



Build Early Childhood Mathematical Logic Intelligence (AUD) with ScaffoldingAt the Beam Center at the Al-Falah School, Ciracas, East Jakarta

Zukhairina ¹, Sri Hadayati ², Rita Zubaidah ³, Schunk Yingxiang ⁴

¹ Asosiasi Pelatih Paud Indonesia Jambi, Indonesia

² Warung Informasi Konservasi Jambi, Indonesia

³ Sekolah Tinggi Agama Islam Mamba'ul Ulum, Indonesia

⁴ University of Warwick, United Kingdom

Corresponding Author: Zukhairina, E-mail: dr.rina111@gmail.com

Received: June 01, 2022

Revised: June 04, 2022

Accepted: June 08, 2022

Online: June 08, 2022

ABSTRACT

the purpose of this research is to describe the experience of Al-Falah school in Jakarta in building mathematical logic intelligence through beam centers using scaffolding. The research was conducted using a qualitative descriptive research approach, this is intended to be able to reveal empirical facts in a natural way, and to reveal something behind every event (some things beyond) in building mathematical logic intelligence, and throughout a series of learning activities for Early Childhood Education in Indonesia. Al-Falah school in a more focused and in-depth manner. The findings of the study stated that the use of scaffolding by teachers during the learning process at the beam center strongly supports the development of children's mathematical logic, this is evidenced by the increasing stage of children's playing with blocks and how children can solve their own problems while playing.

Keywords: Beam Center, Intelligenc, Mathematical Logic

Journal Homepage <https://ejournal.iainbatanghari.ac.id/index.php/attasyrih/index>

This is an open access article under the CC BY SA license

<https://creativecommons.org/licenses/by-sa/4.0/>

How to cite: Zukhairina, Zukhairina., Hadayati, S., Zubaidah, I., R. (2022). Build Early Childhood Mathematical Logic Intelligence (AUD) WithscaffoldingAt the Beam Center at the Al-Falah School, Ciracas, East Jakarta. *At-Tasyrih: Jurnal Pendidikan dan Hukum Islam*, 8(1), 32-50. <https://doi.org/10.55849/attasyrih.v8i1.105>

Published by: Pusat Penelitian dan Pengabdian Masyarakat, Institut Agama Islam Nusantara Batang Hari

INTRODUCTION

The school is one of the parties involved in education matters, apart from the family and the community or the environment. In fact, sometimes the role of the school becomes very important for human education (Nadya et al., 2022). Schools carry out educational tasks, namely realizing the goals to be achieved as stated in the 1945 Constitution, and participating in taking on general responsibility in preparing children with character and building a more advanced generation.

PEarly Childhood Education (PAUD) is directed at facilitating healthy and optimal child growth and development in accordance with the values (Rohmalimna et al., 2022), norms and expectations of society. This education is carried out through the provision of rich and maximum experience and stimulation (Rahmah et al., 2022). Therefore, a

conducive environment is needed for the growth and development of children. Providing conducive educational stimuli for early childhood can be carried out effectively with the help of educational institutions that provide playground services for children as pre-primary education parks.

Play is a necessity and as an important activity kids do. By playing, children will gain experience and knowledge (Dianovi et al., 2022). Remembering that the world of children is the world of play, through play children get lessons that contain aspects of language, cognitive, social, emotional and physical development (Najeed et al., 2022). Through playing activities with various forms of play, children are stimulated to develop in general, both in the development of thinking, emotion, and social.

After World War I, there were three well-known theories of play, namely:

First, a psychoanalytic theory that sees children's play as an important tool for releasing their emotions and for developing a child's sense of self-esteem when children can control their bodies, objects and a number of social skills. This theory was developed by Sigmund Freud and Erik Erikson (Nopiana et al., 2022). Second, Cognitive Development Theory which examines play activities in relation to intellectual development. Jean Piaget (1929) held the view that every human being has a pattern of cognitive structure, both physically and mentally, that underlies the behavior and activity of one's intelligence and is closely related to the stages of child growth. He argues that intellectual (cognitive) and affective always go hand in hand like a coin. This theory believes that human emotions and affection arise from the same process in the stages of cognitive development. So Piaget divided the stages of cognitive development into 4 types of processes: assimilation, accommodation, conservation and reversibility (Hartini et al., 2022). Third, Theory of Vygotsky (1967). This theory emphasizes the centralization of social relations as an important thing that influences cognitive development because children first find knowledge in their social world, then become part of their cognitive development. So playing is a child's way of thinking and how children solve problems (Ilham et al., 2022). The theory from Vygotsky (1967). This theory emphasizes the centralization of social relations as an important thing that influences cognitive development because children first find knowledge in their social world, then become part of their cognitive development. So playing is a child's way of thinking and how children solve problems (Firman et al., 2022). The theory from Vygotsky (1967). This theory emphasizes the centralization of social relations as an important thing that influences cognitive development because children first find knowledge in their social world, then become part of their cognitive development. So playing is a child's way of thinking and how children solve problems.

It's been a long time, the block is a tool that is fun to play (Firman et al., 2022), not only for children and even adults like it. Beams are a type of structured construction. Beams have a fixed shape, are hard, and have certain characteristics for each shape. These blocks are played by children in a center called the block center as one of the structured development games.

The uniqueness of the center of the beam is starting from the shape of the beam

specific, accuracy of other forms, mathematics that can be built in a more concrete way and problem solving (problem solving) by building children's minds to be able to think scientifically (Demina et al., 2022). Besides that, the rules that are applied also build noble attitudes both for children and for their teachers. Learning at the Al-Falah school in Ciracas, East Jakarta, about how all attitudes (Hikmah et al., 2022), aspects of development and multiple intelligences are built simultaneously in every activity at the center, one of which is the block center whose main goal is to provide opportunities for children to play with development materials (Dewi S et al., 2022). Piaget stated that playing development materials helps children to develop skills that support their schoolwork and supports building concepts and systematic thinking.

