The Impact of Block Media on Early Mathematics Development in Children Aged 5-6 Years

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Abstract: This study aims to determine the relationship between block media and early math development of children aged 5-6 years at Aqila Rajabasa Kindergarten. This study uses a quantitative method using a correlation approach. The sample in this study used total sampling with children aged 5-6 years and obtained the results of class B children consisting of 2 classes with a total of 39 children. Data collection techniques using observation sheets and documentation. Hypothesis testing in this study uses the product moment correlation formula to see the relationship between two variables, see the direction of the relationship between the two variables and see whether the relationship is significant or not. Based on the results of calculations using a significance of 5% (0.05), it is known that there is a significant relationship of 0.000 <0.050 and pearson correlation of 0.765 is greater than rtable with a value of 0.2605. So that the block media is significantly related to the development of early math in children aged 5-6 years. The conclusion in this study is that block media has a relationship with the development of early math in children aged 5-6 years.

Keywords: *Block Media, Early Childhood Education, Early Math Development*

Abstrak: Penelitian ini bertujuan untuk mengetahui hubungan antara media balok dengan perkembangan matematika permulaan anak usia 5-6 tahun di TK Aqila Rajabasa. Penelitian ini menggunakan metode kuantitatif dengan menggunakan pendekatan korelasi. Sampel pada penelitian ini menggunakan total sampling dengan anak usia 5-6 tahun dan didapatkan hasil anak kelas B yang terdiri dari 2 kelas dengan jumlah keseluruhan 39 anak. Teknik pengambilan data menggunakan lembar observasi dan dokumentasi. Uji hipotesis dalam penelitian ini menggunakan

rumus korelasi product moment untuk melihat hubungan dua variabel, melihat arah hubungan dua variable dan melihat apakah hubungan tersebut signifikan atau tidak. Berdasarkan hasil perhitungan dengan menggunakan signifikansi sebesar 5% (0,05) diketahui bahwa ada terdapat hubungan signifikansi sebesar 0,000 < 0,050 dan pearson correlation sebesar 0,765 lebih besar dari rtabel dengan nilai 0,2605. Sehingga media balok berhubungan signifikan dengan perkembangan matematika permulaan pada anak usia 5-6 tahun. Kesimpulan pada penelitian ini bahwa media balok memiliki hubungan dengan perkembangan matematika permulaan anak usia 5-6 tahun.

Kata Kunci*: Media Balok, Pendidikan Anak Usia Dini, Perkembangan Matematika Permulaan*

INTRODUCTION

Education is a program designed to develop knowledge and skills to prepare individuals for a better future. Early childhood, ranging from 0 to 6 years of age, is often referred to as the "golden age" because it is a period of significant growth and development. During this stage, a child's brain develops rapidly, with 80% of brain capacity being formed by early childhood and the remaining 20% developing through later childhood (Khadijah, 2016; Purba, 2021). There are six key aspects of development that should be achieved during early childhood: religious and moral values, language, cognitive abilities, physical-motor skills, social-emotional skills, and artistic expression. Building effective learning methods can enhance cognitive abilities, especially when learning is conducted through play-based methods that meet children's developmental needs. When done correctly, these methods can support the stages of cognitive development and help equip children with the skills they need for the future (Amalia, 2018; Aprianti, 2019; Hidayana, 2024).

Based on Piaget's theory (Walujo, 2017), children aged 2-7 years are in the pre-operational stage of cognitive development. According to Wiyani (2014), this stage is advancement from the sensory-motor stage, as children at this age begin to develop symbolic thinking. Piaget emphasized that the most significant symbols are spoken and written words. The ability to use symbols enables children to recall shapes and qualities, and even communicate about them with others in their surroundings. This symbolic understanding is a crucial foundation for their cognitive development.

Jarwani (2022) revealed context mathematics beginning of a child age early means ability child in analyze use numbers. This is can teach child for can Study in environment social effective and environmental academic. Ability mathematics beginning of a child age early is one of expected capabilities can develop in accordance with stage development child. Ability mathematics beginning of a child age early is base For develop ability in learning mathematics the basis of which is associated with life everyday life (Nurhazizah, 2014; Gunawan, 2024). One of the learning media that can used for practice development mathematics the beginning child age early that is with use learning using block media that can very beneficial for development mathematics beginning of a child age early. This is in line with opinion Yuhasriati (2016) plays can grow creativity with practice direct so that capable find new things for example like play block. Beam media can practice self in solve problem in create a building through cooperation in develop ideas as draft Study children (Hasendra, 2019; Yunianingsih, 2024).

Based on the data collected during the pre-research period, it was found that children are generally developing in accordance with expectations (BSH) or very well (BSB) based on specific developmental indicators. The data showed that children can count and write numbers from 1 to 10, as well as distinguish between large and small objects. However, there are areas where children face challenges, such as stacking objects according to patterns and recognizing shapes. These findings highlight both the strengths in the children's development and the aspects that require additional support and guidance to enhance their overall growth.

