Improving Early Childhood Cognitive Abilities Through Brain Gymnastics Activities at ABA Kartini Kindergarten, Binjai Kota District

Nurul khodijah, Asmidar Parapat, Zannatunnisya

Abstract

This research aims to improve early childhood cognitive abilities through the application of brain gym activities at ABA Kartini Kindergarten, Binjai Kota District. Based on the results of initial observations, most of the children of group B have low cognitive development, namely 30% have not developed and 40% have begun to develop. This condition shows the need for a learning strategy that is able to stimulate the balance of right and left brain functions so that children can think actively, creatively, and focus. The study used the Kemmis and McTaggart spiral model Class Action Research (PTK) approach with four stages: planning, action, observation, and reflection. The study subjects consisted of 20 children aged 5–6 years (11 boys and 9 girls). Data was collected through observation, interviews, and documentation, then analyzed quantitatively using the percentage of learning completeness and qualitatively through the description of the observation results. The results showed that there was an increase in children's cognitive abilities from pre-cycle by 30%, to 55% in cycle I, and increased again to 90% in cycle II after the application of brain gymnastics activities.

Keywords: Cognitive Ability, Early Childhood, Brain Gymnastics, Brain Gym, PTK.

Nurul khodijah[1]
[1]Islamic Religion & Humanities Study Program, Universitas Pembangunan Panca Budi, Indonesia
e-mail: nurulkhodijah64@gmail.com[1]

Asmidar Parapat[2], Zannatunnisya[3]
[2,3]Master of Islamic Religion & Humanities, Universitas Pembangunan Panca Budi, Indonesia
e-mail: asmidarfarapat1992@gmail.com[2], jannatun@dosen.ancabudi.ac.id[3]
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Introduction

Early Childhood Education (PAUD) is a non-formal service organized by the government as stated in Law No. 20 of 2003 concerning the National Education System Article 1 Paragraph 14. In the regulation, it is explained that Early Childhood Education is an effort to foster early childhood through the provision of stimulation to help physical and spiritual growth and development so that they are ready to enter the basic level (Scarlet & Scarlett, 2025). In this context, the implementation of PAUD does not only focus on the academic aspect, but also includes the development of the entire potential of the child as a whole, including cognitive development (Parapat, Efiawati, et al., 2021).

Early childhood cognitive development is an important basis for learning readiness at the next level of education. One of the efforts that can be made to stimulate this aspect is through brain gymnastics activities, because these activities have been proven to be able to train concentration, coordination, logical thinking skills, and problem-solving skills. Children aged 5–6 years are expected to show improved cognitive abilities in accordance with the indicators of developmental achievement in the Permendikbud PAUD, in line with Piaget's theory of cognitive development which emphasizes the importance of active stimulation through physical activity and direct experience (Vriegde & Pudyaningtyas, 2020).

In line with this, early childhood development as a whole includes six main aspects that need to be stimulated, namely the moral aspects and values of religion, cognitive, physical, motor, language, social-emotional, and art. The development of these six aspects plays an important role in preparing children for the next level of education. One of the aspects that is the main focus is cognitive development, as stated in the Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 137 of 2014 concerning National Standards for Early Childhood Education, which divides it into three main stages: learning and problem solving, logical thinking, and symbolic thinking. Cognitive development is closely related to the brain's function in understanding, reasoning, acquiring knowledge, and developing understanding (Susanto, 2017).

The reality in the field shows that there are still many indicators of children's cognitive development that have not developed optimally. This can be seen from the low ability of children to concentrate, be independent, creative, and confident. This condition also occurs in children at ABA Kartini Binjai Kota Kindergarten based on the results of the initial ability test. Therefore, learning efforts are needed that can stimulate brain function in a balanced manner, one of which is through brain gymnastics activities to support the optimization of early childhood cognitive development.

