percentage of achievement for each indicator was calculated by dividing the number of children who reached the BSH and BSB categories by the total number of children observed (12 children), then multiplying the result by 100%. Thus, the percentage values presented in the results tables represent the proportion of children who demonstrated the expected level of achievement on each learning-focus indicator.

Before data collection, all research instruments underwent expert validation to ensure their relevance, clarity, and alignment with the research objectives. The instruments were reviewed by two experts, consisting of one lecturer specializing in Early Childhood Education and one lecturer specializing in educational research methodology. The validators assessed the observation indicators, interview questions, and documentation format. Suggestions concerning the wording and clarity of the observation indicators and interview questions were incorporated before the instruments were finalized for field use.

To ensure the trustworthiness of the findings, source and method triangulation were applied. Source triangulation was conducted by comparing observational findings concerning children's behavior with information obtained from classroom teachers, the school principal, and parents. Method triangulation was conducted by comparing data obtained from classroom observations, semi-structured interviews, and documentation. Theoretical interpretation was also supported by perspectives from play-based learning, neuroscience-informed learning, cognitive development, and early childhood education. Member checking was conducted by discussing preliminary interpretations with the classroom teachers to confirm the accuracy of the researcher's interpretation of classroom conditions and children's responses.

The research procedure consisted of four stages. The first stage was preparation, which included identifying the research problem, developing the research instruments, validating the instruments, and obtaining research permission from the school. The second stage involved preliminary classroom observation to identify children's learning-focus conditions and understand the existing learning environment. The third stage consisted of data collection through classroom observations, interviews, and documentation during the implementation of *Play-Based Neuroscience Learning*. The fourth stage involved organizing, interpreting, and verifying the collected data before drawing conclusions.

Data were analyzed using the interactive model proposed by Miles and Huberman (2014), consisting of data reduction, data display, and conclusion drawing and verification. During data reduction, information obtained from observations, interviews, and documentation was selected, categorized, and focused on the implementation of *Play-Based Neuroscience Learning* and children's learning focus. The reduced data were then displayed in descriptive narratives, observation summaries, interview findings, and supporting documentation to facilitate the identification of patterns and relationships. Conclusions were drawn throughout the analysis process and continuously verified by comparing information across data sources and collection methods. This analytical process was used to develop an integrated interpretation of how *Play-Based Neuroscience Learning* was implemented and how children's learning focus changed within the research setting.

RESULT AND DISCUSSION

Result

Based on classroom observations, semi-structured interviews, documentation, and developmental observations of 12 children in Group B at TK Muslimat NU 57, the implementation of *Play-Based Neuroscience Learning* was accompanied by positive changes

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in children's learning focus, participation, and engagement during classroom activities. The learning activities integrated movement, music, colors, sensory stimulation, and collaborative play into the daily learning process. The findings below describe the children's initial learning-focus condition, the implementation of the learning activities, and the conditions observed following implementation.

Before the implementation of *Play-Based Neuroscience Learning*, several children experienced difficulties maintaining attention during classroom activities. Some children were easily distracted by classmates, classroom objects, and environmental noise. Others talked while the teacher was explaining, moved from their seats, played with stationery, or left learning activities unfinished. The classroom teacher also reported that these behaviors occurred more frequently when learning activities relied mainly on verbal explanations and repetitive seatwork.

Children's learning focus was observed using five indicators: maintaining attention during learning activities, following teacher instructions appropriately, actively participating in learning activities, completing learning activities independently, and maintaining concentration without being easily distracted. Each indicator was assessed using four developmental categories, namely *Belum Berkembang* (BB), *Mulai Berkembang* (MB), *Berkembang Sesuai Harapan* (BSH), and *Berkembang Sangat Baik* (BSB). For reporting purposes, children who achieved the BSH or BSB category were classified as having reached the expected level of development. The percentage was calculated by dividing the number of children who reached BSH and BSB by the total number of children (12), then multiplying by 100%. The initial observation results are presented in Table 1.

