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**STIMULATING YOUNG LEARNERS' PHOTOGRAPHIC MEMORY THROUGH  
4D FLASHCARDS TO STRENGTHEN THEIR RIGHT HEMISPHERE**

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**Abstract**

This research aimed to explain how stimulating young learners' Photographic Memory through 4D flashcards can strengthen the students' right hemisphere. In every step of human development, there are a number of experiences happened that cannot be just forgotten. In that process, brain characters process a number of activities. Giving the right stimulus at an early stage of age gives a very great impact on the next human development process. There are several methods that we can apply for balancing the right hemisphere capability, one of them by using flashcards as a medium that uses a card game. Flashcard has several types but one of the most interesting cards is the 4D flashcard. 4D Flashcard is a card with pictures that can move and produce a sound. By introducing this Flashcard to children, they can be more excited to learn. 4D flashcard was first introduced by an application in the Smartphone called Octagon 4D Flashcard. Introducing the learning materials through 4D Flashcard can be delivered in a simple way and most important in a pleasant atmosphere both for the children and the teacher or parent. Even though the learning procedure only takes a few minutes but it gives a real benefit for children in stimulating their brain development. This research is a three-circled case study research in which applied to young English Learners in LIA Padang. The techniques were successful to improve their right hemisphere

Keywords: 4D Flashcard, Young Learners, and Photographic Memory

## I. INTRODUCTION

The character formation of children's brains can be activated by balancing the right and left brains. stimulated One of the brains is not enough, either right brain or left brain only. Especially in the formation of character, balancing both sides of the brain are very crucial in learning. Child development is a process of change in which the increased ability of a child to do physical activity, think, feel, communicate, and interact with people and objects that are increasingly complex. This process is often expressed as physical development, mindset, emotion, and social. The brain is the control center. The development of children by multidimensional and includes the cognitive, sensory-motor, and socio-emotional areas expressed by Martini et al, Pearson Benjamin Cummings (2012). The whole area of this development affects each other. Cognitive is the brain process for thinking that includes attention, memory, and perception. Sensory is the ability to receive stimulation stimuli from the environment. Motoric is the ability to perform body movements. According to Grantham-McGregor et

al (2007), a child who lost the opportunity to develop in his childhood will be able to experience a 20% decrease in income he should be able to achieve in his later adulthood. At the age of 3 years, the baby's brain growth has reached 90% of an adult brain. The growth of each region is influenced by stimulation that will stimulate the neural activity of the brain region. This stimulation is derived from daily learning.

Montessori in Hainstock (1999) says that this time is a sensitive period. During this time the child is particularly receptive to stimuli and the environment. Montessori further states that the golden age is a period in which children begin to be sensitive to receive stimulation and efforts education from the environment either intentional or unintentional.

In general, the right side of the brain controls the left side of the body and the left side of the brain controls the right side of the body. Although the two parts of the human brain look similar, different functions. In most people, the left side brain functions for language, reasoning, calculation, and speech. While the right side of the brain

works for emotion, face recognition, and music. There are several parts of the brain whose function is focused on things like shape recognition, consciousness, abstract thinking, and more (Patterson et al, 2013). The brain will be easier and more efficient to perform certain tasks if there is one area that is only devoted to the function. It also allows the brain to perform multiple tasks simultaneously (multitasking), for example, one part of the brain plays a role to speak, then the other part plays a role in recognizing faces, places, objects, and maintaining our balance. There seem to be also other advantages of sharing the two sides of the brain. For example, human studies also predict that brain division is useful for the development of cognitive skills, including IQ, fluency in speech, and reading ability. DePorter (2002) reveals that the left-brain thinking process is logical, sequential, linear, and rational. The left brain based on reality is capable of performing abstract and symbolic interpretations. The way of thinking is appropriate for regular tasks, verbal expressions, writing, reading, audiotorial

associations, placing details and facts, phonetics, and symbolism.

