

The Influence of Media Video CD Tutorial on Science-based Learning Multisensory-Ecology to Improve Early Childhood Cognitive Ability

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Abstract-Science learning which is provided in early childhood can stimulate and improve children's thinking, and bring out the children's' interest and curiosity. In science learning, children can have various opportunities to understand the universe and environment surrounding them by doing observations, experiments, and various other science playing activities. By using Media-based Learning technology, it is expected that the media will help the science learning process. Various strategies and approaches can also be used by early childhood educators in presenting science learning. The implementation of a multisensory-ecological-based science learning model supported by the use of video tutorial media is assessed to improve cognitive abilities as well as various other abilities in early childhood. Multisensory-Ecological-based science learning is one of the models of benchmarking that prioritizes the process skills and science content through the experience of multiple senses. The use of media learning video CD Tutorial can be an alternative guide for educators early Childhood in delivering materials related to the learning of science-based multisensory ecology so that with the video Tutorial Teachers can develop various activities that can spur and stimulate the cognitive development of children.

Keywords: science, multisensory-ecology, video tutorial, early childhood

I. INTRODUCTION

A. The essence of early childhood

Early childhood is the most important time along the span of human life. Many scholars have stated that children's brain development is optimally in the age of 0 to 5 years. This period is known as "The Golden Age" or is interpreted with the golden period. The children's nerves will multiply and become more connected when the child is given proper stimulation (Sujiono, 2009). According to the NAEYC (National Association for the Education of Young Children), Early childhood is a child who is in the range of ages 0 to 8 years old who get education services in the nursery, pre-school education, kindergarten, and Primary school. In this early childhood, children experienced rapid growth and development, even as a leap of development (Mulyasa 2012).

In early childhood, the maturation of children's physical and psychic functions, so that they are ready to respond and realize the developmental tasks that are expected to arise in their daily behavior. Childhood is a sensitive time so that educators must immediately give direction or stimulation that is useful to the child (Santoso, 2012). Educators should understand the children's developmental periods. The ability to choose activities and match them with child preparedness is significant. Readiness is based on the period of child development, especially the child-sensitive period when they are ready to learn and need to study (Montessori, 2015).

Early childhood is also known as childhood in the early age of 2 to 6 years. Education experts call this time a preschool period where the child begins to enter the preparation period before they start to enter basic education, while the psychology experts call this time a time of practice because at this time the child began Learning the fundamentals of social behavior in preparation for entering a higher social life. In addition, early childhood is also referred to as the time of the Explorer, this label is given because at this time the child wants to know the state of his environment, how his mechanics, how he feels, and how it is part of

the environment. One of the most common ways of exploring the environment is by asking a lot so that this time is also referred to as the inquiring age (Hurlock, 2011).

It can be concluded that early childhood was the most important time in the range of human life and became the foundation for the development of children's potential for the future. It is a critical period where parents and educators must provide proper stimulation so that the potential of children can be optimally able to work.

Traits and characteristics of early childhood development

Early childhood development has its own characteristics. These traits are common and special. Chouhlin in Sujiono (2010) describes the general characteristics of early childhood, including: 1. In early childhood, the child demonstrated a passionate, captivating behavior, sometimes appearing rough at certain times. 2. They begin to learn to understand the world around though sometimes it is still difficult for them to distinguish between delusion and reality. 3. In certain situations the child is good, can cooperate with others at other times become a regulator and claimant. 4. The child begins to develop language skills. 5. Physically at this age, the child has large power and a short concentration range.

Special features that characterize early childhood attitudes including: 1. Happy to ask about what is seen, heard or perceived. 2. The attitude of bent, stubborn and difficult to set often appears. 3. Enjoy playing without getting tired. 4. Glad to explore (explore), never quiet, like to move here and there to know the condition of the environment, very sensitive to the changes that are happening in the environment. 5. The child is an accomplished antigamator 6. Love the fun.