To support children to build concepts and systematic thinking

then support from the teacher is needed which is called Scaffolding (foothold). According to Vigotsky's theory, scaffolding is the provision of a number of assistance to students during the early stages of learning in the form of assistance for learning and solving problems, then reducing assistance and providing opportunities to take on greater responsibility after he can do it (Rohmalimna et al., 2022). In the center of the beam, scaffolding given to children can be in the form of instructions, encouragement, warnings, describing problems into solving steps, giving examples, and other actions that enable students to eventually learn independently (Kartel et al., 2022). The purpose of this study was to find out about the use of scaffolding in the learning process at Beam Centers which contributes to building Early Childhood Mathematical Logic intelligence (AUD) in PAUD Al-Falah School, Ciracas, East Jakarta.

Mbuild Mathematical Logic Intelligence

Intelligence is a matter of intelligence or the perfection of the development of reason such as intelligence and sharpness of mind (Ministry of National Education, 2008). According to Bainbridge (2010) in a popular sense, intelligence is often defined as a general mental ability to learn and apply knowledge in manipulating the environment, as well as the ability to think abstractly (Gabriela et al., 2022). Logic is knowledge of the rules of thinking or ways of thinking that make sense, while mathematics is the science of numbers, the relationship between numbers, and the operational procedures used in solving problems concerning numbers.

There are seven multiple intelligences, according to the theory of Gardner Howard (1999) (Multiple Intelligence), namely: a). Linguistic Intelligence, b). Logical Mathematics Intelligence, c). Musical Intelligence, d). Bodily-Kinesthetic Intelligence, e). Spatial Intelligence, f). Interpersonal Intelligence, g). Intrapersonal Intelligence. In addition to the seven intelligences above, we can also build other intelligences such as Nature Intelligence and Spiritual Intelligence which are known as advanced intelligence.

Maccording to Gardner (2003) mathematical logic intelligence is defined

scientific reasoning abilities, mathematical calculations, logical thinking, inductive/deductive reasoning, and the sharpness of abstract patterns and relationships (Qureshi et al., 2022). Can also be interpreted as the ability to solve problems related to mathematical needs as a solution (Mansoursamaei et al., 2023). Children with this ability

will be happy with formulas and abstract patterns. Not only in math numbers, but also in analytical and conceptual activities. According to Gardner there is a link between mathematical intelligence and linguistic intelligence (Nagendran et al., 2020). In mathematical abilities, children analyze or describe logical reasons, as well as the ability to construct solutions to problems that arise. Linguistic intelligence is needed to trace and describe it in the form of language.

According to Piaget, children should be able to conduct their own experiments and research on their own. Teachers, of course, can guide them by providing the right materials. But the important thing is that in order for a child to understand something, he has to construct it himself, and he has to re-invent it (Brunese et al., 2020). And this theory of cognitive development examines play activities in relation to intellectual development.

Block centers are centers that provide opportunities for children to develop systematic thinking skills using structured development media (Tjoa & Guan, 2021). The main purpose of the block center is to give children the opportunity to play with development materials. Piaget stated that playing development materials helps children to develop skills that support their schoolwork and supports building concepts and systematic thinking.

Suggested equipment in beam centers includes unit beam sets,

large hollow wooden blocks, foam blocks or molded blocks, role-playing props, mini figures of different cultures, miniature transportation vehicles, traffic lights, strollers, toy trucks.

RESEARCH METODOLOGY

This research uses qualitative methods through the point of view of education science with participant observation to describe, describe, explore and describe the Beam Center Curriculum at Al-Falah school, Ciracas, East Jakarta from various sources such as principals/directors, center teachers. In this qualitative research, interviews, observations, and document utilization were used.

PThis research was conducted at PAUD Al Falah School, Ciracas, Jakarta

Qeast, the reason this school was set as a research location was because of the uniqueness of this school, namely this school is the only school in Indonesia that was coached by Pamela helps (Viswanathan & Mogensen, 2020), as the developer of the Beyond Center and Circle Time Learning Approach (BCCT) from Tallahase , Florida (Yang et al., 2019). related to Sentra Beams as a learning approach in PAUD (Mayerhoefer et al., 2020). The subjects of this study consisted of 5 people, namely 1 Director of Al Falah School, 1 Beam Center Teacher, and 3 Students (Nadimi-Shahraki et al., 2021). The determination uses a purposive sampling technique, namely the technique of taking samples of data sources with certain considerations. As key informants were center teachers, directors as additional informants, and students as objects of observation. Data collection is done by means of observation, interviews and documentary evidence.

RESULT AND DISCUSSION

Solicitation(scaffolding)

In the learning process of the learning center at PAUD Al-Falah school in Ciracas, East Jakarta, there are systematic steps taken to achieve the objectives of the planned curriculum, for this the Beam Center has four main points, namely: 1). Main Environmental Foothold; 2), Preliminary Main/Balance Before Main Main; 3). Individual Footing When Playing; 4). Foothold After Main Main.

The block center teacher, Ibu Tini, stated that, "When playing at Block play is the same as playing time at other centers, which is one and a half hours (Xu et al., 2019). One hour for playing blocks, fifteen minutes for opening, and fifteen minutes for recalling. "However, there are things that are done by the teacher that are not counted as playing time, namely environmental settings.

Play environment invitation

The playing environment policy is an activity to set up the children's play environment which is carried out by the center teacher before the group of children who will be playing enters the block center area. This step is usually done by Mother

this is the teacher of the block center at 09.15 WIB before the child enters the center at 10.00 WIB.