## **II. REVIEW OF RELATED LITERATURE**

### **2.1 Nature**

The brain is a very fundamental part of the process of human thinking, both in understanding something and to understand new knowledge. In addition, the brain is the center of thinking, behavior, and human emotions that reflect the whole self (selfhood), culture, psychology, language, and memory. Further, Descartes (as cited in Semiawan, 1997) suggests that the brain is the center of consciousness of people, while the human body is a horse.

Therefore, its development should be given good stimulation, in order to develop optimally in carrying out its function. As suggested by Tanner and Santrock (2007) that the number and size of brain nerves continue to increase at least until the age of adolescence. Some of the increase in brain size is also caused by myelination, a process in which many brain cells and the nervous system are enveloped by layers of fat cells that are

blocked. This increases the speed of information flow within the nervous system. Another important aspect of brain development at the cellular level is the dramatic increase in connections between neurons (neural cells) (Ramey and Ramey in Santrock, 2007). A synapse is a thin gap between neurons where the connection between neurons is formed. According to (Huttenlocher, et al in Santrock, 2007) the connection used will be strengthened while the untapped will be replaced by another connection or will vanish. This means that in neuroscience, these unused connections will be trimmed in the visual cortex area (sight), auditory (auditory), and prefrontal (reasoning, self-regulation) in the brain.

These areas are essential for the implementation of advanced cognitive functions. Such as learning, memory, and reasoning. Ivry (in Santrock, 2007) reveals that within individuals with an intact brain, there is a specialization of functions in several areas :

a) *Verbal Processing.*

The most extensive research on the two hemispheres of the brain is on the language aspect. In most individuals, speech and grammar are in the left

hemisphere of the brain. However, this does not mean that all language processing is done in the left hemisphere. For example, understanding the language aspects such as the proper use of language in different contexts. Metaphors, and humor, also involve the right hemisphere.

b.) *Non-Verbal Processing.*

The right Hemisphere is commonly more dominant in non-verbal information processing. Like the perception of space (spatial intelligence), visual recognition, and emotion. For example, for most people, the right hemisphere works primarily as they process information about a person's face (Santrock, 2007). The right Hemisphere's brain may also be activated when people express emotions and when they recognize the emotions of others. (Heller, et al, in Santrock, 2007). Furthermore, the Semple's study (in Semiawan, 1997) explains that if the process and brain function of the right hemisphere is enhanced. the skill of one's work increases and the learners exhibit a tendency to study the various fields more deeply and diligently.

## **2.2 Brain Development of Children aged 3-6 years**

By the time the child is about 3-4 years old, the child's basic neuron connection system is well connected, while his nervous system begins to expand. Networks that get a lot of reinforcement will grow well and be maintained, while those who do not get strengthening will weaken and over time will disappear. By the time a child is 2-3 years old, connections between different parts of the brain continue to expand. All the parts that have been connected in the connection network begin to work as one unified whole. As children aged 3 - 4 years, strong connection lines begin to build in associative tissues. These pathways reinforce the connections between the auditory and vision centers, between the hearing and motor areas, allowing for the best possible coordination of vision, hearing, and motor neurons. With such strong connections, the child begins to control the motion, stop, move again, change direction abruptly, and imitate other people's movements like clapping or kicking at high speed.

Furthermore, when children aged 4-6 years nerve connection arrangement is functioning properly so that it can coordinate the brain and movement, both physically and non-physically well. At this age, the child, in general, has entered kindergarten school. Therefore, kindergarten was created as a bridge to facilitate the transition period between infancy and childhood. Kindergarten must also begin to introduce children to a wider culture and world. It is in preparation for academic learning in the next years (Suratno, 2005).

## **2.3 Left Hemisphere and Right Hemisphere**

DePotter & Hernacki (2000) says that the human brain has three basic parts called the "triune brain (reptiles, owned by all reptiles), the limbic system (mammals, owned by all mammals), and brain thinking (neocortex). These parts of the brain have different functions:

1. Brainstem (Reptilia): sensory-motor function, survival, "face or flight".
2. Limbic system (mammals): feelings/emotions, memory, biorhythmic, immune system.