Research conducted by Monikasari (2023) found that problem that is A little difficulties at the time counting and recognizing symbol numbers 1-10 only that 's still the case Not yet appropriate explain that with existence application of block media can help child in understand learning counting the beginning child age 5-6 years, its application with method let child counting and arranging beam number This as you wish heart them and the application of block media this can also help teachers to know how far has the development progressed ability counting in children, as well as teach and train child Study counting numbers 1-20 with right, and the results from study This is with existence application of block media number can

help child in understand learning counting the beginning child age 5-6 years, its application with method let child counting and arranging beam number This as you wish heart them and the application of block media this can also help teachers to know how far has the development progressed ability counting in children, as well as teach and train child Study counting numbers 1-20 with appropriate.

Playing with blocks or beams can enhance children's thinking abilities, including exploration, imagination, creativity, problem-solving, and more (Faeruz, 2021; Basthina, 2024). While building with blocks, children learn about various shapes, colors, sizes, weights, positions, balance, and other attributes, all of which contribute to the development of more complex skills. Additionally, during teaching and learning activities using block media, children are introduced to different types of shapes, numbers, sizes, colors, patterns, symbols, construction, and problem-solving tasks. These activities provide a comprehensive foundation for their cognitive and creative growth (Noviani, 2020; Ernitasari, 2022; Mala, 2022).

Beam media also has benefit play beam will give chance for child for develop: (1) Skills interaction with Friend peers; (2) Ability communicate; (3) Strength and coordination movement motor smooth and rough; (4) Thinking symbolic; (5) Concept mathematics and geometry; (6) Knowledge topology / mapping; and (7) Skills differentiate vision (Saleh, 2010; Hasbi, 2021). With thus the block media own relatedness with mathematics beginning in children who become a medium for stimulate development mathematics the beginning children, in particular child age 5-6 years.

METHODS

This quantitative research utilized a correlation method to examine the relationship between block media and early mathematical development in children aged 5-6 years. Conducted at Aqila Rajabasa Kindergarten, the study included all 39 children from class B as the sample. Data collection employed observation and documentation techniques. Observation utilized a checklist to assess block media activities such as arranging blocks by color, shape, and size, as well as constructing various structures. Documentation involved analyzing school profiles, lesson plans, and

student evaluation results. The reliability coefficients for the block media variable and early mathematics development were 0.847 and 0.911, respectively, indicating high reliability. Indicators for early mathematics included number recognition, distinguishing shapes and colors, and understanding measurements.

The study's methodology covered research variables, design, population and sampling, data collection instruments, and analysis techniques. Prerequisite tests for normality and linearity, conducted using SPSS version 23, confirmed that the data were normally distributed and the variables were linearly related. Correlation analysis using the product-moment formula tested the strength, direction, and significance of the relationship between the two variables. Results indicated a significant linear correlation, highlighting the influence of block media on early mathematical development.

RESULTS AND DISCUSSION

The data obtained is based on research conducted to determine the relationship between block media and the development of early mathematics that has been carried out, among others.

Table 1. Percentage of Block Media Observation Results

No	Category	Interval	Frequency	Presentation
1.	Not Yet Developed	42,25 -4 4,25	6	15.38%
2.	Starting to Grow	4 4.50 - 46.50	12	30.77%
3.	Developing As Expected	4 6.75 -4 8.75	15	38.4 7 %
4.	Developing Very Well	49.00 -5 1.00	6	15, 38 %
Amount			39	100%

Based on Table 1, the assessment categories for block media from 39 children, namely 6 children (15.38%) are in the category of not yet developing, 12 children (30.77%) are in the category of starting to develop, 15 children (38.47%) are in the category of developing according to expectations, and 6 children (15.38%) are in the category of developing very well.

Table 2. Percentage of Results of Observations of Early Mathematics
Development

No	Category	Interval	Frequency	Presentation
1.	Not Yet Developed	8 1,50 - 84,50	5	1 2, 85 %
2.	Starting to Grow	84.75 - 87.75	10	25, 68 %
3.	Developing As Expected	88.00 - 91.00	11	2 8,10%
4.	Developing Very Well	91.25 - 95.25	1 3	33, 37 %
Amount			39	100%

Based on Table 2, the assessment categories for the early mathematical development of 39 children, namely 5 children (12.85%) are in the category of not yet developing, 10 children (25.68%) are in the category of starting to develop, 11 children (28.10%) are in the category of developing according to expectations, and 13 children (33.37%) are in the category of developing very well.

The results of data analysis using SPSS version 23 show that there is a relationship significance 0.000 with *product moment correlation* of 0.885 between block media and early mathematical development. Given R_{table} with a significance of 5% (0.05) and N = 39, then R_{table} is obtained 0.2605. So the significance of 0.000 <0.05 and $R_{count} > R_{table}$ or 0.885 > 0.2605 then accept Ha and reject Ho which means block media (X) is significantly related to early mathematical development (Y) in children aged 5-6 years.

The results of a study conducted during the learning process at Aqila Rajabasa Kindergarten revealed that the teachers play a significant role in guiding children's behavior to ensure it aligns with the pre-designed learning objectives. The children's ability to assemble blocks into familiar structures, such as houses and mosques, demonstrates their understanding and engagement with the lesson. As they build, they are able to identify and name the various parts of the structures they have created. The use of block play offers valuable insights into assessing the children's development and progress in meeting the established learning objectives. This aligns with Yuliati's (2018) view that learning objectives outline the expected behaviors students should demonstrate as a result of the learning process.

Based on the results of the research conducted, it was found that children at Aqila Rajabasa Kindergarten demonstrated significant progress

in early mathematics learning, which included the following key aspects: (1) Recognizing Numbers – Children were able to spontaneously identify simple number concepts when the teacher asked about the quantity of blocks used, allowing them to understand the concept of addition and number representation. (2) Recognizing Patterns – Children showed the ability to identify patterns by arranging blocks of different colors, shapes, and sizes to form regular patterns. (3) Connecting Shapes and Quantities – Children demonstrated the ability to connect shapes and quantities by relating block arrangements to real-life objects or their surrounding environment, such as associating shapes and numbers with familiar objects. (4) Introduction to Geometric Shapes – Through block play, children were introduced to basic geometric shapes found in their surroundings, such as circles (e.g., a clock), triangles (e.g., a house roof), and rectangles (e.g., a window). (5) Measurement – Children were able to understand and compare the size of objects, distinguishing between large and small items, and comparing sizes of two or more objects. The early mathematics development at Aqila Rajabasa Kindergarten plays a crucial role in supporting cognitive growth during early childhood. As Susanto (2011) emphasizes, early mathematics is essential for equipping children with important life skills, laying a foundation for their future development.

The results of the research conducted by the current researchers align with the findings of Ernitasari (2022) regarding the use of block media in introducing mathematical concepts to children, showing a significant influence. The study revealed that children could understand mathematical concepts such as numbers, quantities, shapes, and object amounts, particularly through block media. The children showed great enthusiasm and understanding during lessons, demonstrating that learning mathematics can be engaging and enjoyable when activities are implemented in a fun and interactive way. The use of media in early childhood education is crucial because it allows children to engage directly in meaningful learning experiences. Furthermore, children were able to sort and compare objects based on different attributes such as length, size, height, and quantity. At this early stage, children demonstrated the ability to group and classify objects based on shape, color, and size, showing a strong grasp of foundational mathematical concepts.

The use of block media in teaching is closely related to the development of early mathematics in children. Block media helps children learn and recognize numbers by counting the blocks used during activities. As the learning progresses, children can symbolize the amount of blocks with numbers. They can also create patterns using blocks based on color, shape, and size. Additionally, children are able to connect the blocks to real-world structures in their surrounding environment. According to Utami (2022), block media facilitates the introduction of fundamental concepts such as: (1) recognizing numbers, (2) making connections, and (3) understanding numerical symbols. Block media greatly supports both teachers and children in evaluating early mathematical development. This approach allows teachers to easily assess and provide feedback, ensuring that the evaluation aligns with the learning objectives.

Using block media to introduce early mathematics to children can significantly enhance their development. The use of blocks helps improve various cognitive skills, as stated by Fairuz (2021), including thinking ability, exploration, imagination, creativity, and problem-solving. Block media serves as a concrete tool that actively engages children, allowing them to experience hands-on learning. This approach not only fosters the development of early mathematical concepts but also encourages critical thinking and cognitive growth, providing a solid foundation for their future learning.

CONCLUSION

Based on the results of the research and data analysis, it can be concluded that block media is significantly related to the early mathematical development of children aged 5-6 years at Aqila Rajabasa Kindergarten. This conclusion is supported by the results of calculations using the product moment correlation formula with SPSS version 23. With a significance level of 5% (0.05), the findings show a significant relationship, with a p-value of 0.000 < 0.050. The Pearson correlation coefficient of 0.885 is greater than the r-table value of 0.2605, indicating a strong positive relationship. Therefore, the alternative hypothesis (Ha) is accepted, and the null hypothesis (Ho) is rejected. This demonstrates that block media plays an important role in the early mathematical development of children in this age group.

Children can use block media to study various early mathematics concepts. They can practice counting by determining how many blocks they use during play, create patterns using different shapes, colors, and sizes of blocks, and differentiate between blocks based on their attributes. Additionally, children can recognize various geometric shapes and explore building structures with the blocks, even naming the buildings they create. These improvements are evident in the children's cheerful and happy attitudes throughout the learning process. Early mathematical development is crucial during this period, as children's brains undergo rapid growth. When children develop a strong sensitivity to early mathematics, learning in later stages becomes much easier and more effective.

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