

CHILDREN'S SPATIAL IMAGINATION WHEN PLAYING WITH LEGO BLOCKS

Ervina Damayanti¹, Evi Resti Dianita²

¹ Prodi PIAUD, UIN Kiai Haji Achmad Siddiq Jember, Indonesia
e-mail: ervinadamayanti527@gmail.com

² UIN Kiai Haji Achmad Siddiq Jember, Indonesia
e-mail: evirestidianita@uinkhas.ac.id

ABSTRACT

Children's spatial imagination in games using lego blocks can be a supporting factor for developing creativity and innovation. However, many adults have not realized the importance of understanding spatial imagination when playing, especially in spatial games using lego blocks. For this reason, this research aims to reveal children's spatial imagination in playing activities with lego blocks. The research approach used is an approach to the type of phenomenology. The research was conducted on several children aged 3-6 years. The results showed that children are interested in practicing their visual-spatial skills by playing with lego blocks. In addition, there are no indications of the existence of a stereotypical form of spatial imagination from the activity of building Lego blocks in children.

Keywords: children, spatial imagination, playing, lego blocks

ABSTRAK

Imajinasi spasial anak dalam permainan dengan menggunakan balok lego dapat menjadi faktor pendukung pengembangan kreativitas dan inovasinya. Namun, banyak orang dewasa belum menyadari pentingnya memahami imajinasi spasial anak ketika mereka sedang bermain, khususnya dalam permainan spasial menggunakan balok lego. Untuk itu riset ini bertujuan untuk mengungkap tentang imajinasi spasial anak dalam kegiatan bermain dengan balok lego. Pendekatan penelitian yang digunakan ialah pendekatan kualitatif dengan jenis fenomenologi. Riset dilakukan pada beberapa anak usia dini yang berusia 3-6 tahun. Hasil penelitian menunjukkan bahwa anak-anak mempunyai ketertarikan untuk melatih kemampuan visual-spasialnya dengan bermain balok lego. Selain itu tidak terdapat petunjuk adanya bentuk imajinasi spasial yang bersifat stereotipikal dari aktivitas membangun balok lego pada anak.

Kata Kunci: anak, imajinasi spasial, permainan, balok lego

INTRODUCTION

Every child has their special imagination, which is different from one another. Rich imagination can be one of the markers that a child has high creativity. As stated by Desmita (in Fakhriyani), among the characteristics of creativity in children is the presence of a strong imagination, in addition to other indicators, such as self-confidence, initiative, and broad interest (Fakhriyani 2016). According to Taylor, imagination refers to a person's mental capacity to transcend time, place, and circumstances, to think about what might happen, plan and anticipate the future, create fictional worlds, and consider alternatives far and near to experience. This multifaceted capacity usually appears early in life and develops over time throughout a child's preschool years (Taylor 2013).

Furthermore, Suyadi (in Subiyantoro; Habsari) revealed that children usually tend to have more diverse imaginations than adults. (Habsari 2017; Subiyantoro 2012). Margaret Mose Nice said that a child's imagination is like a poem. They can create joy, but on the other hand, their originality and creative power contain a sense of genius and deserve to be appreciated according to the value of their genius. However, unfortunately, many adults know almost nothing about the fundamental factors that affect children's creativity and how to use them (Nice 1919).

According to Vygotsky's theory of imagination, imagination is not just a static mental pastime. It is also not just an activity without consequences in reality but has an essential function for human life. Creating new ideas and discoveries requires a particular form of imagination which is also determined by culture and social environment (Vygotsky 2004). Based on Vygotsky's opinion, imagination plays a significant role in determining the progress of human civilization.

According to Fleeer, imaginative creation can appear when the physical and psychological conditions needed for its formation are ready. In this sense, Fleeer notes that imagination is a collective historical experience acquired from childhood. It can be influenced by playmates or adult social action through planning and implementing specific game-based programs such as those in schools and kindergartens. Being supported by these cultural and historical activities, the relationship between imagination and everyday reality forms into awareness in children (Fleeer 2011).

Smith and Mathur said that children who are imaginative and easy to create fantasies tend to have better coping skills and mechanisms and have the ability to regulate their emotions (Smith and Mathur 2009). According to Lazarus and Folkman, as quoted by Pourang and Besharat, Coping is a series of behavioral and cognitive responses that aim to reduce the pressure of stressful situations to a minimum (Lazarus and Folkman 1984; Pourang and Besharat 2011). Therefore, the development of children's imagination is significant to be done by parents and early childhood educators.