3. Brain thinking (neocortex): Intellectual thinking, reasoning, sane behavior, language, higher intelligence.

The brain is divided into two major parts of the left brain and the right brain. The left brain regulates and controls the right side of the body and the right side of the brain controls and regulates the left side of the body. Each left or right hemisphere has a different function. The Left hemisphere is closely related to:

1. Logical thinking, related to how to think and analyze logically
2. Language abilities, related to language
3. Writing, related to writing
4. Science & math work, related to matters of science, chemistry, and mathematics.

While Right Hemisphere is related to:

1. Musical & Artistic ability, ability in art and music.
2. Perception of space, used when fantasizing
3. Imagination & fantasizing, associated with imagination and fantasy
4. Body control & awareness, can be seen in the model, a dancer who can control the balance of his body.

The part that connects the left brain and right brain is Corpus Collosum. But sometimes often work the left and right brain conflict occurs. Evident from a test given to children with the form of writing about a variety of colors and then the text is colored differently from the content of the writing. Such as: red, yellow, and green. Conflict occurs because the right brain is more likely to see color, while the left brain is more dominant to read.

## **2.4 Young learners' Memory**

Remembering is the process of calling back information that has been stored as Long Term Memory (LTM) into Short Term Memory (STM). The ability to remember is determined by several factors, namely the organization of memory, automation, and STM. Well-organized memory will be easy to remember (Suyanto, 2005). According to Cicero (Rose & Nicholl, 2006), memory is a valuable part and saves everything. Walgito (2004) states that memory relates to past experiences, it can be said that what is remembered is something that has been experienced and perceived.

Memory is not only the ability to store experience, but also the ability

to receive, keep, and re-create. Suryabrata (2006) adds that human activity not only determined by the influences and processes of the present time, but also by the influences and processes of the past. From the opinion of the understanding of memory according to the experts previously, it can be emphasized that the child's memory is the ability of the child's brain to capture or insert, store, and re-create information that has been seen or experienced by the child. Memory works in four stages: memory recognizes something, impresses in memory, memory keeps impressions, and memory stores what needs to be stored. The development of child memory will be fixed when children aged 4 years ago will achieve the best intensity when children aged approximately 8-12 years. At that time the power of memorization can contain a lot of material, so the memory of kindergarten children is very important to be optimized (Ahmadi and Sholeh 2005).

## **2.5 Photographic Memory**

Photographic memory is the ability to remember events, images, numbers, sounds, smells, and other

things in great detail. Memories already recorded in the brain can then be easily recalled whenever the information is needed.

According to Gordon (2002), Photographic memory is like photography with a camera. You are photographing an event or object with your mind. Then the portrait you save in the photo album. When you need certain information from the portrait, you can easily open your photo album. You just look at the photo, zoom in or zoom out in the desired section, and the information will come back in your memory as if it's still fresh. This phenomenon usually occurs in children.

## **2.6 How to develop photographic memory**

Every child has a Photographic Memory. Photographic memory has to do with the right hemisphere of the brain. Contrary to the logical left hemisphere which consciously reviews all incoming information, the right hemisphere takes images in quickly—at a rate of more than seven images per second. This information is stored in long-term subconscious memory. When the images stored in the

subconscious memory are pleasant, then the child can retrieve the information easily. Teaching photographic memory techniques is a joyful process. It is done simply by playing games. However, sometimes there are blocks to a child's ability to recall information. Therefore, we needed interesting ways to stimulate Photographic Memory.

The right brain is subconscious and intuitive, takes in information quickly, and requires no repetition. Presenting information slowly and repetitively exercises the left brain, while flashing information to a child quickly stimulates the right brain. By age six or seven the left brain is dominant, but before age six there is a window of opportunity where the right brain is dominant. According to Shichida (1993), presenting large amounts of information at a fast pace to infants, toddlers and preschoolers stimulates the right brain and can activate photographic memory. Research shows that young children benefit from being shown flashcards such as Phonograms, word cards, and math cards if sessions are happy, relaxed, and brief, and cards are

presented quickly. Material can always be new and interesting with different pictures, words, facts, or problems. To develop photographic memory and other right-brain abilities that include speed-reading and computer-like calculating ability, we should use flashcards.