Table 1. Initial Ability Test

Categories	Number of Children	Percentage (%)
Not Yet Developed (BB)	6	30%
Start Growing (MB)	8	40%
Growing Up With Expectations (BSH)	5	25%
Very Well Developed (BSB)	1	5%
Total	**20**	**100%**

Source: Data processed by researchers, 2025

Based on Table 1 regarding the results of the initial ability test of children in group B of Kindergarten AB Kartini, Binjai Kota District, it can be seen that of the 20 children who were the subjects of the study, most of the children's cognitive abilities were still relatively low. This can be seen from 6 children (30%) who are in the *Undeveloped (BB)* category and 8 children (40%) who are in the *Starting Developing (MB)* category. Meanwhile, only 5 children (25%) have reached the *Developing as Expected (BSH)* category and 1 child (5%) has been in the *Very Good Developing (BSB) category*.

The data shows that more than half of children (70%) are still in the category of low cognitive development, which indicates that children are not able to think optimally in recognizing concepts, remembering, grouping, and solving simple problems according to their developmental stages. This condition is suspected to be caused by learning methods that are still monotonous and lack of active stimulation for the child's brain. Therefore, efforts are needed to improve cognitive abilities through fun, interactive, and stimulating right and left brain coordination, one of which is through the application of brain *gyms* as an alternative learning strategy at ABA Kartini Kindergarten, Binjai Kota District.

Brain gymnastics is one of the relaxation techniques in teaching *(indoor or outdoor)* by doing healthy, natural and simple movements to face tensions and challenges in oneself and others in delivering the message of lessons in order to achieve the expected goals (Astuti, 2017).

Furthermore, brain gymnastics is a series of movements that aim to unite the mind and body as part of kinesiology education, which is the science that studies the relationship between body movements, muscles, and brain function. This activity is important for children's cognitive development because it can increase concentration and balance left and right brain function. Good concentration skills help children solve problems and keep their minds focused from various distractions that may be experienced (Susanto, 2017).

Through *Brain Gym*, children are trained to be calmer and focused, so that they are better able to absorb information and communicate. Because by using brain exercises, children will train all parts of their body so that they feel relaxed and ready to learn again. Because through brain exercises, children can be better prepared to receive new learning materials, improve their short-term memory, ability to concentrate, improve communication skills and control their emotions. These movements facilitate learning and are especially beneficial for learning abilities (Balqisty et al., 2025).

Based on the description above, the researcher tried and applied brain gym activities which are a series of exercises based on simple body movements to stimulate the right brain, left brain and all parts of the brain that are very closely related to children's cognitive development. Researchers are interested in conducting research on improving early childhood cognitive abilities with brain gymnastics activities at Aba Kartini Binjai Kota Kindergarten.

Based on this, this study is entitled "Improving Early Childhood Cognitive Ability Through Brain Gymnastics Activities at ABA Kartini Kindergarten, Binjai Kota District." The formulation of the problem in this study is how brain gymnastics activities can improve early childhood cognitive abilities in ABA Kartini Kindergarten, Binjai Kota District. The purpose of this study is to find out and analyze the improvement of early childhood cognitive abilities through the application of brain gymnastics activities at the institution.

Literature Review

2.1. Cognitive Abilities of Children Aged 5-6 Years

Early childhood is a group of children who are in a unique process of growth and development, meaning they have growth and developmental patterns (fine and gross motor coordination), intelligence

(thinking, creativity, emotional intelligence, and spiritual intelligence), social-emotional (attitudes and behaviors as well as religion), language, and communication that are specific to the child's growth and development level(Munisa, 2020).

Capabilities Cognitive is an internal process that occurs in the central nervous system when individuals think and process information. According to Marinda, (2020) Cognitive is a mental activity that involves understanding, reasoning, and decision-making. In addition, cognitive can be interpreted as an individual's ability to connect, assess, and consider an event or event. The process of learning and the emergence of ideas are manifestations of cognitive activity that are closely related to the level of individual intelligence (Rozana et al., 2019).