According to Suryana (2013) The unique early childhood has the following characteristics: 1) is egocentric, it can be observed when the child scramble the toys, 2) children have a high curiosity, 3) children are unique, uniqueness owned by Each child complies with the innate, interests, abilities and backgrounds of different cultures and lives. 4) Rich child imagination and fantasy. 5) The child has a short concentration power.

Sujiono (2014) states that early childhood is in the second stage of the pre-operational phases. This stage has a feature that must be considered: a. The development of knowledge with regard to experience close to him and the symptoms that he can observe. B. Exploration and manipulation of a concrete object C. The development of ability distinguish various important aspects in the environment D. Coordination of various knowledge in the operation of the consciences E. Achievement of the ability to think cause and effect. Based on the characteristics that mark the development period of early childhood children, an early childhood educator is supposed to have knowledge of the characteristics of children, so that educators can develop activities and stimulate programs Appropriate and in accordance with its development. The learning process performed by educators should be implemented in an integrated and consider the various dimensions of children's development or according to children's developmental characteristics.

B. Multisensory-ecology based Science learning

Early childhood is also known as the asking time. Children have very high curiosity. Everything that is seen and found will invite curiosity for the child to dig in and understand it deeper. Science learning is a great time for the child to ask questions, investigate, collect data and find answers. The best strategy can be achieved by looking for natural phenomena that can be learned over time. Through learning the children's science will have the opportunity to ask and answer questions, investigate, and learn to apply their problem-solving skills, Lind (2013),

Carin and Sund (in Ratnawati, 2008) define science as a system to understand the universe through controlled observation and experimentation. Science is one of the branches of science that focuses on the study is the nature and processes that exist in it. In addition, science is also science related to how to find out about the symptoms of nature systematically, so that science is not only the mastery of the knowledge Group of facts, concepts, or principles alone but also is a process of discovery. According to Mayesky (2012), Children can obtain their knowledge through science activities. Children will also develop their skills through various science activities. Among them the smooth motoric skills, the awareness of the five senses, the development of various creativities and the emergence of attitudes and awareness to care and keep the environment.

Early childhood science studies can be interpreted as things that can stimulate or stimulus them to increase curiosity, interest, problem-solving and to bring out thoughts and actions such as observing, Thinking, and linking between concepts to events. Everything that appears around us and what is happening around us can also be said as Science (Brewer, 2007).

According to KBBI (2008) Science is systematic knowledge of nature and the physical world including botany, physics, chemistry, geology, zoology and so on. As well as the systematic knowledge gained from observation, research, and trial that leads to determining the nature or principle of something being investigated. Jackman (2012), also explains that science is a combination of process skills (about how children learn) with content (what children learn). The science learning Model that is expected to take place in early childhood is a learning that can stimulate and develop basic children's abilities that include cognitive, social and emotional abilities simultaneously while being able to hone and improve various other basic capabilities.

The importance of science learning for early childhood is to impart to the child that to understand the world or surrounding environment through a process known as scientific investigation (Lind, 2013). Through learning science children have the opportunity to inquire, answer questions, investigate and learn to apply skills in problem-solving. Exploration is the first step of the child in the face of a new situation. Children observe with all the senses including vision, hearing, smell, feel and tasting (multisensory) to classify, predict and communicate so as to find another point of view. This multi-sensory experience is a key thing to build a child's understanding of their world.

The multisensory approach emphasizes teaching by means of visual, auditory, kinaesthetic and tactile (VAKT) principles, involving several sensory modalities. According to Mercer and Mercer in an international journal titled *Multisensory Approaches and Learning styles theory in the elementary school: summary of Reference Papers* (in Fiani, 2012) It is mentioned that the multisensory approach is also known as VAKT (Visual-Auditory-kinaesthetic-tactile) means that students learn best when information is presented in different modalities, which is when involving more than one of their senses.

Sensory detection is the process of detecting the existence of the stimulus from the outer environment through the senses. In humans, there are five sensory systems, namely: (1) visual system (vision); (2) auditory (hearing); (3) somatosensory; Olfactory (smell) and gustatory (tasting). The multisensory experience involves more than one sense of play. Children use all their senses to process their experiences. A multisensory experience with objects and people around the child is a key thing to build their knowledge of the world. (Yaswinda, 2018).

Ecology can be interpreted as a science that learns interactions among fellow beings and between living creatures and their environment. In the ecology of living Creatures studied as a unit or system with the environment. (Hutagalung, 2010). Ecology is also interpreted as a science that examines the reciprocal relationship between living creatures and the surrounding natural conditions. Ecological-minded education is important to form human-ethical environment. (Yaswinda, 2017).

When discussing ecology will not be separated from talks about its constituent components. Namely the abiotic and biotic factors. Abiotic factors include temperature, water, humidity, light, topography, and others. While the biotic factor includes living creatures consisting of humans, animals, plants, and microbes. So multisensory-ecological-based science learning is presented by prioritizing the skills of the science process and the contents through a multisensory experience (involving the senses of sight, hearing, feel, smell, and that emphasizes human interaction with the surrounding environment in an integrated learning with the aim of improving the cognitive, emotional and physical abilities of early childhood children.

C. Cognitive development of children age

Early childhood cognitive development is related to how a child's thinking ability develops. Many experts give his opinion on the child's cognitive development. Various research continues to be developed and spawned new findings. Everything refers to the findings of how the child thinks and how thought develops. Research on neuroscience scientists continues to provide insight into how the brain develops and how it influences the children's thought processes and behaviors.

Piaget in Santrock (2008) expressed his opinion that the cognitive process in children is a unit of soul and body that cannot be separated therefore Piaget presents four basic concepts that become a reference to the occurrence of cognitive itself i.e., (1). Schemes, concepts or frameworks that exist in individual minds (2). Assimilation, a process when a child inserts new knowledge into existing knowledge, (3). Accommodation, a process that occurs when a child adapts to new information, (4). The equator, a mechanism by which the child moves from one stage of thought to the next in his quest to understand his world according to Sujiono (2011) Cognitive is a process of thinking, which is the ability of individuals to connect, assess and Consider an incident. Cognitive development illustrates how the child's mind develops and functions so that it can be thought. The process of thinking relates to the level of intelligence that characterizes a person with a variety of interests, especially aimed at ideas and learning spirit.

Cognitive development refers to the brain and how the brain works. This is related to how the child thinks, how the child sees their world as a child, and how they use his or her mind to learn. According to

Sudarna (2014) stating cognitive is a process that occurs internally in the central nervous structure at the time the human being is thinking.

From the opinion above, it can be concluded that cognitive is a process of thinking that occurs in a child related to the ability of children's intelligence to create something, the ability to respond that can connect a Events with other events so that the child is able to solve a problem.

The essence of cognitive development of early childhood

Basically, cognitive development is intended for the child to explore the world through its senses so that with the knowledge that the child will establish his life and become a human intact. With his nature as God's being to empower what is in this world for the sake of himself and others (Sujiono, 2011). Mena & Eyer in Retraningrum (2016) suggests cognitive development into concern because it relates to skill, memory, language, and problem-solving skills. This shows that it is important to pay attention to the cognitive development of children because it relates to the children's skills and children's proficiency in life.

According to Piaget in Sujiono (2011) Reasons why the importance of teachers developing cognitive abilities of children is: 1) in order for children to develop their perception based on what he saw, hear and feel, so that the child has a complete understanding and Comprehensive, 2) in order for the child to train his memory of all events and events that have been experienced, 3) in order for the child to develop their thought in order to connect an event and the incident that has been experienced, 4) child is able to understand the various symbols, 5) so that the child is able to perform reasoning well that occurs through a natural process (spontaneous), as well as events that occur through the scientific process (experimental), 6) so that the child can solve the problem that he will be able to help himself. The process of cognition encompasses various aspects such as perception, memory, thoughts, symbols, experience, and problem-solving.

Some experts argue that there are several ways to encourage the intellectual growth (cognitive) child of one of them by playing that provides useful experience for the child when later faced with a problem that is more complex in real life (Hughes, 2010). There are many varieties of science games that can be given to children so that they can provide useful experiences. Through the game, the child's thought is trained and developed so that children have the ability to solve problems faced by science methods.

It can be concluded that cognitive development is an information processing activity by stimulating the child's sensory nerve to form long-term memory to help the child complete its development duties in accordance with the stages Development. Teachers play an important role in developing cognitive abilities for children because, through cognitive development, thought functions can be used quickly and appropriately to address a situation to solve a problem.

Characteristics of early childhood cognitive development

According to Piaget (in Beaty, 2013) children compose their knowledge actively and build an understanding of the world and through the four stages of cognitive development, namely: 1. Sensory motor Stage (0 – 2 years) 2. Preoperative (2 – 7 years) 3. Concrete Phase – Operational (7 – 11 years). 4. Formal Stage of operation (11 + years). Based on the stage of cognitive development Piaget in early childhood was called pre-operative period. During the pre-operation, the child has been able to use symbolic thinking that the child is able to develop to mentally imagine an object that does not exist, Soetjningsih (2012).

Meanwhile, according to Yusuf in Masitoh (2005) suggests that the characteristics of children's cognitive development in the preschool period as follows: a) able to think by using symbols, B) His fiction is still limited by perception, c) think still stiff, The way it focuses on the beginning or end of an information, d) the child has already begun to understand the basics of grouping something on the basis of one dimension.

Based on the above opinion can be concluded, that the cognitive development in early childhood (AUD) through a stage and in accordance with the characteristics of each age of early childhood and has begun to show his attention to the ability to read the beginning, Environmental recognition, and basic mathematical abilities.

Factors affecting cognitive development

Vygotsky (in Santrock 2008) contains the view that knowledge is influenced by a collaborative situation, meaning knowledge distributed between people and the environment, which includes objects, artifacts, tools, books, and communities where people interact with others. It can be said that cognitive function comes from a social situation. According to Vygotsky, the child uses talks not only for social communication but also to help them accomplish the task. Language and thought initially evolved apart, then fused. Vygotsky believes that children often use private speech (language used for personal self-reliance) will be more socially competent than those who do not.

According to Sugiono (2011) Cognitive development is influenced by (1) hereditary/hereditary factors. (2) environmental factors, (3) maturity, each organ can be said to be mature if it has reached the ability to undergo the function of each. (4) the formation, all circumstances outside the person that affects the development of intelligence. (5) Interests and talents, (6) Freedom, freedom is the freedom of man to think and choose certain methods of solving problems.

Based on the theory above it can be concluded that there are several factors that can affect the cognitive development of the child i.e. family/offspring, environment, interests, maturity, and freedom of thinking.

D. Learning Media

The word media is derived from Latin *medius* which is the plural form of the word *medium*. Literally, this word means center, intermediary, or introduction. Learning Media is defined as a tool for both physical and non-physical use as an intermediary between teachers and learners in understanding the subject matter more effectively and efficiently (Swandi, 2014). Accordingly, Arsyad (2007) also stated that if a media carries messages or details aimed at instruction and contains the meaning of learning, the media is called learning media. This Media has several terms such as hearing aids, teaching materials (instructional material), hearing communication (Audiovisual Communication), visual education, education technology (Educational technology), props and explanatory tools.

Gagne (in Sadiman, 2012) states that media is all forms of physical tools that can present messages and stimulate students to study, such as books, movies, tapes. This medium becomes a tool to present the materials that will be provided to the students. In addition, the use of media in teaching is preferred to improve the quality of learning and will be able to help learners to increase their interests and learning outcomes. According to Heinich (in the Arsyad, 2007) it states that the media is an intermediary that brings information between the source and the acceptance. While other members Gerlach and Ely (in Asyhar, 2012) say that the media when understood broadly is the material and events that build conditions that make students able to gain knowledge of skills and attitudes.

According to Pritandari (2015), learning will be more interesting when there is a precise combination of a selection of learning methods with the media used. The suitability of learning methods with the learning materials and media will create a positive impression for the students. With this positive impression, the material that has been delivered will not be easily lost. The learning process is often faced with abstract material and beyond the daily student experience so it becomes difficult to understand with the media learning all this process will be able to be easily understood.

From the above explanation can be deduced by the meaning of learning media is a tool that can be used to transmit messages from the sender to the recipient in a learning process, so that learning can run Effectively and efficiently.

E. Video Tutorial Learning

The education system in Indonesia has begun to change. New approaches begin to be introduced for learning to be more memorable and meaningful. Technology is one of the most dominant factors in the change in the education system. The use of technology-based learning media is felt very helpful and very useful in the process of teaching. Video Media is often used in the learning process. The video Media has the advantage of being attracted more even in short duration. Complex and difficult work processes in learning can be recorded in advance. Compared to having to demo executed directly. In addition, it saves time. Meanwhile, the weakness is one-way communication. It must be balanced with other forms of feedback (Chandra, 2016).

Video Tutorials as one media can help the role of lecturers, teachers or resources in delivering the material. With the use of this video, the material can be viewed in a threaded so that the level of understanding of the person who studied was also higher. The language of the video tutorial comes from two syllables namely video and tutorials. According to the dictionary, Video means 1 part that radiates images on television. 2. Recording live images to be aired on television. While the Tutorial means: 1. Class guidance by a tutor for a student or a small group of students. 2. Additional teaching through tutors.

According to Daniel L. Schwart and Kevin Hartman (in Chandra, 2016) The use of the video is designed to be used both to learn through tutorials as well as in assessments and to give comprehensive work to categorize the use of videos into Various learning outcomes are seeing, engaging, doing and saying. In addition, viewing a video can help people to see things that were not previously viewable as well as introduce concepts and objects to the audience.

According to Al Irdaus (in Prithandari 2015) video tutorial is a video made to explain the details of a particular process, how to do certain tasks, how to do exercises and so on to facilitate the task of the trainer

or Instructor or teacher or manager in communicating the material. In this video production process information can be displayed in a combination of various shapes (shooting video, graphics, animation, narrative, and text) that allows the information to be absorbed optimally by watching the video. According to Kesuma (2015) tutorial Video Learning is one of the alternative electronic learning media that contains knowledge and insight into a theory. Through tutorial video learning students can learn independently and with more flexible time and more profitable when a material can not be understood or well absorbed by students then the tutorial video can be Watched again. Video tutorials can be aired repeatedly.

Video tutorials can also be interpreted as a live image recording that serves as a system of communication or media teaching and learning mentoring for learners. Video tutorials can replace the role of educators in presenting material to learners (Baharudin, 2014). The usual learning process during this time is teacher-centered or centered on educators this causes learners to be less active and less involved in the process of constructing a concept.

From some of the above opinion can be concluded that the video tutorial is a series of live images delivered by a tutor or teacher that contains learning messages that help people who are watching understanding a material Learning.

II. CONCLUSION

The development of technology has a very important influence on the world of education, various facilities in the learning process can be obtained from the use of existing technology media. The implementation of science-based multi-sensory learning by utilizing the video tutorial media CD is very useful. Because the presence of video CD tutorials can facilitate and improve the understanding of educators when presenting science learning materials. Early childhood education teachers needed a medium that they could reference and guide when introducing science in the field, especially when the material had to be presented for early childhood. An ecological multisensory-based science learning Program supported by the availability of Video CD tutorials is believed to be effective for developing various aspects of child development including the cognitive development of children. The use of Video CD tutorials Besides being able to improve understanding can also be a reference work step when an educator will introduce science to early childhood. Therefore the presence of science learning tutorials based on multisensory ecology is assessed to provide a great effect to stimulate the cognitive development of early childhood.

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