## **2.7 4D Flashcard**

Method of stimulating the brain development of children with flash media because this method according to Sumardiono (2007) is the most easily understood method by children especially those who are still in the early age (0-8 years). According to Sakane (2007), flashcard media is a learning method that uses a very effective game card to build children learn to read and know the environment from an early age. The benefits study with flash media include:

1. *Flashcards engage "active recall"*: Active recall has been proven to create stronger neuron connections for that memory trace. And because flashcards can so easily facilitate repetition, they are the best way to create multiple memory-enhancing recall events.



2. *Develop right brain memory – Shichida Method:* The Shichida Method in a Nutshell. The Shichida Method of Education systematically stimulates children's brains according to their developmental age. It simultaneously cultivates children's intelligence and aesthetic sensibility. The Method provides the framework for cultivating children's learning skills.

3. *Train concentration skills:* Typical for children whose memory is below standard is usually seen from the beginning to be more active than other children, have a short attention span, never listening to the information completely and in doing the tasks are often not as expected.

4. *Increase vocabulary quickly:* Flashcards are parts that can help to improve the vocabulary skills of children, especially the ability to listen to Listening skills and speaking skills.

5. *Give an exciting learning experience:* flashcards provide a learning experience that is not found in other media. Learning media is divided into three kinds, among others: audio, visual, and audiovisual. Media cards include visual media as well as image media and other visible materials. The

media card is one of the simplest media that can effectively help the learning process, especially the language of learning. Where the existence of a card that contains writing or pictures will increase the interest and motivation of students in learning.

Flash Card is already very popular in developed countries, but still very little known in Indonesia. This flashcard can be applied to children aged 4 months and over. Flashcard has many types but the most interesting is the 4D flashcard. 4D Flashcard is a card with interesting pictures that can move and make a sound. By introducing this Flashcard to the child, the child is more excited to learn. 4D flashcard was first introduced by an application in the Smartphone that is Octagon 4D Flashcard.

## **2.8 Kind of 4D Flashcard to Stimulate Photographic Memory**

Flashcard is one of the tools that have long been used in effective learning activities, but in stimulating Photographic Memory in children, parents should choose the kind of interest Flashcard. There are kinds of flashcards that can be used to stimulate memory.

#### 1. House Object Flashcard

Flash Card "House Object" is a learning tool for children to know objects that are around the house. The name of the object in the card as well as a device for learning to read. The pattern of images and colors can stimulate the right brain. Various types of child activities will stimulate to increase the potential of intelligence owned by children.

#### 2. Color Flashcard

Flashcard cards for children to provide visual stimulus, color recognition, and train Psychomotor. This learning process can be added with free coloring activities that provide flexibility and stimulus to the right brain in the form of child creativity. By completing one picture to completion, the child also learns to complete the job with due diligence.

#### 3. Alphabet Flashcard

Flashcard alphabet as a means for learning children recognizes letters. The color and image on the card can strengthen the right brain memory in children. Children who through the learning process with flashcards are able to remember words more quickly

than other children who do not learn to use flashcards.

#### 4. Animal Flashcard

Learning the names of animals while learning the alphabet letters is fun. Some of these animal name flashcards consist of animal names such as fish, chicken, cats, and others. This animal flashcard is a great way to introduce the name of the animal, but also a powerful memory development tool for children in introducing pictures of words.

### **III. RESEARCH METHOD**

This research is case study research that is appropriate to be applied in testing if a technique can solve current problem arise. By increasing the students' right hemisphere so that they can think more creatively and critically, the researcher tries to apply 4D flashcards in the teaching and learning process through 3 stages of learning. Pre-teaching activity, Whilst-Teaching, and Post-Teaching. The research was done in LIA Padang. There are 15 participants which consist of 9-10-year-old children.

