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Increasing Cognitive Flexibility Through Smart Wheel Game Games (Action Research on Children Group A RA Al-Mubarok Tangerang City, 2017-2018)

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Abstract: The aim of this study is to describe the process and results of improve cognitive flexibelity through smart wheel game. The subjects of this study were 20 children. This research method is based on the Research Action Class Action Research model Kemmis and Mc. Taggart which includes four stages: planning, actionand observation, reflection. This action research was conducted in two cycles and each cycle consisted of 8 meetings. The collected data used in this action research was interview, observation and documentation. Teknik data analysis used in this research is the analysis of qualitative and quantitative data. The result of study revealed that the increase of cognitive flexibelity ability children through smart wheel game. The development level of the achievement of the focused attention gained by the children in pre-cycle was 42,1. At the first cycle, the score was 48,6. Additionally, in the second cycle, the result was 54,75. This study revealed that the smart wheel game constitutes as one of the means to increase the children's cognitive flexibelity.
Keywords: cognitive flexibelity, smart wheel game, action research

Introduction

Cognitive ability is one aspect of basic ability that needs to be developed through the provision of appropriate and positive stimulation. Cognitive ability describes brain development (*brain*) of children so that it can perform its function in thinking. One of the cognitive functions is the executive function. One aspect of the child's executive functional ability is *cognitive fl exibility*. As Jelena Obradovic points out, executive functions as a set of high-level cognitive skills (self-control, working memory, and cognitive flexibility) that help children manage their own attention, behavior, and emotions.

Cognitive fl exibility or known as flexible thinking ability is the ability of individuals to think and flexible action in accordance with changing circumstances that will help children develop and use their imagination and creativity in solving problems.

Cognitive flexibility in children is still not developed optimally, seen from the observations made by researchers, as well as teachers class A group AA Al-Mubarok. The children of A RA Al - Mubarok group of Panunggangan Subdistrict of Pinang Tangerang Sub - district are 20 children, consist of 13 boys and 7 girls. Not yet optimal *cognitive flexibility is* child'sseen from: 1) 15 children or about 75% of the total number of children, not yet able to group objects by color, shape, and size; 2) 15 children or about 75% of all children, have not been able to comply with the rules of the game; and 3) 15 children or about 75% of the total number of children, have not been able to follow the changing steps in the game**.**

Learning in kindergarten / RA will be more effective if using methods and approaches appropriate to the world of children, namely the world of play. For children, playing is the main activity, the most important, and the basic needs. By playing, they move freely, actively, and dynamically. Playing can stimulate children's minds, provide opportunities for the birth of ideas, and expand new ideas. Based on the problems encountered at school, researchers designed a study using games in order to improve *cognitive flexibility* in children.

The game *smart wheel game is* basically the same as the play wheel game. In the play wheel the game is performed to show the numbers and the child can move and move according to the number that appears. Basically the ability of children in counting can not be separated from how the child's cognitive function develops. Therefore, from the research, researchers modify the play wheel game to further improve its cognitive function, namely by inserting various other media, such as image cards.

The game can be adapted to themes in the ongoing learning process. This game is also specially designed to attract children and can develop their ability to recognize the concept of numbers, and improve memory work to remember the various numbers and objects that he encountered, so that children can finish the game. Therefore, the researcher conducts research entitled "Improvement of *cognitive flexibility* through *Smart Wheel Game Game"*

Based on the things that have been mentioned above, the purpose of this research is as follows:

1. knowing the process of implementation of *smart wheel game game* in improving *cognitive flexibelity* in group A RA Al-Mubarok Tangerang City.
2. Knowing result ofimprovement *cognitive flexibelity* in group A in RA Al-Mubarok Tangerang City game *smart wheel game.*

Review of Literature

1. Cognitive Flexibility

J. Bruce Morton (2013: 4) mentions that *"Cognitive flexibility: This involves creative thinking and flexible adjustments to changing requests. This assumption of children in their imagination and creativity to solve problems. "The* statement is interpreted that*cfull flexibility* is a skill that involves creative thinking and flexible adjustment to change. This ability helps children in using their imagination and creativity to solve problems.[1]

c*Anotherognitive flexibility assessment was* expressed by Alicia Benavides-Nieto et al (2017: 474)*"Flexibility: evaluating the presence of problems in the child by changing freely from one situation, activity or aspect of a problem to another, as required by circumstances.*"Noting that flexibility is seen by evaluating childhood problems by altering freely from one situation, activity or aspect of the problem to another, as required by circumstance. It is better understood as seeing how children solve problems in various ways.[2]

