



**THE INFLUENCE OF MANIPULATIVE TOYS TO MATH LEARNING
OUTCOMES OF 6-7 YEARS OLD CHILDREN (AN EKSPERIMEN IN 1TH
CLASS OF TELUK PUCUNG ASRI VIII ELEMENTARY SCHOOL IN
BEKASI)**

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Abstrak

Mathematics is the based of knowledge that children will find everyday. The application of this science was unconsciously do every day even when playing. However, in educational institutions, especially schools, learning math become a scourge that is very difficult. Thus, the study was conducted aiming to obtain empirical data on the effect of manipulative toys of mathematics learning outcomes of children aged 6-7 years old. The method used in this study is to design experiments Randomized control group pretest-posttest. Data collection techniques using the techniques of written test with objective form fields. After doing analysis of data, the conclusion there are differences in mathematics learning outcomes of children who are given manipulative toys and without manipulative toys. Thus, therefore to enhance the mathematical learning of children aged 6-7 years old, educators need to provide a means of manipulative play in the classroom. Then the material is delivered with a child involving the active use of tools such games.

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INTRODUCTION

Mathematics is a system of quantitative thinking that is a development of thinking skills. Mathematics can shape a person to be more disciplined in your thinking, because in it there is a systematic steps to solve a problem. Without realizing it, children will always encounter the mathematics everyday. Such as pouring a glass of water, the child will use the mathematical sciences, namely an estimate or predict which will occupy a glass of water. Thus man can not escape the math.

But the reality that exists in society, mathematics has always been a frightening specter. Mathematics lesson that is feared to be causing the child's learning outcomes has declined. This is caused by some unscrupulous educators who sometimes pay less attention to the development of student learner characteristics, which in this case is the early childhood. Thus, educators sometimes pay less attention to the stages that must be given a developmentally appropriate early childhood, especially children aged 6-7 years. At this age according to Piaget, cognitive stages children are still in pre-concrete operational stage. At this stage of the child still requires concrete objects and fun method of obtaining information about a concept. Educators do more for the transfer of information in the form of knowledge without regard to the understanding and the application in daily life as a stage of the process of children's cognitive domain that is being developed. Thus the cognitive development of children less than optimal.

Besides mathematical material delivered only by using the lecture method and doing the questions in writing only, so that children are less eager to learn. Implementation strategies varied learning and fun for children can be done through play. This is in accordance with any principles of early childhood learning, by learning through play. This is so the child's long term memory can be more easily used to receive and store information. According to Woolfolk, information would easily be absorbed if the source of information to the attention of the

child. Therefore, researchers interested in studying the influence of manipulative toys form learning outcomes of children aged 6-7 years.

RESULT AND DISCUSSION

Mathematics Learning Outcomes

According to Abdurrahman, the results obtained by studying the ability of a person after going through the learning activities (1996:31). According to Sudjana, learning outcomes are shown the results after a learning experience (2005:5). According to Waluyo, the results of learning are learning the value determined by the assessment or measurement of learning in the learning process as per time (1997:20). Activity measurement was carried out to measure the success of the children receiving the information when teaching and learning activities take place.

It can be concluded that learning outcomes are the results obtained after the child through the learning experience. The results were determined through measurement when the learning process takes place or at a particular time.

Learning outcomes can be influenced by several factors both internal and external. Internal factors consist of physical and psychological. Physical factors include physical health. Psychological factors include intelligence, interests, talents, motivation, and maturity. External factors consist of the curriculum, interaction with teachers, environmental conditions are conducive and effective, and the community. These factors include the child's activity, the role of the media, friends hanging out, and forms of community life in the environment around the child.

According to Copeland, mathematics is a quantitative thinking as developing the ability to find, create, test, and generalize (1994:112). Mathematics is not only concerned with numbers, but it is a set of ideas and principles that can understand and relate to each other.

According to Johnson and Myklebust in Abdurrahman, the symbolic language of mathematics is a practical function to express the quantitative relations and spatial (1996:217). According to Bakhtiar, mathematics is a language that represents a set of meanings of a series of statements to be conveyed (2004:188).

Based on some previous statements can be concluded that, mathematics is a symbolic language that is a result of the development of quantitative thinking ability to discover, create, test, and generalize to express quantitative relations and spatial.

According to Burn and Lorton, mathematics for early childhood has three stages, including: (1) understanding the concept stage, (2) phase transition, (3) phase of the introduction of symbol number (2000:22). Understanding of the concept stage is the initial stage of the child to obtain information about mathematical concepts. At this stage of early childhood, particularly children aged 6-7 years will be introduced to mathematical concepts through concrete objects, because the cognitive stage of pre-operational children are still concrete. At this stage of understanding the concept, the child will get to know eight-track mathematics, including numbers (arithmetic), patterns and functions, geometry, graph metrics, estimation, probability, and problem solving (2000:2).

The second stage is the intermediate stage of understanding the concept with the introduction of the symbol number. At this stage students begin to connect the concrete objects with mathematical symbols. For example, there are two pictures of umbrellas are connected by two-digit symbol. The third stage is the stage number symbol. At this stage the children have started to use mathematical symbols and no longer using objects to make the concept concrete.

According to Marks, the delivery of material for early childhood mathematics should consider some basic principles, such as readiness to learn, inquiry and discovery, emphasis on the stages of learning math, comprehension, exercising regularly and

periodically, a variety of activities, exercises that are rational, the application of (1988:26). Educators must consider the child's readiness to learn, that educators must be sensitive to children's readiness to receive the material. This relates to the characteristics of child development. Any mathematical material to be presented must be adjusted to the characteristics of child development to match the capabilities of the child.