### **IV. FINDING AND DISCUSSION**

#### **4.1 Pre-teaching Activities**

Pre-teaching is a strategy that involves teaching students concepts or skills prior to a lesson on the subject. The idea is to give the student a preview of the lesson that will allow them to put their knowledge to work during the lesson. Pre-teaching can provide students with more knowledge and confidence when approaching a new topic. This can help to increase engagement and reduce frustration. There are two examples of pre-teaching activities:

First, Create eye-catching displays or working walls for new words. Linking them to a specific theme or topic will help, with symbols or pictures representing the words and their meanings for example word “Chicken”. Point words on the wall and call some students to say vocabulary words out loud. After some students spell it, you close the word and ask students to write it in their notebook. To check the correct spelling, ask your students to describe what they have written.

Encourage verbal use of a new word first, pronouncing it very carefully for the children. A fun activity

is to have the words displayed on the board and after going through them as a group. It can help to clap the syllables within the word as rhythm helps auditory memory skills. Mnemonics can help some children to remember how to spell new words.

Second, ask students to describe the shape of the chicken, and where the children can find the chicken. After the student can describe the chicken, the teacher can show the Flashcard and imitate the sound of the chicken. So, students can remember the shape of the chicken, and the color of the chicken.

To help learners really grasp a concept, consider incorporating drawings into your lesson training is the best theories in teaching, topics, and areas of learning that are taught. Using visual facilitation and pre-drawn flip charts not only helps draw in learners (so to speak) but makes it easier for them to remember the concepts they have just learned. The pictures and the words about the topic offer an easy way for people to link the concept to the picture.

#### **4.2 Whilst Teaching Activities**

Whilst teaching activities vary depending on what learner’s skill or the

ability the teacher would like to practice. These processes may be the most complex to develop in a classroom setting. In this activity, the teacher can stimulate the student's memory.

First, the student sits in a circle. The teacher holds up and scans a 4D flashcard and shouts the name example "Chicken". The teacher passes it on to the next student who also says its name and passes it on to the next student. This way to help the student's name of Chicken. By repeating the word chicken then students will always remember the vocabulary.

Second, the teacher matches the flashcard with the food eaten by the animal so, that when the card is scanned the animal will eat it. After the teacher finished matching the food, the teacher gave each animal card to the students then one by one students try to do a scan on the card and the food card. This strategy is used to improve the ability of photographic memory and students can learn what kind of food animals eat.

Third, after all, students match the cards, it's time to teacher puts the animal card on the floor randomly on

the right and puts the food cards on the left. The teacher will call the student to find the animal that was mentioned. After that student chooses and the teacher will do a scan on the card. If the animal appears to feed on the match, the card selected by the student is correct.

### **4.3 Post Teaching Activity**

The post teaching activity provides students a way to summarize, reflect, and question what they have just learned.

After all the materials are given, the teacher gives the student a task sheet. Each student is given a paper that contains the name of the animal. Then the teacher mentions the name of the animal and each student pastes a picture of the animal on its paper sheet. Students who successfully paste the images correctly will be awarded a star by the teacher.

After applying the teaching procedures in stimulating students photographic memory by using 4D flash card in 3 circle. There are some developments in students in the right hemisphere o learning.

1. Flashcards stimulate right-brain ability and develop children's ability to remember things like letters, pictures, sounds, etc.
2. By showing the flashcard to the child's right hemisphere working to remember the shape of the flashcard and flashcard enhances the child's sensory abilities
3. 4D flashcard is attractive and displays real visual images, the child's brain captures the image like a camera and keeps it in long-term memory.
4. The 4D Flash Card creates a sound that the student can hear clearly. With the repetition of the sound on the card, students can quickly remember the word on the card.

## V. CONCLUSION

In development, humans must have passed the stages of developing and changing. In the process of life, a human learns to adapt to various obstacles. It was then that the activation of the character of the brain, whether cognitively existing in the right division. Providing a gracious stimulus to the child's brain as early as possible greatly affects the success of further development. It is important because the brain controls the center of all body

activities both physical and emotional behavior. The development of the brain as the center of coordination of human activity needs to get as much stimulus as possible. Similarly, the intelligence of children is not only formed from intellectual intelligence alone but also from the emotional intelligence contained in the right brain. In this data writer have, the writer thinks 4D Flashcard can stimulate children's Photographic Memory faster. Pre-teaching teaching, whilst teaching and Post teaching methods are also needed to strengthen their Right Hemisphere.

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