Further, Susanto, (2017) explains that cognitive abilities are related to the way individuals act and solve the problems they face. Thus, cognitive development is the result of thinking

activities that occur in the brain. The early childhood mind has been active since birth and develops rapidly along with physical growth and a stimulating environment. The age period of 0–8 years is known as the golden age (*Golden Age*), in which the child's brain development takes place very quickly and determines cognitive abilities in the next period (Parapat, Munisa, Nofianti, et al., 2023).

Based on the Regulation of the Minister of National Education Number 58 of 2009, aspects of children's cognitive development include general knowledge and science skills. The two indicators that are the focus of this research are (1) the ability to classify objects based on function, and (2) the ability to solve simple problems in daily life.

According to Piaget's theory of cognitive development, children aged 5–6 years are at the stage of *Pre-Operational*, which is the time when the child begins to use symbols such as language, pictures, or pretend games to represent objects or events (Parapat, Munisa, & Novianti, 2023). At this stage, the child begins to develop the ability to distinguish and classify objects based on color, shape, size, and function; understand the concept of cause-effect; as well as recognizing numerical symbols and simple counting. In addition, children are also able to remember information for a certain period of time, understand sequential instructions, and show a high curiosity about the surrounding environment.

Based on the description of the theory, it can be concluded that the cognitive development of children aged 5–6 years is an important phase in forming the basis of symbolic thinking, understanding basic concepts, and the ability to solve simple problems. This process does not develop automatically, but is strongly influenced by experience and stimulation from the environment, both at home and at school (Parapat et al., 2021) Therefore, educators and parents play an important role in providing a learning experience that is varied, fun, and appropriate to the child's developmental stage so that their thinking skills develop optimally.

2.2. Brain Gymnastics or Brain Gym

The brain is the center of the mind. Emotions, concentration, and all the stress conditions that occur in a person can come from the balance of the brain. According to Prasetya (2013:32) The brain is the only organ of the human body that is always active, aka never sleeping. As Dennison (in Citra and Margaretha, 2013:5) states that: *"Brain Gym"* is a series of simple and fun movements used by the disciples *Education Kinesiology* (Edu-K) to improve their learning ability by using the whole brain.

Movements in brain gymnastics are made to stimulate the left and right brains (laterality dimension), relax the back of the brain and the front of the brain (the focusing dimension), and stimulate the systems related to feelings or emotions, namely the midbrain (limbis) and the cerebrum (concentration dimension).

According to brain gymnast Dennison (in Muhammad, 2013: 31) "movements in brain gymnastics can produce stimuli that can improve cognitive abilities (alertness, concentration, speed, perception, learning, memory, problem-solving, and creativity)". Because stimulus for early childhood is very important to maximize brain intelligence and connect between brain nerve cells *(synapse).* So it's important to know that *synapses* In early childhood it is very easy to form and also easily disappear depending on the attitude of the people around him.

In addition, brain gymnastics also harmonizes the ability to be active and think at the same time, optimizes the function of the five senses, improves balance or harmonization between emotional control and logic, and maintains flexibility and balance of the body. So that the goal of developing aspects in the teaching and learning process is achieved, because of the increase in the child's brain work after stimulation is given. Brain gymnastics activities function as a stimulus that can be done before the start of learning, in the middle of learning when the child starts to get bored and also when the learning has finished as a stretch of the child's brain. Because when children start to feel bored, there will be a decrease in the brain's ability to work. According to brain gymnast Dennison (in Muhammad, 2013: 31), movement in brain

gymnastics can produce stimuli that can improve cognitive abilities (alertness, concentration, speed, perception, learning, memory, problem-solving, and creativity).

Here are some of the applications of the benefits of brain gymnastics (Muhammad, 2013:58), namely, developing reading skills, developing mathematical skills, developing writing intelligence, increasing concentration during exams, developing whole-body coordination, improving language and memory skills, activating the brain in three dimensions, increasing hearing acuity and as a therapy for disorders in children.