This routine activity is usually started by the teacher by arranging the playing environment. The main playing block is the shape or substance that takes place either vertically or horizontally, depending on how the block is placed. When children build by placing one block on top of another, they quickly notice that the building gets taller. This pattern can continue until a limitation is reached in the form of a wall or other object. So there must be a change in direction if the pattern continues. When the child builds, the arrangement takes up a lot of space. Sometimes they have to change directions or change patterns because of limited space. Some children tend to build in a very narrow space, while others tend to expand the building arrangement in different directions. Some children have great interest in exploring vertical places and want to build higher. The teacher in many instances, becomes frightened and warns the child to stop this activity and deprives the child of the opportunity to face the problems encountered in building higher once the child has developed some construction skills.

BThe shape and size of the beams apart from being classified, the racks are also arranged in a series arrangement. According to Mrs. Tini "...the shape of the block is science. The shapes of blocks make children have to know how to hold them. If the block is long how to hold it, if the block is heavy how to hold it. If the long beam is held with one hand approximately what will happen. He needed to think about how the block could get to its place safely, not to fall and hit the leg. Sometimes a child wants to carry a lot of blocks, but he has to limit himself by only carrying a few, that's extraordinary."

The child also learns that blocks can be stacked flat on edge, on end and the use of each side can be combined to create different characteristics to the structure. Weight is a

factor in studying size and this means that some blocks are heavier than others. The way children hold blocks can grow their interpretation of weight, sometimes not quite right until they learn to hold it in a different way. If children already know the similarities and dissimilarities of the sizes and shapes of the various blocks, they are more likely to match and choose the right ones. This activity is an important form of classification for scientific thinking.

On a table Mrs. Tini arranges literacy in the form of writing tools and measuring instruments. Then a bookshelf with books that contain stories or pictures that can inspire children according to the theme. This is so that children who do not have an idea can use it **the media to bring up ideas or ideas in building or in certain cases.**

BaThere are many important and necessary possibilities to compare lengths, heights, in constructing beams. each block can be used as a unit of measure and the child finds similarities between the different units of measure. So these units can be transferred into a larger unit for several smaller units.

Next, Mrs. Tini took boxes for storage of playing aids at the block center in the form of accessories. Accessories commonly used for children's play at the block center are micro role play tools in the form of stuffed figures of various sizes, ages, professions, as well as other aids such as traffic signs, colored block toy cars as decorative blocks. Mrs. Tini said that "The colored blocks are for decoration and are used when the Mearak building is complete, complete, complete, finished, and the children already know about it because the rules have been given for the first time at the start of the new school year."

The accessories or playing aids are arranged on a red table by classifying according to shape and type, starting on the left side of the table is an arrangement of family dolls in casual clothes of two sets which are enforced and sorted by doll height, gender symbol and shape. which indicates the symbol of age (the shortest and youngest dolls are at the front and ends with dolls that symbolize old age).

Next is the arrangement of family dolls with two sets of formal attire which are also sorted according to the height of the doll, the symbol of gender and also the shape which indicates the symbol of age. The teacher does this with the intention that children can learn indirectly from these arrangements. Children will learn how they have to classify, sort, tidy up and without realizing it build their mathematical logic intelligence.



Figure 1. Environmental settings for micro role playing tools

The accessories that are arranged or arranged on the table are the accessories that the child needs according to the theme, accessories that are not related to the theme will not be removed, this allows the child to focus on the theme being discussed. Even though these tools or accessories are already on display on the table, that doesn't mean that children can't get more than what is provided. Because the teacher still leaves these tools in the box. The teacher deliberately does not display the accessories as a whole because they have their own purpose, namely if a child needs the play equipment in the box, he must talk to the teacher so that he can get the accessories needed, this will build their language and social skills.

The teacher then prepares the base for building geometric shapes such as circles, rectangles, rectangles, semicircles and right triangles. The base of this beam uses contrasting colors, namely red, yellow, blue and green. Base shapes made with geometric shapes will make children feel familiar and close to mathematics, while contrasting colors make children recognize colors quickly. For the base of the building, you can prioritize the basic color.

Mrs. Tini added that "With a base this big (pointing to the base beam),

so he had to think about how big a building for a pedestal like this. He must set his will, what with a small base he can build a very large building? He will measure, he began to measure. Just like when we think that if we just need to eat one plate is full, we don't eat anymore. And that fosters a qona'ah (sufficient) attitude."



Figure 2. Base settings for building and teacher media

Apart from that, the mat also stimulates children to think mathematically, as explained by Ibu Tini which states that a child who has already chosen a play mat will think, "If my mat is this big, what kind of building can I prepare?" that can be used?", "If I use a block that is too long, can I make a garden later?", "Parking area?"...and usually the child will say "Oh, I have an idea..", "I think I can use it. shorter beams to be able to make a building according to my ideas..", he thought and it was mathematical logic.

After the teacher has set the base for building which is prepared by estimating the distance of the child's movement when picking up the blocks and building the building, then the teacher sets the media that will be used for the initial foundation of the game. Teachers who already have plans based on lesson plans made provide a number of blocks to be used as illustrations.

In setting up the environment the teacher will consider how the child is move around, and for that they need a large enough space to be able to move safely. The teacher also prepares the media that will be used in the form of books or pictures and provides blocks that will be introduced to children, as well as being used to build to encourage new ideas in children when they play later.