Table 1. Children's Learning Focus Before the Implementation of *Play-Based Neuroscience Learning*

No.	Learning Focus Indicator	Children Reaching BSH/BSB	Percentage
1	Able to maintain attention during learning activities	2	17%
2	Able to follow teacher instructions appropriately	3	25%
3	Actively participated in learning activities	4	33%
4	Able to complete learning activities independently	5	42%
5	Able to maintain concentration without being easily distracted	1	8%

As shown in Table 1, the proportion of children who reached the expected developmental level (BSH/BSB) was relatively low across all five learning-focus indicators. Only two children (17%) were able to maintain attention during learning activities, while three children (25%) were able to follow teacher instructions appropriately. Four children (33%) actively participated in learning activities, and five children (42%) were able to complete learning activities independently. The lowest proportion was found in the ability to maintain concentration without being easily distracted, with only one child (8%) reaching the BSH/BSB level. These observations indicate that most children still required teacher guidance and environmental support to maintain their attention and engagement during learning activities.

To respond to these conditions, the teachers implemented *Play-Based Neuroscience Learning* by integrating movement, music, sensory stimulation, colors, and collaborative games into classroom activities. The learning process was organized into opening, core, and closing activities. During the opening activity, teachers invited children to participate in

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simple *brain gym* movements accompanied by songs. These activities were used to prepare children physically and emotionally before entering the core learning activities.

The core activities involved games that required children to respond to instructions through movement and sensory experiences. One of the activities was *Follow My Color and Movement*, in which children listened to instructions, identified colors, and responded through coordinated body movements. Children were also divided into small groups during selected activities to facilitate interaction and provide more focused teacher guidance. When children began to lose attention, teachers used verbal praise, called children by name, provided gentle prompts, and interacted directly with them to redirect their attention.

Following the implementation of these activities, changes were observed in children's learning focus. The observation results following implementation are presented in Table 2.

Table 2. Children's Learning Focus Following the Implementation of *Play-Based Neuroscience Learning*

No.	Learning Focus Indicator	Children Reaching BSH/BSB	Percentage
1	Able to maintain attention during learning activities	10	83%
2	Able to follow teacher instructions appropriately	11	92%
3	Actively participated in learning activities	10	83%
4	Able to complete learning activities independently	9	75%
5	Able to maintain concentration without being easily distracted	10	83%

Table 2 shows that a higher proportion of children reached the BSH/BSB level across all five learning-focus indicators following the implementation of *Play-Based Neuroscience Learning*. The highest proportion was observed in children's ability to follow teacher instructions, with 11 children (92%) reaching the expected developmental level. Ten children (83%) were able to maintain attention during learning activities, actively participate, and maintain concentration without being easily distracted. Meanwhile, nine children (75%) were able to complete learning activities independently. Compared with the initial observation, the proportion of children reaching BSH/BSB increased on all five indicators.

The observational findings also showed changes in children's classroom behavior. Children appeared more enthusiastic and actively involved during activities that incorporated movement, music, colors, sensory stimulation, and collaborative play. They responded more readily to teacher instructions and participated more consistently in the games. Several children who had previously left activities unfinished remained involved until the activities were completed.

The interview data supported the classroom observations. Teacher 1 explained that children's attention was more easily maintained when learning activities incorporated play, movement, and colorful materials rather than relying primarily on verbal explanations. The teacher stated:

"Children become more focused when they learn through play. If they only sit and listen, they become bored quickly. However, when learning includes movement and colorful games, they become more enthusiastic and attentive."

The school principal also described changes in the classroom atmosphere following the implementation. According to the principal, the activities encouraged teachers to pay greater attention to children's developmental characteristics and to adjust learning activities to

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children's readiness and needs. The principal observed that children were more willing to participate and interacted more positively during classroom activities.