The principle is the principle of investigation and discovery relating to the learning process. When children are involved active learning implemented in the process of investigation and discovery problem solving maths problems. The principle of emphasis on the stages of learning mathematics, is a principle that must be considered when drawing up the material gradually from the simple and basic to the more difficult and complex. The principle of understanding the principles for educators to always pay attention to the situation of children. Attention to the child's level of understanding in more depth before proceeding to the next math materials.

Principle of exercising regularly and periodically, and are rational, that is the principle for educators to always provide opportunities for children to practice solving math problems. Training provided should be appropriate to the material that has been given and in accordance with the stages of child development. The material is presented to the children's attention and is easily absorbed and settled in the child's long-term memory, then the material is delivered through a variety of activities such as using a game and do not forget the material obtained is applied in everyday life.

Based on previous exposure to mathematical learning outcomes are the results obtained by the child after receiving the information or knowledge of mathematics (2006: 6). So that optimal results can then mathematics, mathematics learning outcomes can be measured using the cognitive classification, taxonomy model of Bloom. This model includes six aspects, including: (1) remember / knowledge, (2) Comprehension,

(3) application, (4) analysis, (5) evaluation, (6) creat (2004: 237).

According Arikunto used to evaluate elementary school students only consists of three levels, namely knowledge, comprehension, and application. This is based on the taxonomic classification for the order shows that the more serious business (2006: 121). For example, for understanding, students can first remember or know the return (2005: 165). To measure the learning outcomes of mathematics can be done through a written test techniques.

Manipulative Toys

Manipulation play is a play activity by using certain tools as a complement to foster children's special abilities such as mathematical ability. Manipulative according Tedjasaputra is an activity to use something skill fully. Something that can be made is treated according to the will and the mind or the imagination of children who do(2001: 82).

According Sudono, manipulative toys are toys that can be used to develop children's cognitive. These toys consist of all toys with small size and can be played on a table (2000 : 128). According Montesori, "manipulative toys are the toys illustrate Concept That Such as large and small, hot cold, loud and soft, and soon"Tools manipulative game is a tool used by children to acquire a knowledge of an understanding of the concept of learning (www. michelolaf.com, 2005, retrieved September 2010).

Based on previous exposure, it can be manipulative play thing is a small game and is played on a table that can be used to obtain a concept of knowledge so as to develop children's cognitive and train students skill.

Manipulative toys has several features, including: (1) means the game can stimulate students to actively participate in the process of playing, (2) unstructured toy form, (3) toys made has a purpose for a particular development (www.indosiar.com-news-htm, 2005, retrieved September 2010).

Manipulative toys have some condition that the child is assured of safety and comfort when playing with these toys. These terms

include, (1) can be used in a constructive way or that can be made in various forms, (2) intended for children over the age of 1.5 years, and serves to develop the various aspects of development, (3) made of materials that are safe for children, not sharp and use a non-toxic paint, (4) the child is actively involved or do something (1992: 43).

Some manipulative toys can be used to develop simple mathematical ideas for young children especially ages 6-7 years (1992: 18). Among them some toys, peg boards that can be used to convey the concept of arithmetic or numeracy and the introduction of simple statistics. In addition to the peg board game equipment that could be used to convey the concept of arithmetic is a set of beads as ronce. The beads can also help educators convey the concept of patterns and functions based on the pattern of colors or shapes, sizes concepts, the concept of estimation or forecast, and the concept of probability. Lego, blocks and puzzles, can be used by educators to develop the concept of geometry and mathematics problem solving (www.michelolaf.com, 2005, retrieved September 2010).

Cognitive development of 6-7 Year-Olds

According to Piaget, children aged 6-7 years are in pre-operational stage of cognitive development of concrete (1996: 58). According to Hughes, children aged 6-7 years had some characteristics of cognitive development, including: (1) wholeheartedly devote attention and work that is intellectual, (2) imagination soar, (3) capable of performing the operation count to five, (4) can be demonstrated using one hand five, (5) can count to 30 (1993: 2).

According to Hurlock, children aged 6-7 years have the characteristics of cognitive development, including: (1) is able to recognize numbers up to five hundred in stages, (2) recognize the value of the place, (3) has the ability to recognize the concepts in math concepts such as addition and subtraction, the concept of calculating the mixture, the concept of multiplication, and division, the concept of built space, broad

concepts, the concept of time, (5) able to classify objects according to the story, (6) is able to play the puzzle (1999: 20).

According to Armstrong, there are some characteristics of the cognitive development of children aged 6-7 years, including: (1) the child can calculate arithmetic problems quickly by rote, (2) enjoy the computer language.

CONCLUSION

The results of this study concluded that there are differences in mathematics learning outcomes of children aged 6-7 years in the process of delivery of content using a math manipulative games with games that do not use manipulative tool. It appears that mathematics can be developed through active learning and fun to use tool permainan. Dalam this, educators should enhance the learning techniques are more varied use of the game. Educators also need to prepare for a game device in accordance with the material to be delivered so right on target. Effectiveness of time is also worth noting that the material presented can be further optimized and thoroughly. Thus mathematics may be a fun lesson and eagerly awaited by young children, particularly children aged 6-7 years.

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