PThe framework for the Main Environment for Structured Development is a). management awal development environment with the selected building site; b). planning for the intensity and density of development experience; c). organize the development environment to support positive social relations; d). allowed to use at least 100 (preferably 200) uncolored unit blocks for each child in the group; e). have color blocks grouped by color to complement construction trim; f). Have a wide range of micro role play tools available to extend development experience to micro role play; g). has literacy materials, such as picture books, desks, children's books, paper, pencils, markers, crayons, and others; h). has blocks sets representing different cultures for preschoolers and elementary school aged players. (Latif et al., 2013)

Maccording to Pam, Pre-set the building construction environment by area

symbolized by: - Organize the construction environment to support positive social interaction; - Allow access to a minimum of 100 (preferably 200) natural-colored unit blocks

for each child in the group, - Sets of colored blocks classified by color for decoration if a child's construction has been completed, - Have a variety of microspheric drama props available to expand construction experience in micro-dramatic plays such as: a). normal people: with cultural diversity, role diversity and age diversity, b). disabled people, c). vehicles: cars, agricultural equipment, and other modes of transportation, d). animal family: various kinds of forest, agriculture and forest (zoo) animals, if only one type of animal family is provided then it cannot support children to play aggressively. (Phelps, 2012)

Hepls (2012) found that important variables have an impact on behavior

Early childhood is the number and arrangement of opportunities to play. Teachers in quality early childhood classrooms are aware of this, and will wisely arrange the room to meet the developmental needs of children, provide a basis for children's activities and attitudes or behavior so that they can learn to use play materials appropriately and play with other children, make diaries of children's development towards readiness for their next school (Soendari & Wismiarti, 2010) Additional materials such as small pieces of carpet, trees, furniture, etc. Have literacy materials available, such as coffee tables, picture books, children's books, paper, pencils, markers, etc. In addition, it is also possible to provide block sets representing different cultures available for kindergarten and elementary age players (Phelps, 2012).

Early Steps to Play / Footing Before Main Main

The first fifteen minutes are called the starting point of play or opening. In this initial step, Ibu Tini invites the children to gather and on the floor by circling a circular building base, on which there are a number of blocks prepared by Ibu Tini during the environmental setting. The first activity carried out was Mrs. Tini inviting the children to sing together, the song assalamualaikum, or other songs according to the theme. After that Mrs. Tini said her greeting and asked how the children were doing. Next Mrs. Tini asked how many children sat with them today. Children start counting them one by one, there children learn to count in series. Mrs. Tini asked again how many girls, how many boys. Then what is the total number of girls plus boys. The children immediately counted and added them up with cheerful faces.

The age of 4, kids really start to put skills into play

by counting their number together. They are able to count sets of objects, tell us when a doll or person miscalculates, and join to count together when it counts objects on a screen. Kids at this age, they can even compare sets. They can recognize that one set of items is larger than another and smaller than a third set. For example, they know that a set of four cookies is larger than a set of three cookies and smaller than a set of five cookies. By age 5, children develop the ability to count both and compare numbers at levels characteristic of preschool. On this subject, some argue, that children can place numbers in precise locations in a counting series, relative to other numbers. (Hirsh, Golinkoff, &

Here the mathematical concept starts to work, namely calculating the series,

classify and sum. After that Mrs. Tini asked the children about their theme of the day, and the children would be able to answer them. Even though it was their first day using a new theme, usually there were children who could still answer it. This is because at the end

of the previous theme, the teacher had informed the children about the new theme they would discuss next week. This builds children's memory and perception.

Bu Tini said hello, invited the children to sing, then told them about today's theme, namely "Communication" and provoked the children to talk about what communication is, what are the means of communication, how do people communicate. Mrs. Tini showed a book with pictures of airplanes and said "Pictures can also provide information to people who see them".

IMrs. Tini starts by reading a story from a book or showing a picture to then tell about the picture shown to the child. When there are children who are not focused, Mrs. Tini stops for a moment in the hope that the children will focus again so they can play immediately if the initial steps go well.

In telling stories according to the theme, Mrs. Tini began to flow knowledge in the form of explanations, explanations or new vocabulary as previously prepared through lesson plans and scaffolding. The vocabulary conveyed is not

directly given to the child, but Mrs. Tini starts from asking questions to explore the knowledge that is already in the child. If there are children who can say the vocabulary in question, Ibu Tini will give an award by saying alhamdulillah, congratulations, and applause. And what is said by the child who mentions the vocabulary has indirectly provided information to other friends who don't know.

MDeveloping the abilities to ask questions through the activity of assembling blocks appears to be a realistic approach in a scientific sense. Young children usually tend to work intuitively rather than logically. It is better to allow children to make descriptions of the activities they are doing, as they use the equipment and use it in different ways. Through exploration, creation and discovery, children develop ways of thinking about the physical phenomena they encounter in their constructions. In this way, they construct basic information in a meaningful way that will be relatively consistent with later complex concepts. To support the above, during the early stages of playing the teacher provides support through telling stories, asking questions and modeling.

After conveying some information to the children, Mrs. Tini invited

ason to pay attention and see what block he was holding. Mrs. Tini started asking questions to explore the child's knowledge of the blocks. Starting from the name of the block, the shape of the block, the characteristics of the block, how it feels when touched. Then took a different block, and Mrs. Tini started asking again what the name of the block was, what was its shape, what were its characteristics, how was it different from the first block, longer or shorter, heavier or lighter, thicker or thinner , children begin to think critically. And all of that is the concept of mathematical thinking (mathematical logic). Galinsky (2010) states that critical thinking is a high-level skill among the executive functions of the brain, because critical thinking is closely related to reflection: instead of accepting from the outset the characterization of someone because of a situation, carrying out that characterization, or refusing to take it for granted and say that enough is enough, as well. It's all the result of deep reflection and making as critical thinking as possible.

Science education now focuses on the importance of children to

learn things that characterize a problem and in compiling blocks children can learn about the characteristics of all kinds of blocks. Each block has certain qualities, such as: size, shape and weight, and because the beam has three dimensions, the beam has characteristics, namely: thickness, width and length. Children immediately distinguish many of these dimensions as they build blocks. Blocks can look the same or not the same, depending on their placement with other blocks (Al-Falah, 2013).