Furthermore, c*ognitive flexibility* in Havard University (2011: 2) is defined as *"Cognitive flexibility is the capacity to nimbly switch gears and adjusted to changed demands, priorities, or perspectives. It is what enables us to apply different rules in different settings. "* Further understood c*ognitive flexibility* is the ability to adjust to changing demands, priorities, or perspectives. This is what enables us to apply different rules in different settings.[3]

Gedeon O. Deák and Melody Wiseheart (2015: 31) mention that *cognitive fl exibility is the capacity to modify memory work, attention, and response selection in response to changing endogenous and exogenous task demands.* Interpreted cognitive flexibility is the ability to modify working memory, attention, and selection of responses in response to changing task demands.[4]

Li, Yanwey, et al (2016: 1) mentions that *cognitive fl exibility, de fi ned as the ability to switch between two or more demands, forms the basis of early emotion regulation strategies*. It is understood that c*ognitive flexibility*, defined as the ability to switch mentally between two or more demands, adjusts to the circumstances.[5] The

development of *cognitive flexibility* according to Gedeon O. Deak and Melody Wiseheart (2015: 39) can be seen in three ways: 1) Three Dimension-Changes Card Sorting, in this activity, more applying to the three-dimensional card that the child will classify images by color, size, and shape. The command is performed interchangeably, the child can group various images according to the disclosed command; 2) Flexible Induction of Meaning-Objects, this activity asks the child to mention the meaning of an object. Identify objects more specifically. By first showing the image, and begin to invite the child to identify it, based on shape, size, and color; 3) Flexible Induction of Meaning-Animatesv, this activity is done by mentioning an object from the description that has been described first. Described in advance the characteristics of an object, then the child can guess the meaning of the description that has been disclosed.[6]

From some of the above activities it can be concluded that the method in developing c*ognitive flexibility* in children emphasizes more on how children understand a concept or increase knowledge, understand the rules, and solve problems in various ways. But basically it must be understood that the child in understanding the concept in his environment should be done through play activities that support the exploration and new discoveries for himself, and emphasize the existence of social interaction in children play activities, so the concept obtained by children will be more meaningful.

From some of the above concepts, it can be synthesized that *Cognitive flexibility* is the ability of children in thinking and acting flexibly shown from 1) knowledge of the object, 2) understanding of instruction, and 3) selection of ways to solve problems.

From some of the above opinions, it is concluded that c*ompitive flexibility* is the ability to think and flexible action in accordance with changing circumstances that will help children develop and use their imagination and creativity in solving problems. In this study, we will measure the child's ability in c*ognitive flexibility in* terms of the child's ability to express opinions, take care of circumstances, and choose ways to

resolve problems. Then more specifically explained that *Cognitive flexibility* is one aspect of the executive function.

2. *Smart Wheel Game*

Peter K Smith (2010: 1) many mention thatgames *"playtakes an appreciable portion of many children's time budgets. It seems likely that it is an important part of children's development. "* Which means that playing is needed by children in larger portions. This seems to be an important part of children's development.[7]

Basically play is a very meaningful activity for children's development. Elizabeth Hurlock in Suyadi (2010: 283) reveals that "playing or playing are activities to gain pleasure" from the phrase, it is seen how play is a kagiatan that supports a happy feeling for the child so that the child can perform all activities that are meaningful to him.[8]

Similarly Piaget in Sandra J Stone (1993: 4) also defines play as a form of consolidation practice ofacquisition *mental skill;* playing facilitates the translation of experience into internal meaning. where basically play is a child's activity to gain the mental abilities or skills the child gained through meaningful experiences.[9]

Docket in Yuliani (2009: 144) views that play is a necessity for children because through playing the child will gain knowledge that can develop his ability. In children's play activities try everything around them, children explore the environment and get new discoveries that are meaningful.[10]

Based on the above views, it can be concluded that play is a larger, child-centered activity in life with great pleasure, to gain meaningful experience and develop mental skills through exploring the environment to gain meaningful discoveries.

From various opinions above, it can be concluded that play activities for early childhood that support the executive function of children is to provoke children to think actively and creatively in planning, executing and completing activities by doing exploration in play activities. As for the types of games that support these three aspects is the game of *smart wheel game*.

The game of *smart wheel game* is a game devoted to developing the thinking ability of children, assisted by the playground of a rolling wheel with numbers, as well as drawing cards, games involving the rules that the child must follow in completing the game, done individually or in groups . In this game all aspects of child development can be developed because it contains a variety of knowledge that can be obtained by children

Research Method

This research is a type of*action research*which generally aims to collect data related to the improvement of creativity through clay play. In the research design of this action the researcher plans the research activities take place 8 times a meeting during one cycle and will proceed with the second cycle of 8 times meeting if the results in the first cycle has not reached the assessment criteria or not yet maximal.

Basically this action research uses Kemmis and MC Taggart procedures. This model is essentially in the form of a device that consists of four components that are seen as a spiral cycle and includesthe steps of: planning*(planning),*action (acting), observation*(observing)*and reflection*(reflecting).* These four components are viewed as one cycle. Understanding the cycle in this study is a cycle of activities consisting of planning, action, observation and reflection. If the improvement of creativity in children in cycle 1 has not been successful then the second cycle will be held until the research is declared successful. Where the second cycle is the repetition of the first cycle is the improvement of the results of reflection.

Researchers and teachers collaborate in improving the learning process in children especially in the process of creativity, where the increase in creativity is done by playing *clay* that can trigger children to be actively involved in learning to be creative because it uses media that appeal to children according to the characteristics of early childhood. The design of action research cycles designed by researchers in accordance with the Kemmis and MC Taggart model, as follows

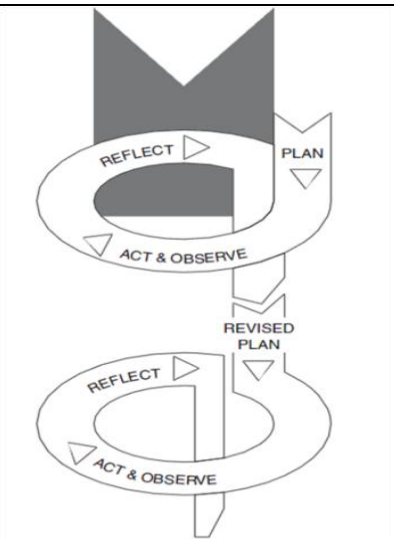

Figure 3.1 Spiral series of Action ResearchModel Kemmis and Taggart

This action study was conducted in the model model Kemmis & Taggart*acting*and*observing*as a whole because they consider that the two components are two inseparable activities. Where in this study, researchers provide action in order to improve the ability to think flexible children through the application of *smart wheel game game.*

These stages occur repeatedly, until the objectives of the study are achieved. Therefore, the definition of cycle in this model is a cycle of activities consisting of four components, namely: planning (*planning*), action (*acting*), observation (*observing*), and reflection (*reflecting*).

Data analysis techniques conducted in this research are qualitative data analysis techniques and quantitative data analysis techniques. The technique uses Mills and Huberment opinions consisting of: data *collection*, data *reduction*, display data anddata *conclusing drawing / verification.*

Research Results

Cognitive flexibility of children in A-RA Al-Mubarok group of children has improved greatly. In the observation cycle II, seen the average score of achievement level of *cognitive flexibilityity of* children has increased. Seen from cycle I that has score of 48,6 which is in developing category according to expectation, and experience improvement in cycle II with score 54,75 with category developing very well. The increase of the average score of achievement level of *cognitive flexibelity is* child6.15.

After the action is done in cycle I, then obtained result thatdata of *cognitive flexibelity* child have increase. There are 45% or about 9 children from 20 children who have reached the level of achievement that has been determined by researchers and collaborators. There is an increase in the average achievement rate of *cognitive flexibility* childwhich in the pre cycle obtained score 42.1 and cycle 1 with score 48, 6. So that the average score increase in cycle I is 6.5.

In cycle II obtained data showing that *cognitive flexibility of children* in children group A RA Al-Mubarok has experienced a good improvement. In the observation cycle II, seen the average score of achievement level of *cognitive flexibilityity of* children has increased. Seen from cycle I that has score of 48,6 which is in developing category according to expectation, and experience improvement in cycle II with score 54,75 with category developing very well. The increase of the average score of achievement level of *cognitive flexibelity is* child6.15.

Cognitive development is very important role in children process information. One that must be developed is *cognitive flexibility*. *cognitive flexibility* is a child's ability in 1) knowledge of the object, 2) understanding of instruction, and 3) selection of ways to solve problems.

In this study, researchers used the game *smart wheel game*. Where this game emphasizes the active activities of children in finding new information with the help of the media in the form of rotating wheel numbers. *cognitive flexibility* which is one aspect of the development of executive function in children can be developed through the play process.

It can be concluded that *cognitive flexibility* can be improved with games that support the interaction of children with playmates, as well as activities that explore the environment so that children can get the information they meet, with various rules that must be obeyed in the play.

In this study, researchers lifted the game *smart wheel game* as an activity that supports the improvement of *cognitive flexibility* child. This is in accordance with the game process of *smart wheel game* that supports the activities of children to interact with friends, exploring the media play in the form of rotating wheel numbers, processing information in the form of numbers he encountered, as well as images of objects from other objects such as fruit to increase the child's understanding of the concept counting, and demanding the child to obey the rules so that the child can control himself in completing the game.

In this study researchers and collaborators focused the research by applying the game *smart wheel game* in improving *cognitive flexibelity of* children. Where problem indicators in this game include 1) Grouping objects by color, shape, and size; 2) Obey the rules in the game; 3) follow the changing steps in the game.

These indicators are enhanced through the application of *smart wheel game games. Smart wheel game* is a kind of game that contains the value of math and science. That can cover a wide range of topics, according to the learning objectives. The game *smart wheel game* can be said as a play wheel game that can be played individually or in groups. *smart wheel game* aims to stimulate all aspects of child development, both cognitive aspects, physical aspects of motor, language aspects, and social aspects of emotional. Stimulus aspects of child development can be done by planting the concept of mathematics and science.

Indicators Grouping objects by color, shape, and size can be enhanced through *smart wheel game games* by inviting the child to play the wheel and recognize the number symbol. The child is asked to group objects according to the number of numbers, either by color, shape or size. To gain an understanding of colors, shapes and sizes, the child must have a fun atmosphere through play activities.

This is in accordance with the views expressed by Ece Özdoan (2011: 2118)*"playfacilitates learning relevant processes such as rehearsing, Practicing, repeating, imitating, exploring, discovering, revising, extending, combining, transforming, testing"* means, is widely recognized playing facilitates the learning of such relevant processes as practicing, practicing, repeating, imitating, exploring, discovering, revising, expanding, combining, altering, testing. Exploration, repeating, imitating, finding, rehearsing activities are also found in *smart wheel game games.*

As with the above indicator, the indicators obey the rules in the game and follow the changing steps in the game can be developed through the game of *smart wheel game.* Because in this game there are some rules that must be obeyed by the child. In accordance with Piaget's opinion in Sandra J Stone (1993: 4) also means playing as a form of consolidation practice ofacquisition *mental skill;* playing facilitates the translation of experience into internal meaning. where basically play is a child's activity to gain the mental abilities or skills the child gained through meaningful experiences.

From that opinion then obviously the game of *smart wheel game* can improve the indicator on *cognitive flexibelity of* children. Due to some meaningful experiences for children gained in the game of *smart wheel game.* The game of *smart wheel game* begins by turning a big circle or a rotary wheel in which there is a number that is numbers 1 through 10. In this game *smart wheel game the* child will rotate the wheel until the wheels stop right by marked a small flag to indicate the stop position at the existing numbers in the *smart wheel game* .

After the turning wheel stops the child will do to open the side of the wheels contained small boxes containing various images such as fruit, if the child in turning the wheel stopped at number 3 then the child opened the box that read number 3, and the box turned out is a picture of an apple, then the child takes a picture of an apple piece and put it in a stick according to the number of turns that stop at the rotary wheel, if it stops at number 3 then the apple input is 3, and after that the child can insert a picture of the shaped piece apple to the stick, the picture pieces are not only one picture only, but there are pictures of bananas and mangoes. In this game the child can concentrate to calculate whether it is true that the apple in accordance with the number of apples.

The various numbers that change the child encounters can train the child's ability to adjust the circumstances that occur. In addition, changes can be made through different instructions given in the game. In accordance with the opinion of Docket in Yuliani (2009: 144) view that play is a necessity for children because through playing the child will gain knowledge that can develop his ability. In children's play activities try everything around them, children explore the environment and get new discoveries that are meaningful.

In *cognitive flexibelity of* children, there are many other factors that influence, because basically *cognitive flexibility* associated with other disciplines. Can be illustrated in the following chart:

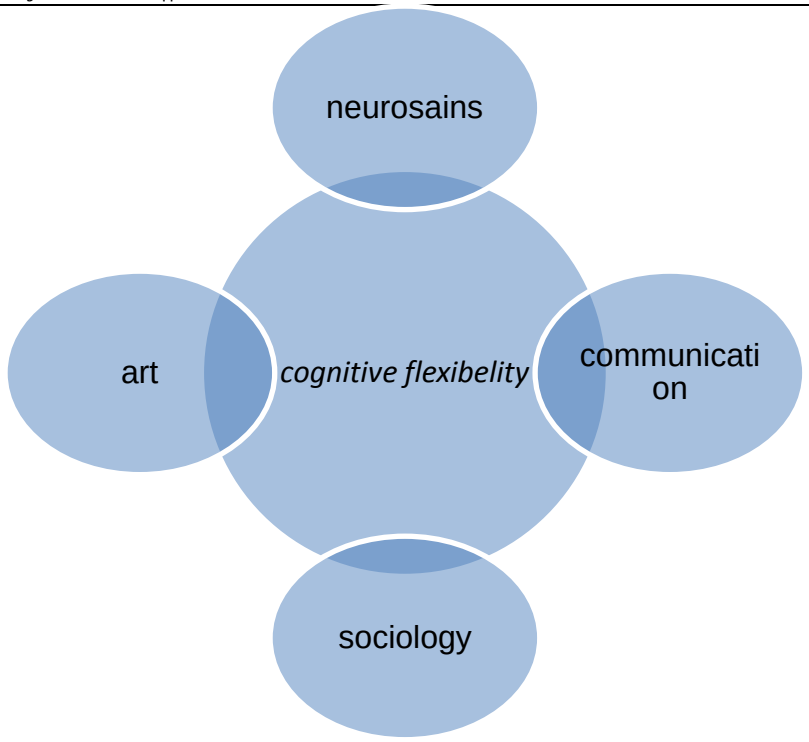

Chart 4.2 Linkages of *cognitive flexibelity* With Multidisciplinary and Interdisciplinary Other Science

The link between *cognitive flexibility* in neuro-science is evident from how *cognitive flexibility* relates to brain function. In accordance with the opinion of Jelena Obradovic (2016: 65) states that *"Executive functions (EFs) are a set of higher order cognitive skills (ie, inhibitory control, working memory, and cognitive fl exibility) that help children regulate their own attention, behavior, and emotions. "* That defined executive function as a set of high-level cognitive skills (self-control, working memory, and cognitive flexibility) that helps children manage their own attention, behavior, and emotions.

Cognitive fl exibility or known as flexible thinking ability is the ability of individuals to think and flexible action in accordance with changing circumstances that will help children develop and use their imagination and creativity in solving problems.

In sociology science is known that children live in social environment and must recognize their environment to gain meaningful experiences. It can be done with play activities, one of them by playing a role. In accordance with the opinion of Beth Morgan Russell (2015) which states that, *"Sociodramatic play provides fertile ground for nurturing the blossoming executive function of the skills of older preschool children. Due to the nature and content of dramatic play with peers, it offers multiple opportunities for children to use the thinking skills of inhibitory control, working memory, and cognitive flexibility. These thinking skills are essential to children's current and future well-being.*"

It is understood that the sociodramatic Game can support the development of executive functioning skills developed from preschoolers. Because of the nature and content of dramatic games with peers, it offers many opportunities for children to use their thinking skills of self-control, working memory, and flexible thinking. This thinking skill is important to improve in children today and the future.

Similar to sociology, the science of communication clearly shows that children play and communicate. In early childhood communication is one of the most important components. Communication means an exchange of thoughts and feelings. Such exchanges can be implemented with any form of language, such as: cues, emotional expressions, speech, or written language. The most common and effective communication is to talk. Essentially in the world of child play requires the other person to express his ideas and thoughts. With communication also can add a new understanding of children about vocabulary that has never heard. Teachers always provide opportunities for children to express their opinions and do question and answer well.

From a variety of *smart wheel game activities* that have been done by children, children gain new experiences in play, and develop knowledge. So it can be concluded that the indicators in *cognitive flexibelity of* children can be developed through the game *smart wheel game.*

Conclusion

Smart wheel game is a type of game that contains the value of math and science. That can cover a wide range of topics, according to the learning objectives. The game *smart wheel game* can be said as a play wheel game that can be played individually or in groups. With various activities performed in the game of *smart wheel game*, then *cognitive flexibilityity of* children can be increased.

Increased *cognitive flexibility of children* in the AA group of children RA Al-Mubarok has experienced a good improvement. After the action is done in cycle I, then obtained result thatdata of *cognitive flexibelity* child have increase. There are 45% or about 9 children from 20 children who have reached the level of achievement that has been determined by researchers and collaborators. There is an increase in the average achievement rate of *cognitive flexibility* child.

From the observations made in cycle II, there are 80% or 16 children who have reached the specified TCP that is 51. So researchers and collaborators conclude the implementation of the action is said to succeed, in other words that the *cognitive flexibility of children* in the group AA RA Al-Mubarok has increased through the application of *smart wheel game games.*

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