Information obtained from parents also indicated changes in children's learning behavior outside the classroom. Parents reported that some children became more enthusiastic about attending school and appeared more willing to concentrate during activities at home, including drawing, building blocks, and completing simple learning tasks. One parent stated:

"My child now enjoys learning more and is easier to guide during activities at home."

These parental reports were used as supporting information rather than as independent measures of children's learning focus at home.

Documentation further supported the observational and interview findings. The daily lesson plans (*Rencana Pelaksanaan Pembelajaran Harian* / RPPH), photographs of learning activities, children's developmental records, and learning media showed that the learning process included movement activities, collaborative games, sensory exploration, and teacher-child interaction. The documentation also illustrated children's active participation and positive responses during the learning activities. Children's spontaneous expressions, such as *"This game is fun," "I like learning with colors,"* and *"I want to play again,"* reflected their positive emotional responses to the activities.

Overall, the results indicate that following the implementation of *Play-Based Neuroscience Learning*, a larger proportion of children reached the BSH/BSB level on all observed learning-focus indicators. The most notable proportion was found in following teacher instructions (92%), while maintaining attention, active participation, and maintaining concentration without being easily distracted each reached 83%. Independent completion of learning activities reached 75%. These observational findings were supported by teacher, principal, and parent reports, as well as classroom documentation, indicating positive changes in children's attention, participation, and engagement within the research setting.

Discussion

The findings indicate that the implementation of *Play-Based Neuroscience Learning* was accompanied by positive changes in children's learning focus across all five observed indicators. The proportion of children who reached the expected developmental level (BSH/BSB) increased from the initial observation to the observation following implementation. The most notable result was children's ability to follow teacher instructions, which reached 92%, while the indicators of maintaining attention, active participation, and maintaining concentration without being easily distracted each reached 83%. The ability to complete learning activities independently reached 75%. These findings suggest that learning activities designed around children's developmental characteristics may create conditions that support sustained attention and active engagement. However, because this study employed a qualitative case study design, these changes should be interpreted as observed changes within the research context rather than as evidence of a causal effect.

The role of play is particularly relevant in explaining the observed changes. Play transforms learning from an activity in which children primarily listen to the teacher into an experience that requires them to respond, explore, make choices, and interact with others. Through play, attention is maintained through active involvement rather than prolonged verbal instruction. This interpretation is consistent with Amir et al. (2024), who found that play-based learning encourages children's participation, exploration, and involvement in early childhood classrooms. Apriyansyah and Kurniawaty (2022) similarly reported that appropriately designed educational games can support children's engagement and the

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development of competencies through active learning experiences. The present findings extend these observations by showing that play can be combined with movement, sensory stimulation, and positive teacher interaction to create a more engaging learning environment.

Movement-based activities also appeared to play an important role in supporting children's readiness to participate. The opening activities involving simple *brain gym* movements and songs provided opportunities for children to move before engaging in the core learning activities. During the core activities, children were also required to coordinate physical responses with verbal and visual instructions. Dian et al. (2022) reported that brain games and gymnastics were associated with increased concentration among young children. Nurdianingtyas and Mukminin (2026) similarly reported positive changes in children's cognitive abilities following the implementation of *brain gym*. These findings are consistent with the present observation that children responded more readily to instructions and remained involved when learning included structured movement. Nevertheless, the improvement observed in this study cannot be attributed to movement alone because the activities were implemented together with play, music, sensory stimulation, and teacher support.

The integration of music and visual stimuli, particularly colors, also appeared to provide meaningful cues that helped children remain involved in the activities. In the *Follow My Color and Movement* activity, children were required to listen to instructions, recognize colors, and respond through coordinated movements. This combination required children to attend to auditory and visual information while simultaneously performing a physical response. Fitri and Nurhafizah (2023) found that movement-and-song activities can support children's participation and social-emotional development. In the present study, music was similarly used as part of an interactive learning sequence rather than as an isolated activity. The use of colors and songs may therefore have helped make learning instructions more concrete and engaging for children.

Multisensory stimulation further strengthened the experiential characteristics of the learning process. Children were exposed to movement, sound, color, physical interaction, and social experiences within the same learning activities. Such variation provided multiple opportunities for children to interact with learning content and reduced reliance on prolonged verbal explanation. Susanti (2021) emphasizes the importance of considering children's brain development when designing early childhood learning, while Ashari et al. (2024) highlight the relevance of sensory stimulation, movement, emotional experiences, and social interaction in neuroscience-based early childhood learning. The present study supports this perspective by illustrating how these elements can be integrated into regular classroom activities. However, the study does not establish which specific sensory component contributed most strongly to the observed changes in learning focus.

The findings also highlight the importance of teacher responsiveness in the implementation of *Play-Based Neuroscience Learning*. The activities did not automatically maintain children's attention merely because they involved games or movement. Teachers continuously observed children's behavioral responses and intervened when attention began to decline. Verbal praise, calling children by name, providing gentle prompts, and interacting directly with children were used to redirect attention without creating pressure. This indicates that the implementation of neuroscience-informed play requires active teacher facilitation. The teacher's ability to recognize children's behavioral signals and adjust activities accordingly may be an important contextual factor in maintaining children's engagement.

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The use of small-group activities also contributed to children's opportunities for social interaction. Children were required to observe peers, follow shared rules, communicate, and coordinate their actions. These interactions created social reasons for children to remain involved in the activity while simultaneously providing opportunities to practice self-regulation. Prihatiningsih et al. (2025) reported that social interaction and peer relationships are associated with children's development through *play-based learning*. The present findings complement this perspective by indicating that collaborative play can support learning focus through both task engagement and social participation. Thus, children's attention in play-based learning should not be viewed solely as an individual cognitive process but also as a behavior shaped by interaction with peers and teachers.

The reports from parents provide additional contextual information regarding children's responses to learning. Some parents reported that children appeared more enthusiastic about learning and were easier to guide during activities at home. These reports suggest that positive classroom experiences may have been reflected in children's attitudes toward other learning activities. Nevertheless, these findings should be interpreted cautiously because the study did not systematically observe or measure children's behavior at home before and after implementation. Therefore, parental reports serve as supporting evidence rather than as evidence that the classroom intervention caused changes in children's behavior outside school.

The findings have implications for early childhood teaching practice. Teachers may consider designing learning activities that alternate short periods of instruction with movement, sensory exploration, music, and collaborative play. Such an approach can provide children with varied opportunities to direct and sustain their attention while meeting their developmental need for physical activity and social interaction. The findings also indicate that the implementation should remain flexible. Teachers need to observe children's responses and modify the duration, grouping, instructions, or level of stimulation when children begin to lose focus. Therefore, *Play-Based Neuroscience Learning* should not be interpreted simply as the use of *brain gym* or particular educational games, but as an approach that integrates developmentally appropriate play, multisensory experiences, emotional support, and responsive teacher facilitation.

From a theoretical perspective, the findings contribute to the discussion of neuroscience-informed early childhood pedagogy by illustrating how neuroscience principles can be incorporated into play-based classroom practice. Previous studies have examined brain games, physical activities, sensory stimulation, or play-based learning as relatively distinct approaches (Dian et al., 2022; Amir et al., 2024; Ashari et al., 2024). In contrast, the present study describes the integration of these elements within regular classroom activities and examines children's responses through a qualitative case study. The contribution of the study therefore lies primarily in providing contextual evidence of implementation, including teacher strategies, children's behavioral responses, peer interaction, and the role of the learning environment.

The findings should nevertheless be interpreted in light of several limitations. The study involved only 12 children in one kindergarten and was conducted within a specific classroom context. The findings were derived primarily from qualitative observations, interviews, and documentation, with percentages used as descriptive supporting information rather than inferential statistical evidence. In addition, the study did not employ a control group or a standardized measure of attention. Therefore, the observed changes cannot be generalized to other early childhood settings or interpreted as definitive evidence of the causal

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effectiveness of *Play-Based Neuroscience Learning*. Future research should involve multiple early childhood education institutions, larger and more diverse samples, and quantitative or mixed-method designs. Comparative research could also examine the relative contribution of movement, music, sensory stimulation, collaborative play, and teacher interaction to children's sustained learning focus.

CONCLUSION

This study indicates that the implementation of *Play-Based Neuroscience Learning* was accompanied by positive changes in the learning focus of children aged 5–6 years at TK Muslimat NU 57. The integration of movement, music, colors, sensory stimulation, and collaborative play provided interactive and developmentally appropriate learning experiences that supported children's ability to maintain attention, follow teacher instructions, participate actively, complete learning activities, and maintain concentration without being easily distracted. The observed proportion of children reaching the BSH/BSB level increased across all five learning-focus indicators, with the highest achievement observed in following teacher instructions (92%), followed by maintaining attention, active participation, and maintaining concentration without being easily distracted (83% each), while independent completion of learning activities reached 75%.

The findings also highlight the importance of responsive teacher facilitation in implementing *Play-Based Neuroscience Learning*. Teacher support through positive reinforcement, direct interaction, flexible grouping, and adjustment of activities according to children's responses contributed to an engaging and emotionally supportive learning environment. However, because this study involved only 12 children in one kindergarten and employed a qualitative case study design, the findings represent observed changes within the specific research context and cannot be interpreted as causal or generalized evidence. Future research is recommended to involve larger and more diverse samples across multiple early childhood education institutions and to employ quantitative or mixed-method approaches to examine the contribution of specific components of *Play-Based Neuroscience Learning* to children's sustained learning focus.

REFERENCES

Amaliah, A. R., Marzuki, K., & Ilyas, S. N. (2024). Pengaruh penerapan bermain sains terhadap kemampuan klasifikasi dan berpikir kritis pada anak usia 5–6 tahun. *Golden Age: Jurnal Pendidikan Anak Usia Dini, 8*(1), 117–128. https://garuda.kemdiktisaintek.go.id/documents/detail/4417321

Amir, I., Rohmadheny, P. S., Purnama, S., Rosada, U. D., & Maharani, E. A. (2024). Play-based learning in practice: An exploration of early childhood education teacher's experiences in Yogyakarta. *Journal of Early Childhood Care and Education, 7*(2), 77–95. https://doi.org/10.26555/jecce.v7i2.10948

Apriyansyah, C., & Kurniawaty, L. (2022). Pengembangan model permainan berbasis barang bekas untuk membangun kompetensi abad 21 pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 6837–6849. https://doi.org/10.31004/obsesi.v6i6.3446

Ashari, N., Palintan, T. A., & Annisa, P. (2024). Neuroscience-based learning model in early childhood education. *Atfaluna: Journal of Islamic Early Childhood Education, 7*(2). https://doi.org/10.32505/atfaluna.v7i2.8491

https://doi.org/10.51878/learning.v6i3.14380

Aulia, D., & Sudaryanti, S. (2023). Peran permainan tradisional dalam meningkatkan sosial emosional anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(4), 4565–4574. https://doi.org/10.31004/obsesi.v7i4.4056

Dian, D., Mediani, H. H., & Minnatillah, M. (2022). Brain games and gymnastics on increasing concentration power of early childhood. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 5615–5620. https://doi.org/10.31004/obsesi.v6i6.2487

Dzakkiyah, A. A., Sundari, N., & Mashudi, E. A. (2026). Penggunaan *executive function skills* anak usia dini dalam permainan tradisional engklek: Studi deskriptif. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 10*(1), 447–458. https://doi.org/10.31004/obsesi.v10i1.8039

Fitri, Y. M., & Nurhafizah, N. (2023). Analisis metode gerak dan lagu terhadap perkembangan sosial dan emosional anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(3), 2987–2998. https://doi.org/10.31004/obsesi.v7i3.3350

Harianja, A. L., Siregar, R., & Lubis, J. N. (2023). Upaya meningkatkan perkembangan sosial emosional anak usia dini melalui bermain peran. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(4), 4871–4880. https://doi.org/10.31004/obsesi.v7i4.5159

Imanulhaq, R., & Ichsan, I. (2022). Analisis teori perkembangan kognitif Piaget pada tahap anak usia operasional konkret 7–12 tahun sebagai dasar kebutuhan media pembelajaran. *Waniambey: Journal of Islamic Education, 3*(2), 126–134. https://doi.org/10.53837/waniambey.v3i2.174

Indartiningsih, D., Nursalim, M., & Rahmasari, D. (2023). Kemampuan berpikir kritis matematis dengan *brain based learning*: Systematic literature review. *Transformasi: Jurnal Pendidikan Matematika dan Matematika, 7*(2), 183–198. https://doi.org/10.36526/tr.v7i2.3243

Ismi, A. D., Hariyanti, D. P. D., & Khasanah, I. (2021). Pengaruh penggunaan *ice breaking* terhadap konsentrasi belajar anak usia dini. *Wawasan Pendidikan, 1*(2), 197–203. https://doi.org/10.26877/wp.v1i2.8640

Jensen, E. (2007). *Introduction to brain-compatible learning* (2nd ed.). Corwin.

Khotimah, S. H., Sunaryati, T., & Suhartini, S. (2021). Penerapan media gambar sebagai upaya dalam peningkatan konsentrasi belajar anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 5*(1), 676–685. https://doi.org/10.31004/obsesi.v5i1.683

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.

Nafisah, N. Z., & Syamsudin, A. (2023). Perbedaan tingkat konsentrasi dalam penyelesaian puzzle oleh anak usia 3–4 tahun antara yang merangkak dan tidak merangkak. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(2), 2518–2527. https://doi.org/10.31004/obsesi.v7i2.4322

Nurdianingtyas, A., & Mukminin, A. (2026). Implementasi *brain gym* untuk meningkatkan kemampuan kognitif pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 10*(3), 1855–1864. https://doi.org/10.31004/obsesi.v10i3.8353

Piaget, J. (1964). Part I: Cognitive development in children: Piaget development and learning. *Journal of Research in Science Teaching, 2*(3), 176–186. https://doi.org/10.1002/tea.3660020306

Prihatiningsih, M. I., Apriyansyah, C., Priyanti, N., Sukatmi, S., & Ismail, M. (2025). Hubungan antara interaksi sosial, teman sebaya, dan perkembangan bahasa anak melalui *play-based learning*. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 9*(5), 2251–2262. https://doi.org/10.31004/obsesi.v9i5.7508

https://doi.org/10.51878/learning.v6i3.14380

Rahmatia, R., Pajarianto, H., Kadir, A., Ulpi, W., & Yusuf, M. (2021). Pengembangan model bermain konstruktif dengan media balok untuk meningkatkan visual-spasial anak. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini,* *6*(1), 45–55. https://doi.org/10.31004/obsesi.v6i1.1185

Rismawati, R. (2025). Manajemen pembelajaran berbasis metode eksperimen untuk meningkatkan kemampuan berpikir kritis anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini,* *9*(6), 3157–3164. https://doi.org/10.31004/obsesi.v9i6.7350

Susanti, S. E. (2021). Pembelajaran anak usia dini dalam kajian neurosains. *TRILOGI: Jurnal Ilmu Teknologi, Kesehatan, dan Humaniora,* *2*(1), 53–60. https://doi.org/10.33650/trilogi.v2i1.2785

Vygotsky, L. S. (1978). *Mind in society: Development of higher psychological processes*. Harvard University Press.

https://doi.org/10.51878/learning.v6i3.14380