Next Mrs. Tini made a building from the blocks that were on the base

sabil continues to flow information in the form of SCAFFOLDING on themes, vocabulary and problem solving. Each block that is held is labeled with its name, labeled how to place it and explained the consequences of the arrangement so that the vocabulary about mathematics and themes continues to flow. After finishing building, Mrs. Tini gave the building a name, and invited the children to come up with other ideas for building it later. Before dismantling the building Mrs. Tini asked the children to count how many

the number of beams that have been used in the building. Starting from the lowest beam, then in the middle and finally at the top. Next, Mrs. Tini invited the children to make an agreement about the rules for playing with blocks. Mrs. Tini stated: "The rules for playing in the center of blocks are: first, blocks are for building; secondly, build on a pedestal; third, take enough blocks; fourth, smooth start-finish; fifth, play on time; sixth, clean up. Building blocks, that means very rich, because these blocks are only used for building, nothing else. That's why the children who enter the block center are ready to build, not for others, this helps shape the attitude of children not to use blocks for other things. That's why at the beginning they entered, we thoroughly discussed this rule. Building on a pedestal, alas there is a limit. And these boundaries are important for his future."

Apart from the rules, Mrs. Tini also conveyed her hope for the children to be able to play according to the rules. This was explained by Ibu Tini, that "In every activity, not only at the beam center, we can give them (children) our hope. when you want to talk, want to pray, eat, at the center, cleaning up. Hope it contains rules, procedures. There is also hope that we give in this meeting because we have seen in the last meeting there are things that we need to inform again today 'Mrs. Tini has hope today...', if the children can follow the rules properly good and can focus, then the children will be successful in playing with blocks."

Before the children sat down on the plinth of the building they had chosen, Mrs. Tini started inviting the children to decide how to play, whether they wanted to play alone or in a group. However, this also depends on the teacher's goals, so there are times when the teacher decides whether the children are playing alone or playing in a group. This was confirmed by Mrs. who is not strong enough to play with friends, he will choose to play alone. In fact, we already know, that is the stage that we paid attention to from the previous meetings. For him to be able to play with friends, he really has to be ready."

Furthermore Mrs. Tini added, "Teacher already has a plan, there is a time

the teacher wants to see the child's initiative, so the teacher gives him the opportunity to choose, but there are times when the teacher wants to see the stages of the development of his game, so he has to play alone. But there is another time when the teacher plans for

children to play with friends. And this choice is sometimes given to children to decide for themselves who their friends are, because here there are consequences if he has chosen and decided to choose friends, then when he has a problem, he must be responsible for all the consequences of playing with friends. From here the child learns a lot, how he interacts with friends to be able to solve his problems." Then the children are welcome to go to the mat they have chosen, and pray together before playing and Mrs. Tini provides motivation by saying "Happy building".

Based on the theory, the foundation of experience before playing structured development is: a). read a book that gives ideas to children related to development activities; b). incorporate new vocabulary and demonstrate building-oriented concepts; c). discuss ideas for development play experiences; d). provide children with opportunities for successful social relations by placing sufficient materials and space; e). discuss rules and expectations for development play experiences; f). designing and implementing a transition sequence for main. (Latif et al, 2013)

When the teacher arranges or organizes the environment for the teacher's children to play consider as well as plan how children's play environment can facilitate them to develop all aspects of development and intelligence. For the intelligence of mathematical logic the teacher provides mats with geometric shapes so that children are close to mathematics. The teacher provides blocks with a variety of shapes and sizes so that children can explore various shapes of blocks and analyze problems/problems and investigate problems scientifically with the blocks they use and need when making a building.

Individual permissions When Playing

Children begin to build using blocks. Children who choose to play alone work according to what they think, while children who play in groups communicate to make plans about what buildings they will make. When there were children who played in groups and did not communicate with their friends, and started working independently, Mrs. Tini immediately gave a foothold by going to the child and asking her questions such as "What are you building? Have you talked to your friends about making plans together?"

Science education now focuses on the importance of children to learn things that characterize a problem and in constructing blocks children can learn about the characteristics of all kinds of blocks. Each block has certain qualities, such as: size, shape and weight, and because the beam has three dimensions, the beam has characteristics, namely: thickness, width and length. Children immediately distinguish many of these dimensions as they build blocks. Blocks can look the same or not, depending on their placement in relation to other blocks. Intelligence is indeed a complex thing and requires the process of seeing, hearing, comparing, equating, combining, storing, representing, or expressing through various ways, both verbal and movement. (Hariwijaya, 2010)

Teachers who have experience will immediately know whether a child who has entered the block center for the first time has previous experience playing blocks. This was explained by Mrs. Tini that "It will be seen, even though he has just entered, he has blocks

in his house. He would instantly recognize a block here and know what it was, because he knew what it was.

Through construction and role play, children learn that conditions exist

specific and space restrictions. Children who have extensive experiences with building immediately develop good judgments about space, and they do well. It can be observed that the children seem to have a good sense of space.

the void and that they can move the structures smoothly without toppling them. They seem to be becoming more aware of caring for and treating their equipment with pleasure and confidence. At the block center, when the children played either in groups or individually, it was seen that they had different playing stages for their level of difficulty.

Children build buildings according to what they think and want, they seem to turn into an architect who knows what is needed for the building he is making. Architectural forms have been achieved with beams. Tunnels, bridges, raised platforms and tall buildings are made of beams arranged in certain joints. The building child soon learns to use the units to make different shapes in developing a miniature world using cars, trucks and so on. In developing architectural forms, children learn to deal with similar problems, and the relationship between one type of building and another. Children learn the use of raised surfaces when they place them on the walkway or a place to put their toys. Using the surface allows the child to test its function by pushing the toy up or allowing it to slide freely off the surface.