The development of children's imagination can be done in various ways, including playing activities. Games can help stimulate children's imagination. Play activities can also allow children to demonstrate the skills they have mastered and enjoy greater flexibility and creativity (Lin 2010).

One play activity that has survived for centuries is playing with lego blocks. Lego blocks are a type of game tool/media in the form of a three-dimensional cube/rectangular box made of plastic and can be assembled into a specific shape/building. Therefore, playing Lego blocks is a game that supports a constructive learning approach. It opens up opportunities for children to bring out their creative power more authentically and freely.

Educators and experts agree that playing with blocks or other constructive games can provide various possibilities to improve the quality of learning and development of children's creativity in the early years (Verenikina 2014). Children are direct learners. They have high enthusiasm and interest in being involved in activities in which there is an activity to manipulate objects. Physical manipulation using wooden blocks or plastic blocks of various shapes, sizes, and colors can attract children's attention and involve them in physical activity. These activities can also help the development of fine motor skills, train eye-hand coordination in children, and stimulate their imagination and creativity (Verenikina 2014).

In playing with building blocks, children usually like to be creative, do experiments, and have complete control. They can use blocks to make replicas of palace buildings and trains to make fires, planes, and other objects without any limits to their imagination. The nature of the assignment of play activities like this tends to be open and provides many choices for children without limits. However, it is undeniable that imagination is the key to determining children's creativity when playing with blocks. According to Verenikina, this type of constructive play can contribute to the development of problem-solving skills or children's ability to find solutions to the obstacles they experience. In addition, assembling toy blocks in various shapes and three-dimensional spaces can stimulate children's spatial abilities and mathematical thinking (Verenikina 2014).

Many adults do not understand the importance of mentoring and instructions given to children when playing with lego blocks. Games with Lego blocks and children's imagination can be interrelated to sharpen their creativity and innovation power, especially in the context of spatial abilities. According to some experts, spatial ability is closely related to children's logical thinking skills (Xie et al. 2020). Some even say that spatial abilities contribute to children's skills in mathematics, science, technology, and engineering (Shea, Lubinski, and Benbow 2001). Based on this rationale, it is necessary to have research that can observe the process children go through in optimizing their imagination, especially when playing using Lego blocks.

METHOD

This study uses a qualitative approach to the type of phenomenology. Lincoln and Guba in Mulyadi argue that in a qualitative approach, researchers use themselves as instruments to reveal social phenomena in the field by mobilizing all their sensory functions. (Lincoln and Guba 1985; Mulyadi 2011). Meanwhile, the research approach with the type of phenomenology aims to explore the 'essence' of the meaning of a specific phenomenon experienced by several individuals (Creswell 2015). The role of the researcher in this research observation is as a research instrument that intends to use every function of his senses to capture reality and understand various social phenomena that arise in children's spatial imagination development activities through games with lego blocks.

The data collection techniques used include observation, documentation, and interviews. The sample selection used a purposive sampling technique intending to determine the sample based on a specific purpose, namely based on gender/sex. Observations were carried out using the type of participant observation, namely observations carried out accompanied by the involvement of researchers in informant activities to gather information as a whole. While the data analysis technique uses the Creswell model, which consists of the following steps: 1) data organization; 2) data reading/memoing; 3) describe the data into codes and themes; 4) classifying data into codes and themes; 5) interpret the data, and 6) presenting and visualizing data (Creswell 2015).

There are two kinds of lego blocks, some are products of the Lego® trading company from Denmark, and some are imitation versions sold at lower prices in the market and toy shops in the country. However, the lego blocks used in this research are imitations or cheap versions of Lego blocks.

The informants in this study were 14 early childhood students who studied at the early childhood education level, both in kindergarten and in play groups. 7 of the informants were boys, and the other 7 were girls. The age range of the informants is between 3 years to 6 years. Each informant was observed while doing play activities using medium-sized lego blocks. For data validity, researchers used technical triangulation and source triangulation.

RESULT AND DISCUSSION

What do they build with Lego Blocks?