The Relationship of Brain Gyms with Cognitive Development Brain gymnastics or brain gym is a series of simple movements designed to optimize brain function through physical and mental stimulation. According to Dennison (in Muhammad, 2013), movement in brain gymnastics can produce stimuli that improve cognitive abilities, such as alertness, concentration, speed of thought, perception, memory, problem-solving, and creativity. In children aged 5-6 years, this period is known as the golden age, during which the brain develops very quickly and is responsive to stimulation. By performing brain exercise movements, children are not only trained to move, but also learn to focus attention, coordinate gestures with the mind, and integrate left and right brain functions. This activity helps improve children's ability to think logically, understand concepts, recall information, and solve simple problems that are important indicators of cognitive development. Brain gymnastics is also useful for preparing children to be calmer, focused, and ready to receive learning materials, so that it has a positive impact on their learning success.

Based on the theoretical studies that have been presented, the researcher draws the conclusion that brain gymnastics has an important role in supporting the cognitive development of children aged 5-6 years. Through a series of simple and fun movements, children gain stimulation that helps improve concentration, memory, thinking speed, and problem-solving skills. This activity not only strengthens the function of the left and right brains, but also helps children to be better prepared in facing the learning process that demands attention and understanding of concepts. Therefore, brain gymnastics can be used as an effective stimulation alternative in supporting the achievement of early childhood cognitive development indicators optimally.

Research Methodology

The research was carried out at ABA Kartini Kindergarten, Binjai Kota District in the odd semester of the 2024/2025 school year with 20 subjects of group B (11 boys and 9 girls). The research was conducted in two cycles, each consisting of two meetings.

This study uses the Kemmis and McTaggart spiral Class Action Research (PTK) model which consists of four stages, namely planning, implementation of actions, observation, and reflection. In the planning stage, the researcher prepares a learning plan, media, and observation instruments. The stage of implementing actions is carried out by applying brain gymnastics activities in the teaching and learning process. Furthermore, at the observation stage, researchers and observers recorded the development of children's cognitive abilities during the activity. The last stage is reflection, where the results of observations are analyzed to determine the success of the action and become the basis for improvement in the next cycle. This research was carried out in two cycles, and each cycle consisted of two meetings.

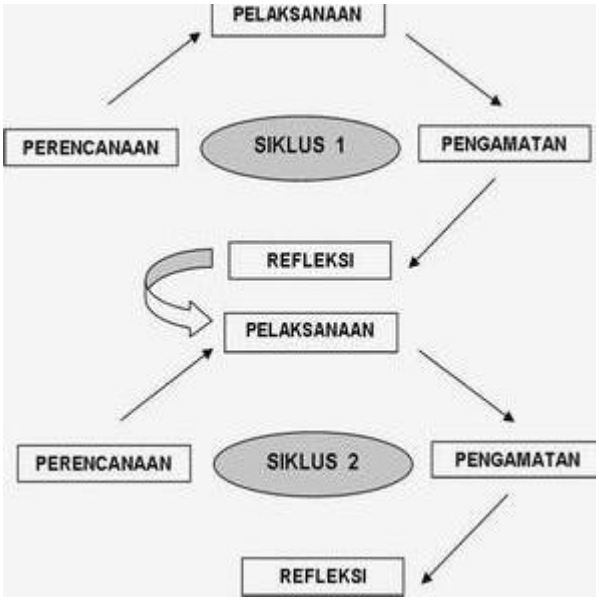

Figure 1. Research Cycle

The research instruments included observation sheets, field notes, documentation, and interviews. Observations were used to assess children's activities and cognitive development, field notes to record learning dynamics, documentation in the form of photos and videos as supporting data, while interviews with classroom teachers and principals were conducted to obtain additional information about children's responses and the effectiveness of activities.

Data analysis was carried out quantitatively using the technique of percentage of learning completeness based on the categories of BB, MB, BSH, and BSB, as well as qualitatively through reduction, presentation, and drawing conclusions from the results of observations, interviews, and field notes. Theassessment criteria are as follows:

1. Not Developed (BB): Children are said to be not yet developed if the value obtained is in the range of 0%–25%.
2. Begin to Develop (MB): Children are said to begin to develop if the score obtained is in the range of 25.1%–50%.
3. Developing as Expected (BSH): Children are said to develop according to expectations if the scores obtained are in the range of 50.1%–75%.
4. Very Good Development (BSB): Children are said to develop very well if the score obtained is in the range of 75.1%–100%.

The design of this method is expected to be able to provide a comprehensive picture of the effectiveness of brain gymnastics in improving children's cognitive abilities, as well as enriching innovative learning strategies in early childhood education.

Results

4.1 Research Results

This class action research was carried out in two cycles with two meetings in each cycle. The subjects of the study were 20 children of group B at ABA Kartini Kindergarten, Binjai Kota District, consisting of 11 boys and 9 girls. The main purpose of this study is to determine the improvement of children's cognitive abilities through the application of brain gymnastics activities. The results of the study showed that there was an increase in children's cognitive abilities in each cycle after the application of brain gymnastics activities in the learning process.

Table 2. Percentage of Child Cognitive Ability Development Each Cycle

Categories Development	Pre-Cycle	Cycle I	Cycle II
Not Yet Developed (BB)	30% (6 children)	15% (3 children)	0% (0 children)
Start Growing (MB)	40% (8 children)	30% (6 children)	10% (2 children)
Growing Up With Expectations (BSH)	25% (5 children)	40% (8 children)	45% (9 children)
Very Well Developed (BSB)	5% (1 child)	15% (3 children)	45% (9 children)

Learning Completeness: Pre-Cycle 30% | Cycle I 55% | Cycle II 90%
Source: Data processed by researchers, 2025

Table 3. Recapitulation of Improving Learning Completeness Each Cycle

Cycles	Completion Percentage	Improvement from Previous Cycle
Pre-Cycle	30%	–
Cycle I	55%	+25%
Cycle II	90%	+35%

Source: Data processed by researchers, 2025

4.2 Discussion

The results of the study show that the application of brain gymnastics activities has a positive effect on improving cognitive abilities in early childhood. Brain exercises help children balance left and right brain function, making it easier for them to think logically, remember information, and solve simple problems. In cycle I, some children still have difficulty following movement instructions and understanding the relationship between physical activity and learning. However, after improvements were made in cycle II, children became more active, focused, and enthusiastic in participating in learning activities. This improvement in cognitive ability occurs because brain gymnastics activities provide a fun and interactive learning experience. Children are not only physically mobile, but also stimulated to think, coordinate, and develop focus and concentration. This is in line with the opinion of Dennison (in Muhammad, 2013) who states that movement in brain gymnastics can improve alertness, concentration, memory, and creativity. This research also supports the results of studies by Astuti (2017) and Balqisty et al. (2025) which found that brain gymnastics activities are able to improve children's focus and logical thinking skills. Thus, the application of brain gymnastics at ABA Kartini Kindergarten provides tangible results in improving children's cognitive abilities, both in the ability to group objects based on functions and the ability to solve simple problems in daily life.

Conclusions

Based on the results of the research that has been carried out through two cycles of action, it can be concluded that the application of brain gym activities can improve the cognitive abilities of early childhood at ABA Kartini Kindergarten, Binjai Kota District. This is evidenced by an increase in learning completeness from 30% in the pre-cycle, to 55% in the first cycle, and to 90% in the second cycle. Brain gymnastics activities have been proven to be able to stimulate the balance of right and left brain functions, improve concentration, memory, and logical thinking skills of children.

Based on the results of this study, it is recommended to PAUD educators to be able to implement brain gymnastics activities routinely before and during the learning process. This activity can be used as a fun and effective learning strategy to stimulate children's cognitive development. In addition, it is hoped that further research can examine the influence of brain

gymnastics on other developmental aspects such as language, social-emotional, and motor in early childhood.

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