For children to go to the next stage of play, the teacher makes a program

specifically, but this program is not equally successful for every child, this is because the increase in stage for children is different from one another. And to make sure the child goes to the next stage the teacher must pay close attention to his characteristics. This is as Mrs. Tini said “Every time he goes to the next stage, he will still show the previous stage, so we cannot say if a new stage has just appeared, he is already at that stage. So the old stages will still appear over and over again, maybe up to three or four times. Sometimes he is in stage one but he has started giving accessories and playing roles there. Group B stage, he has run the car and put the people in their places. For the PG group, the dolls are sometimes just placed or lined up.”

In play activities there are children who focus on work and rules, but there are still children who do not always comply with the rules that have been agreed upon at the start of the game/steps before playing. Punishment is not a culture here because punishment will not be able to develop children and make the rules their own, they might follow the rules but because they are afraid of punishment, not because they follow the rules as their own.

Pother steps are given to children who are less focused, needy

help, information and support. In addition, the teacher continues to channel the Scaffolding vocabulary and stimulates children to add ideas so that there are as many blocks as the children use when building. The use of many blocks is one of the things that teachers

read about children's mathematical logic abilities, the more blocks used, the more complicated the building is made.

Children, like scientists, focus their attention on stability issues and look for ways to build well and satisfy them. Many impulses to think arise from solving problems arising from the interaction of forces related to balance and stability: "How can I build a taller building?", "How can this beam fit here?", "What must be done to make this building fit? not fall?". The accumulation of experience in constructing all kinds of arrangements allows children to foresee good ideas of what can and cannot be done with these tools. Children learn to work with a causal approach and learn to predict the pressures and obstacles that arise from gravitational forces that interact on various parts of the building. (Al-Falah, 2013)

In providing support the teacher usually gives rewards in the form of awards. Appreciation can be given by the teacher through kind words, but not all good words can build up children. As Mrs. Tini said, "We never say "great!", "good!", "great!", we never use those words, because those words don't make children learn, don't make children think. . When he's done, then he's feeling good, he's feeling his best, then "stop!" they will no longer want to think. To reward, always say what they did and we can see the reaction, "Today, you put two blocks side by side, and put one block on top of it!", So the child thinks what else he will do, that's important for the child. But the words "You better get more blocks over there!" are words that are not good, because they do not make children learn and think. We can say "You use three blocks, one on the right side, one on the left side, and you close the top, so there is space, there is distance, some are parallel, the same, there are three shapes!"

When children play, children discover many things. The more children play with blocks, the more experience they get from playing, such as how children solve problems in finding blocks that are suitable for a certain place of the building, making arrangements of blocks with repetitions to form a pattern. According to Ibu Tini, "Why can children do that? That is due to the experience of playing with blocks and making his mathematical logic better. Likewise with the rules, from the start of the game they already got the concept, until when playing, when the game ends, when he classifies, he counts, and he returns it to its original place. There is a big and complete difference, if he does that in every play, and repeatedly, it will be read in every activity."

he uses the small blocks on the bottom and puts the big blocks on the pile, we will see the building sway, but the teacher can see that and ask "If the small blocks are used on the bottom of the building what happens?", "He sways!", "He's unstable!" and all that is a concept. New children usually don't focus on being able to recognize how to make a building stable, maybe he can use small but short blocks, and that makes the building more stable, but maybe he thinks the building is stable, but people can't pass under it. Usually

After getting a foothold from the teacher, the child will take a higher block but with a larger size, so that the building becomes stable and people can pass under it. And that is problem solving." Problem solving is a display of the awakening of children's mathematical logical intelligence.

Accuracy, balance and stability are governed by gravity. When children are first building, they may place one block on top of the other at random and of course the building immediately falls over. Notice the length of time as the child begins to place blocks more carefully or as they straighten the sides of the building with their hands. This indicates that they are aware that several actions are deemed necessary if they want to build taller buildings, even though they do not understand the concept of gravity as a force that interacts between the blocks they arrange. But children will quickly learn to estimate when the building has reached a certain height and becomes unstable. They learn to see certain clues about the stability of a building, and show their awareness when they place additional blocks or when they frequently spread their fingers in anticipation of the building falling. They learn where to place blocks so they can support other blocks, or they learn to have to move blocks slightly to get better balance. Gradually the children also figure out that a wider foundation will be more stable if they want to build a taller building.

Children learn to deal with stability through the use of balance. They learn to use this in a different way. Many children have a tendency to seek balance between left and right when they design their buildings. If they placed a block on one side of the building, they often placed that same block in the same position as the other side of the building. By selectively placing, children must develop their perception of patterns and prepared identification of similar shapes.

From the documentation of the Al-Falah school (2012) it can be seen that the domain of cognition is especially related to the development of mathematical logic intelligence or mathematical thinking for children aged 4 years, namely. Mathematical Process where children show interest in solving problems mathematically. Four year olds enter into the real life world of mathematics through the day.

With guidance, and in the classroom with supported questions, preschoolers can begin to solve simple math-related problems in a concrete way, and provide basic explanations for their solutions. For example: asking a friend “How many people are in your house or in mine”?; trying to find a way to still build a house with blocks, even though the long rectangular blocks are all used up; asked a friend for a special block shape to complete his design; figuring out how many small glasses are needed to fill one bottle at the water table; wondering how to make their playdough into the shape of his teacher's snake; decide who is older if one child is 4 years old and the other is 4 ½ years old;

wondering if there is enough glass for everyone; make a pattern out of the colored lines – red, yellow, red, yellow – on the art table. Patterns, relationships, and functions, such as sorting objects into groups that vary from properties. Children at this age enjoy sorting and classifying, because these activities help them gain control of their world by organizing it. After learning to sort objects by one trait, some four-year-olds begin to sort by two properties (eg placing all shapes of big circle here, big triangle there, and small circle here). Sorting and classification introduces children to structure thinking mathematically. While playing, the child notices the emergence of this understanding by: sorting the pegs according to color; Sort the beam patterns according to shape and color.