We know that there are Lego blocks that are trademarked and produced by a company called The Lego® Group from Denmark. This version of the lego block is sold at a reasonably high price in Indonesia. However, there are also lego blocks in cheap versions made of plastic material. They are commonly sold in the market but have nothing to do with the official lego trademark because the well-known company does not produce them. These Lego blocks are widely used as playing

media in early childhood education institutions in Indonesia. It is even possible that the availability of cheap versions of lego blocks exceeds the official version of lego blocks. Therefore, this imitation version of Lego blocks is easier to find and very familiar among children.

Observations were made successively on the children playing with artificial lego blocks. They consist of boys and girls. The children can play for approximately 15-30 minutes to provide flexibility in creating from lego blocks. All of the informants studied are listed in the table as follows:

Table 1. List of Research Informants

Informant	Initials	Age	Sex
1	ABV	3	Male
2	AAR	4	Male
3	AZK	4	Male
4	YKE	4	Male
5	ADM	6	Male
6	RNF	6	Male
7	HYD	4	Male
8	FNA	3	Female
9	ANA	4	Female
10	NRS	4	Female
11	ALS	4	Female
12	HNM	3	Female
13	ARN	4	Female
14	KYL	3	Female

Based on the results of observations and interviews conducted with children in the age range of 4 to 6 years, the results obtained are as follows:

Table 2. List of Children's Crafts from Lego Blocks

<i>Informant</i>	<i>Sex</i>	<i>Craft</i>	<i>Reason for Making</i>
ABV	Male	Train	He likes toys related to transportation, one of which is trains. Trains are long vehicles and can carry many people from one place to another.
AAR	Male	Gun	He likes things related to war and combat, such as guns and swords.

			According to him, a gun is a great weapon to use to attack enemies.
<i>AZK</i>	Male	Walls	When playing with blocks, he imagines he is looking at a high wall in his house, so he makes a wall or walls from lego blocks.
<i>YKE</i>	Male	A Tower	According to him, the tower is an exciting building because of its towering shape.
<i>ADM</i>	Male	A Suspension Bridge	He wanted to build a big bridge connecting the two lands, and a river flows under it. On the bridge, he put small cars that seemed to be crossing the highway on the bridge. He imagined a big bridge
<i>RNF</i>	Male	A Dragon	According to him, dragons are great animals because they can shoot fire and destroy any object it attacks. He had seen dragons in animated games.
<i>HYD</i>	Male	A Big Boat	He wanted to build a ship because he thought the ship was a vehicle he had never seen before. He wanted to get on a ship. He tells about a ship sailing in the ocean while playing with lego.
<i>FNA</i>	Female	A House	She imagined building houses. He made a shape that he thought resembled a house. According to her, the house is attractive because it can protect him and other family members from the heat and rain.
<i>ANA</i>	Female	A Gun	She made a tool to shoot enemies,

			which he called a gun. He thinks guns can be used to beat bad guys.
<i>NRS</i>	Female	A Gun	She claimed to have seen a gun in a video on Youtube. Usually, police use a gun to carry out their duties
<i>ALS</i>	Female	A Truck	She has a toy truck that has four wheels at home. She wants to make a truck shape like his toy truck.
<i>HNM</i>	Female	A Tower	She claimed to have seen the tower building on television. According to him, the tower is a very tall building. She wants to build a tall tower out of Lego blocks.
<i>ARN</i>	Female	A Tower	According to this informant, the tower's shape is an exciting form because it can bring people to see places far from a height.
<i>KYL</i>	Female	A Mountain	She has seen firsthand the very high mountain ranges, and some mountains are not too high

Spatial Imaginations and Children's Works

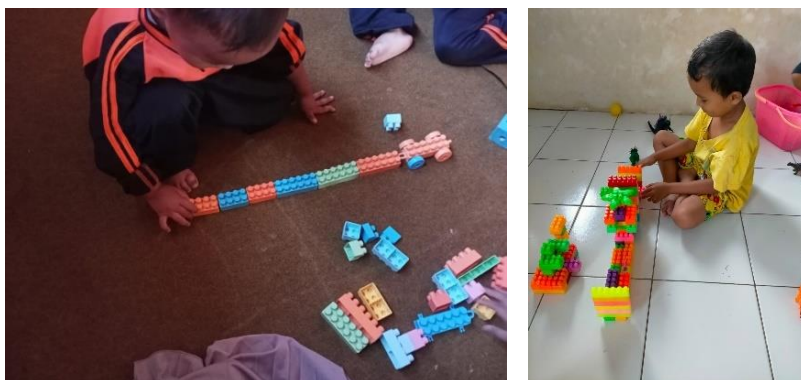
Based on the observations of 14 children, it was found that 11 of them made relatively large reality objects from the arrangement of lego blocks. They are inspired by the original shape of these objects in the real world, where the size of these objects is more prominent than their body size. Among the eleven children were those who built a train, a building wall, a tower, a bridge, a ship, a house, a transport vehicle/truck, a fire dragon, and a mountain. While the other three people made relatively more minor objects or made objects they observed from legends, animated films, cartoons, and video games, namely pistols.

Each child's creation from the arrangement of lego blocks can show different forms and spatial abilities. The ability to visualize much larger objects shows that children can describe shapes by presenting a picture of the spatial shape of the large object. One example is found in the fifth informant. He can form objects with three-dimensional spatial structures that he has seen in

the real world from lego block toys similar to the original, namely making a suspension bridge under which crosses a river or canal. He made the bridge along with the supports and pillars from lego blocks of various sizes.

Children's ability to understand the perspective of spatial planning in three dimensions like this is classified in the form of spatial intelligence (spatial intelligence). In Howard Gardner's theory, spatial intelligence is one of the seven multiple intelligences (Gardner and Hatch 1989). This intelligence allows us to recognize faces, find our way around sites, and pay attention to fine details (Gardner 2001).

Picture 1. Kids are making creations using lego blocks



According to Clements and Sarama, spatial visualization is the ability to generate and manipulate images (Clements and Sarama 2011). According to Maier (quoted by Sorby), spatial visualization is one of the components of spatial skills (Sorby 1999). According to Sorby, there is a distinction between the terms spatial ability and spatial skills. Spatial ability is defined as the innate ability to visualize what a person has in his or her mind before any formal training takes place. Just as a person is born with natural abilities, that is visual ability. At the same time, spatial skills are obtained from something learned or obtained through training/learning (Sorby 1999).

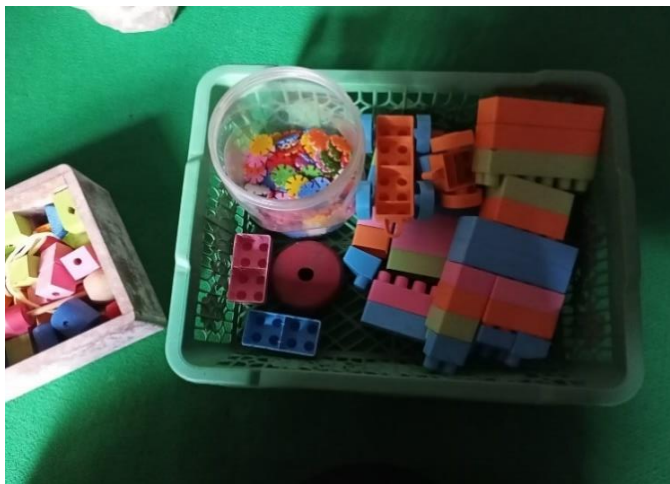
Meanwhile, Lego blocks are included in the visual-physical media used to develop spatial abilities in early childhood. Lego blocks have various shapes, sizes, and colors. Lego blocks are three-dimensional shapes in the form of squares and rectangles, with at least one pair of them being of different sizes. A block has six sides, 12 edges, and eight vertices.

This block game is straightforward to find in every playground, kindergarten, or home. Children usually arrange lego blocks on the floor. Sometimes they arrange lego blocks lengthwise to the side or stack them so that they rise like towers. The arrangement of lego blocks invites their attention to concentrate. Thus, children will learn to construct a building. They can make several buildings or towers, which are then connected to roads or other components.

During playing with lego blocks, the children looked excited and showed their initiative to create objects that they thought were extraordinary or things that they thought were big and great. Children's creations using lego blocks show that they can freely explore the shapes and details of

certain buildings or objects. Although, in practice, the mood or mood of children can change at any time, playing with lego does not limit children's expression. Sometimes they can finish building a house or train in 10 minutes and then suddenly dismantle it and change it into another form of an object.

Gambar 2. Plastic Lego Blocks



In addition to honing children's creativity and innovation, playing activities using Lego blocks also stimulates children to collaborate with their playmates. It looks from the conversations that arise during play activities. Some examples are "what do you want to make? I made a suspension bridge" or sentences like "how about we swap blocks?" when one of the children needs a different lego block that the other friend is using. Conversations like this are very likely to occur when two or more children are playing with Lego blocks together. That is, the game of lego blocks can be arranged collaboratively. Sometimes 2-3 children can form the same building to help each other assemble it. The finding of this study is in line with previous research conducted by Kato et al., which showed that collaborative block creation has a positive effect on social skills and trust in others and can be used in education, therapy, and cross-cultural groups as a medium of communication (Kato et al. 2012).

From a gender perspective, lego blocks are not stereotypical. It can be a medium of play used by boys and girls. Based on the observations, two girls and one boy made pistols from lego blocks. At the same time, toy guns are a type of stereotypical media because they are often considered more suitable for boys. That is, there is no indication of a stereotypical spatial imagination from the activity of building Lego blocks in children.

In this regard, Brosnan points out that gender differences in spatial abilities have long been debated among experts. These differences depart from gender differences in terms of children's play preferences. A study involved 30 boys and 20 girls and asked them to build specific three-dimensional models using Lego blocks. They also received a Shepard and Metzler mental rotation test. The results of the study showed that those who completed the Lego model were significantly

more likely to have higher spatial abilities than those who did not. However, at the end of the discussion of his study, Brosnan said that there was no significant gender difference, because both sexes played with the 'spatial toy' (Brosnan 1998).

Research conducted by Alsrour and Al-Ali also shows that there is no statistically significant difference ($\alpha=0.05$) between the average value of creative thinking in the use of Thinking Creatively in Action and Movement (TCAM) due to the influence of gender (Alsrour and Al-Ali 2014). This result is under the results of other studies that there is no significant difference between girls and boys (Alsrour and Al-Ali 2014; Baer and Kaufman 2008; Potur and Bakul 2009).

In contrast to him, Cassey et al., as cited by Saracho and Spodek, said that there are some indications that girls tend to benefit more from spatial interventions. Researchers have found that the relationship between spatial skills and achievement in mathematics is more substantial in girls (Saracho and Spodek 2008). In more detail, Fennema and Tartre research and suggest that boys and girls in secondary school have significant differences in their verbal and spatial abilities. Their research also found that spatial skill level was more important in math achievement for girls (Saracho and Spodek 2008).

Despite these differences of opinion previously, Brosnan's previous findings indicate an indication of a relationship between children's play with Lego blocks and their spatial abilities (Brosnan 1998). It is also consistent with the results of a longitudinal study which showed that building block skills in preschool children are predicted to support mathematics achievement in middle and high school (Saracho and Spodek 2008).

For this reason, adult support for children's play activities should not be only participating in playing activities. Setting children's playtime, management of the physical and material environment, and the existence of social partners are essential elements that adults must consider, both parents and teachers in kindergarten. It is consistent with previous research showing that children worldwide play in creative ways despite being limited by time and work and that a variety of play partners can support their development (Saracho and Spodek 2008).

CONCLUSION

Based on the previous discussion, it is possible to conclude that children have different spatial imaginations while playing and arranging lego blocks. The depiction of imagination in the form of objects from the arrangement of lego blocks shows different variations of spatial imagination. Children's interest in large objects to be used as models when creating from Lego blocks can also be an indicator of the pattern of their spatial ability. However, of course, this needs to be followed up with further research.

Lego blocks can be a medium of play for boys and girls. Both show the same interest in lego blocks. In addition, the results of observations when children play with lego do not show any differences in imagination preferences and children's play style based on gender. Girls can create stereotypical and identical objects with male characters, such as guns. Vice versa, it is possible for boys to create objects that are stereotypically identified with feminine characters.

RECOMMENDATIONS

1. There needs to be more severe assistance from adults, both parents at home and teachers in kindergarten, on children's playing activities, especially when playing with lego blocks. Some essential things that need attention include time allocation, management of the social environment, and the provision of play partners that support the development of children's spatial imagination. Parents can also consider becoming a child's play partner at home.
2. Further research is needed to reveal patterns that indicate a good level of spatial imagination and spatial ability in children. It is also necessary to ensure and explain in more detail whether a child's ability to visualize spatially on large objects can be an indicator of the development of his spatial intelligence.

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