Mrecognize simple patterns and imitate patterns. Like sorting and classifying, recognizing and creating patterns also introduces children to the concept of order in the world. The four-year-old's natural curiosity can be directed towards the recognition of patterns. They can imitate simple patterns with sounds and objects. Child demonstrates understanding of patterns by: imitating the sound pattern of 2 claps and a pause, then 1 clap and a pause; saw shapes, "oxox" in the margins and copied the pattern with a crayon; draw dots on paper repeating patterns (example: green, blue, green, blue); recognizing patterns in books he already knows and saying the next line before turning the page; predict the next item in a simple AB pattern;, shape or size.

Konsep numbers and operations,saat this child shows an early understanding of anumber and amount. Four-year-olds can count from 4 to 10 objects using a 1-1 relationship, and some children can verbally count upwards of 20 or 30. Many four-year-olds understand that the final object equals the total number of objects. They just learn that the next number in the counting sequence is one more than the number just mentioned and continue to explore the meaning of the words "more" and "less". Example: pointing at each object they count and assigning the corresponding number to each of these objects; know that there are 4 blocks without counting; commented that there were more cars than tow trucks in the beam center; telling a friend who is first in line, "I'm second"; mention the next number when the teacher says "4,5,6,..."; counting steps, jumps, or repetitions of an exercise; count 6 yellow trucks from the truck box; count rote as high as they can.

Geometry and spatial relations,aI want to get to know and describe the characteristics of forms. The four-year child begins to notice the similarities and differences in the characteristics of different forms when attention is focused on the forms in the classroom and the environment. With motivation, four-year-old children can recognize different types of shapes (for example equilateral triangles and isosceles triangles are all triangles), identify special shapes in different orientations of the same shape, and name shapes and discuss the characteristics that these shapes have.

Demonstrate skills on existing geometric shapes he is familiar with: pointing out the shape of a triangle and calculating its sides;

name shapes through their touch rather than visually (eg they can identify the shapes of blocks in a "box"); stacking certain shapes in an image; stated that a shape on the poster looked like "a triangle cut off the top"; matching and sorting shapes; recognize equilateral triangles as triangles even when shown without horizontal lines; find that all the triangles are the same size; imitating shapes or making sequences of existing forms after seeing these forms for a few seconds; identify and name the forms found in the environment; create images from cut shapes.

In addition, children also begin to show understanding of some words that indicate places. Four year olds continue to develop their spatial sense, which is their awareness of themselves in relation to the people and objects around them. They gain vocabulary indicating places and begin to learn about directions, distances and locations (locations). By the age of four, children understand some words that indicate place and direction, such as "above." "lower", "below", "side", and "behind".

Size. It is concerned with ordering, comparison, and describing objects according to one's properties. Grouping something based on a characteristic that changes systematically (from small to large, short to long, soft to hard) is called sequence.

Arranging or sequencing requires the child to observe and distinguish the difference between 2 or 3 objects. Four-year-olds begin to compare and order according to size, length, height and weight as they explore features of things and decide which things are bigger, longer, shorter, or heavier.

To find out the stages of children's play, the teacher uses the playing blocks assessment scale, on this scale each stage has certain characteristics that can be observed directly by the teacher when the child is building with blocks. And for the stages of playing blocks using a standard scale/size based on the work of Guanella FM (1934) and Raifel, S. (1982 and 1984) this scale includes 19 levels of difficulty which show progress in using blocks. (scale attached). Vocabulary related to playing with blocks that builds children's mathematical logical intelligence as shown in the following document.

CONCLUSION

Block Center-based learning at PAUD Al-Falah school makes a contribution that builds Early Childhood Mathematical Logic (AUD) intelligence, through every activity starting from teacher readiness with lesson plans, structuring the playing environment, steps before playing, individual steps when playing and steps after the game that started with the finish shows

aits contribution to the development of AUD's mathematical logic intelligence. This can be seen from the results of the children's assessment which compares the assessment of playing with blocks in the middle of the semester with the assessment at the end of the semester, with a sample of three children. This assessment shows an increase in children's mathematical logical intelligence which is read through the results of the game, seen by how children use blocks that build understanding of mathematical operations and solve their own problems, and investigate problems scientifically.

REFERENCES

- Brunese, L., Mercaldo, F., Reginelli, A., & Santone, A. (2020). Explainable Deep Learning for Pulmonary Disease and Coronavirus COVID-19 Detection from X-rays. *Computer Methods and Programs in Biomedicine*, 196, 105608. <https://doi.org/10.1016/j.cmpb.2020.105608>
- Demina, D., Remy, T., & Danyl, A. (2022). The Use of Quranic Learning Strategies Through the Wafa Method in Elementary Schools. *Journal International Inspire Education Technology*, 1(2), 62–73. <https://doi.org/10.55849/jiiet.v1i2.91>
- Dewi S, Y., Rasyid Umar, A., Ali Khan, A., & Aziz, A. (2022). Fun Arabic Teaching With Media Song For Early Child Education School. *Journal International of Lingua and Technology*, 1(2), 140–156. <https://doi.org/10.55849/jiltech.v1i2.80>
- Dianovi, A., Siregar, D., Mawaddah, I., & Suryaningsih, S. (2022). Guidance and Counselling in Education. *World Psychology*, 1(2), 27–35. <https://doi.org/10.55849/wp.v1i2.95>
-

- Firman, F., Alef, R., & Eric, M. (2022). Use Of Zoom Meeting Applications to Memorize the Qur'an Online. *Journal International Inspire Education Technology*, 1(2), 99–110. <https://doi.org/10.55849/jiiet.v1i2.92>
- Gabriela, M., Cicerchi, G., Colin, H., & Ana, C. (2022). The Role of Parents in Helping Arabic Teachers to Improve Students' Vocabulary. *Journal International of Lingua and Technology*, 1(2), 131–139. <https://doi.org/10.55849/jiltech.v1i2.83>
- Hartini, S., Alie, E., & March, J. (2022). The Relationship Between Authoritarian Parenting and Aggressive Behavior of Adolescents in Nagari Bungo Tanjung. *World Psychology*, 1(2), 18–26. <https://doi.org/10.55849/wp.v1i2.98>
- Hikmah, D., Petoukhoff, G., & Papaioannou, J. (2022). The Utilization Of The Animiz Application As A Media For Arabic Language Learning On Students. *Journal International of Lingua and Technology*, 1(2), 157–171. <https://doi.org/10.55849/jiltech.v1i2.84>
- Ilham, S., Adelir, D., & Delr, Q. (2022). The Benefits of Whatsapp as a Medium in Depositing Memorization of the Qur'an. *Journal International Inspire Education Technology*, 1(2), 86–98. <https://doi.org/10.55849/jiiet.v1i2.90>
- Kartel, A., Charles, M., Xiao, H., & Sundi, D. (2022). Strategies for Parent Involvement During Distance Learning in Arabic Lessons in Elementary Schools. *Journal International of Lingua and Technology*, 1(2), 99–113. <https://doi.org/10.55849/jiltech.v1i2.82>
- Mansoursamaei, M., Moradi, M., González-Ramírez, R. G., & Lalla-Ruiz, E. (2023). Machine Learning for Promoting Environmental Sustainability in Ports. *Journal of Advanced Transportation*, 2023, 1–17. <https://doi.org/10.1155/2023/2144733>
- Mayerhoefer, M. E., Materka, A., Langs, G., Häggström, I., Szczypiński, P., Gibbs, P., & Cook, G. (2020). Introduction to Radiomics. *Journal of Nuclear Medicine*, 61(4), 488–495. <https://doi.org/10.2967/jnumed.118.222893>
- Nadimi-Shahraki, M. H., Taghian, S., & Mirjalili, S. (2021). An improved grey wolf optimizer for solving engineering problems. *Expert Systems with Applications*, 166, 113917. <https://doi.org/10.1016/j.eswa.2020.113917>
- Nadya, N., Ameer, A., & Zaamil, Z. (2022). Emotional Intelligence and Conflict Management Capabilities in Prisoners in Prisons. *World Psychology*, 1(2), 54–70. <https://doi.org/10.55849/wp.v1i2.94>
- Nagendran, M., Chen, Y., Lovejoy, C. A., Gordon, A. C., Komorowski, M., Harvey, H., Topol, E. J., Ioannidis, J. P. A., Collins, G. S., & Maruthappu, M. (2020). Artificial intelligence versus clinicians: Systematic review of design, reporting standards, and claims of deep learning studies. *BMJ*, m689. <https://doi.org/10.1136/bmj.m689>
- Najeed, M. A., Hakonarson, C., & Mentch, G. (2022). Learning Tahfiz with Talaqqi Method Using Whatsapp Application. *Journal International Inspire Education Technology*, 1(2), 125–137. <https://doi.org/10.55849/jiiet.v1i2.86>
- Nopiana, N., Egie, J., & Mers, O. (2022). The Impact of Internet Addiction on Introvert Personality. *World Psychology*, 1(2), 1–17. <https://doi.org/10.55849/wp.v1i2.97>
- Qureshi, M., Mahdiyyah, D., Mohamed, Y., & Ardchir, M. (2022). Scale For Measuring Arabic Speaking Skills In Early Children's Education. *Journal International of Lingua and Technology*, 1(2), 114–130. <https://doi.org/10.55849/jiltech.v1i2.81>
- Rahmah, A., Rouns, E., & Luck, A. (2022). The Effect of Self-Development Program for Improving Independence in Defective Students in SLB N 1 Lima Kaum Batusangkar. *World Psychology*, 1(2), 46–53. <https://doi.org/10.55849/wp.v1i2.96>
-

- Rohmalimna, A., Yeau, O., & Sie, P. (2022). The Role of Parental Parenting in the Formation of the Child's Self-Concept. *World Psychology*, 1(2), 36–45. <https://doi.org/10.55849/wp.v1i2.99>
- Tjoa, E., & Guan, C. (2021). A Survey on Explainable Artificial Intelligence (XAI): Toward Medical XAI. *IEEE Transactions on Neural Networks and Learning Systems*, 32(11), 4793–4813. <https://doi.org/10.1109/TNNLS.2020.3027314>
- Viswanathan, H., & Mogensen, P. E. (2020). Communications in the 6G Era. *IEEE Access*, 8, 57063–57074. <https://doi.org/10.1109/ACCESS.2020.2981745>
- Xu, Y., Chen, H., Luo, J., Zhang, Q., Jiao, S., & Zhang, X. (2019). Enhanced Moth-flame optimizer with mutation strategy for global optimization. *Information Sciences*, 492, 181–203. <https://doi.org/10.1016/j.ins.2019.04.022>
- Yang, X., Wang, Y., Byrne, R., Schneider, G., & Yang, S. (2019). Concepts of Artificial Intelligence for Computer-Assisted Drug Discovery. *Chemical Reviews*, 119(18), 10520–10594. <https://doi.org/10.1021/acs.chemrev.8b00728>

Copyright Holder :

© Zulkhairina et al. (2022).

First Publication Right :

© At-Tasyrih: Jurnal Pendidikan dan Hukum Islam

This article is under:

