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EFFORTS TO IMPROVE MATHEMATICS ABILITY THROUGH MEASUREMENT ACTIVITIES USING DIGITAL SCALES

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ABSTRACT

Early childhood is an individual figure who is undergoing a process of rapid and fundamental development for the next life. With this research, it is hoped that the ability to recognize the concept of the lightweight of children at the age of 5-6 years will increase after using the Wooden Scales media. This research is classroom action research. Classroom action research is research that aims to improve the quality of learning in the classroom. the Kemmis & Mc Taggart model which consists of 4 components, namely: Planning, Acting, Observing, and Reflecting. Ability comes from the word capable which means power (can, able) to do something, while ability means ability, skill, and strength. Ability means the capacity of an individual to perform various tasks in a job. Early childhood is an individual figure who is undergoing a process of rapid and fundamental development for the next life. Mathematics is not just calculating mechanically and procedurally (using the left brain), but also reasoning and thinking creatively and innovatively.

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Introduction

Early childhood is an individual figure who is experiencing a process of rapid and fundamental development for the next life. According to (Sujiono, 2009), children have certain unique characteristics and are not the same as adults.

According to (Hayati, 2016), early childhood is an individual figure who is undergoing a process of development rapidly and fundamentally for the next life. At this time the process of growth and development from various aspects is being experienced by children. There are many ways for children to master learning mathematics, one of which is through creating media where children can make it themselves, and from this media children will understand and understand what concepts they will learn.

Mathematics is not just calculating mechanically and procedurally (using the left brain), but also reasoning and thinking creatively and innovatively to solve problems and make things better (using the right brain) (Gustiati, 2017). Concepts in mathematics cover several fields, including the concept of numbers, shapes,

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sizes, patterns, and colors. This study helps to understand the concept of size, especially knowing the weight and lightness of objects. Because students aged 5-6 years at PAUD Bee Audi have not been able to take mathematical measurements.

Understanding the concept of heavy and light can be done through concrete activities, for example by using scales that the teacher can make himself. With media that can be used directly by children, it is hoped that children will have a good understanding of measurement. However, in reality, in the field, especially in Early Childhood Education Bee Audi, most of the methods of presenting children's learning are less varied, effective, and attractive to children, the ability of children to calculate weight and light in a directed manner has not been achieved and is targeted at the target when there are still many boys. Some children have not been able to know the balance of the weight of objects on the right and left children to know heavy and light.

Related to the description above, in this case, the researcher chose a solution using Digital Scales Media because Digital Scales Media has the advantages of children not only staying in their seats paying attention to the teacher's explanation explaining learning material but children are directly involved in Digital Scales media as actors main. Weighing with Digital Scales is done while standing and involves the movement of the hands, feet, eyes, and mind to determine the target. Through Digital Scales children can gain the ability to develop knowledge, attitudes, and skills by exploring and experimenting.

Based on the description above, the researcher is interested in researching "Efforts to Improve Mathematical Ability through Measurement Activities with Digital Scales Media" for (Group B Class Action Research Age 5-6 Years at PAUD Bee Audi Jakarta)".

As a driving force to improve the implementation of education so that it can become a knowledge product for parents and teachers. With this research, it is hoped that the ability to recognize the concept of the lightweight of children at the age of 5-6 years will increase after using the Wooden Scales media.

Methodology

A. Data collection technique

Data collection techniques in classroom action research This uses several techniques in data collection, as follows:

1. Observations

Observations were made by researchers by making direct observations of the teaching and learning process to take a closer look at the activities carried out by the children. Observations were carried out using observation sheets/observation guidelines that had been prepared previously. The things that were observed in this study included mathematical abilities in measuring activities using digital scales.

2. Field notes

Some of the notes obtained by the researcher recognize the results of observations during the research to get as detailed data as possible so that the research process can run effectively and efficiently. Field notes contain descriptions of teaching and learning process activities.

Data analysis is a process of describing or describing the researchers the techniques used to analyze data obtained from observations, interviews, or tests, as well as explaining the methods, procedures, and measurements used for each type of analysis (Yudhistira, 2013).

B. Data analysis technique

There are two kinds of research data analysis, namely quantitative descriptive analysis and qualitative descriptive analysis. Quantitative descriptive is used to analyze data in the form of numbers, while descriptive qualitative is used to analyze data in the form of information in the form of sentences (Suharsimi, 2015). Analisis data dalam penelitian ini menggunakan analisis data kuantitatif.

The formula used for simple quantitative descriptive data analysis to find percentages is as follows:

Information :

P = Percentage Number

f = the frequency that the percentage is looking for

N = Number of frequencies/many individuals/indicators

C. Data Validity Techniques

Any information that will be used as research data needs to be checked for validity so that the data can be accounted for and used as a strong basis for conclusions. The validity of the data in this study uses triangulation. Triangulation is defined as a data collection technique that combines various data collection techniques and existing data sources.

The triangulation technique is a data validity check that is very frequent and widely used to obtain data from actual reality. The purpose of triangulation is not to find the truth about some phenomena, but rather to increase the researcher's understanding of what is found (Iswadi, Wahyuni, & Agustin, 2020).

Triangulation is a data validity checking technique that utilizes something else. Outside the data is for checking purposes or as a comparison to that data. The most widely used triangulation technique is examination through other sources. Triangulation with sources means comparing and checking back the degree of trust in information obtained through different times and tools in quantitative research.

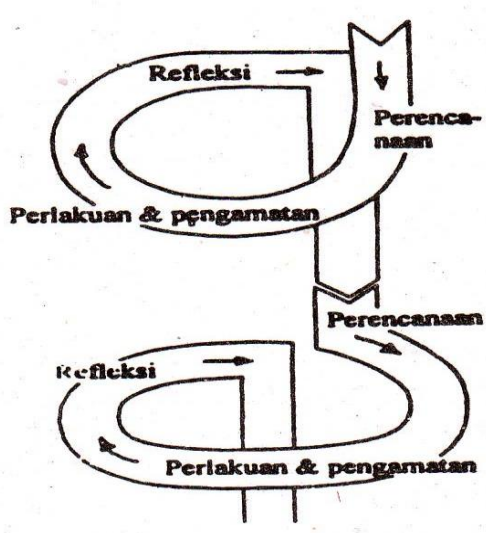

Figure 1. Spiral Model According to (Alshamrani & Bahattab, 2015)

The four stages in action research are elements to form a cycle, namely a round of successive activities that return to their original steps.

Results and Discussion

A. The Nature of Mathematical Ability in Measurement Activities

1. Definition of Mathematical Ability in Measurement Activities

Ability comes from the word capable which means power (can, able) to do something, while ability means ability, skill, and strength. Ability (ability) means the capacity of an individual to perform various tasks in a job. Ability is the power to act as a result of innate training (Kw, 2011). Understanding Learning ability is "modification or strengthening behavior through experience". According to (Bereiter & Scardamalia, 2018) this understanding, learning is a process of activity and not an outcome or goal. Learning is not just remembering, but it will be broader than that, namely understanding. Ability is not a mastery of the results of the exercise but an improvement in behavior. According to (Van Laar, Van Deursen, Van Dijk, & De Haan, 2017), the ability is a global skill or a summary of skills to be able to act in a directed manner, think well, and get along with the environment efficiently. These skills become actual when children can solve problems in learning or everyday life (Hidayat, 2017).

In addition, the ability to learn is "a form of growth or change in a person which is expressed in new ways of behaving thanks to experience and practice". Furthermore, he explained that the new behavior, for example, from not knowing to know, the emergence of new understandings, changes in attitudes, habits, skills, and ability to appreciate the development of social, emotional, and physical traits. Understanding is the process of thinking and learning. It is said so because to go towards understanding needs to be

followed by learning and thinking. Understanding is a process, action, and way of understanding (Ardiyansyah, 2020).

Understanding is the level of ability that expects a person to be able to understand the meaning or concept, situation, and facts he knows. In this case, he does not only memorize verbally but understands the concept of the problem or fact being asked, so operationally he can differentiate, change, prepare, present, organize, interpret, explain, demonstrate, give examples, estimate, determine, and make decisions (Purwanto, 2019).

In the cognitive domain, it shows the levels of ability achieved from the lowest to the highest. It can be said that the level of understanding is higher than just knowledge. The definition of understanding according to (Sari, Siraj, & Fatmalia, 2021) is "a person's ability to understand or understand something after something is known and remembered. In other words, understanding is knowing about something and being able to see it from various angles. Comprehension is a higher level of thinking ability than memory and memorization (Anas, 2011).

The formulation of this last learning act no longer switches between physical changes and spiritual changes. These two aspects are complementary and related to one another, both are complementary aspects. Humans in their actions are always according to spiritual and physical activities. Reading books, for example, is a guide between physical activities in the form of eye movements, hand movements, and bodily attitudes with spiritual activities in the form of processing the meanings contained in the reading, comparing recall, thinking about problems, and so on.

Every act of learning always has a physical aspect called structure and a physical aspect called function. Ability is the result of changes in a child's behavior after getting a lesson. Ability is usually described by a number or letter grade. From this understanding, it can be concluded that ability is the skill or potential to master skills that are innate or are the result of practical training and are used to do something that is realized through action. Whereas in KBBI (Big Indonesian Dictionary) the word can be interpreted as ability, skill, or strength.

Based on this definition the researcher can conclude that what is meant by ability is the child's achievement in teaching and learning activities which can be measured by the child's ability. Ability is more focused on a person's ability to interpret, interpret, translate and restate knowledge into new words according to his or her way.

Overall the exercise for developing an understanding of basic concepts for children includes training in recognizing objects, comparisons, and events that occur around the child, analyzing a process, as well as equipment

and symbols that will be used in the next level of the learning process. Thus, children are expected to be familiar with various objects and media that are commonly used and are interested in exploring the universe (Gracinia & Mulyani, 2013).

The terms heavy and light are commonly used in everyday life to express weight measurements. The weight of an object cannot be seen directly. The tools used to measure weight are called scales. In ordinary scales, there are two sides to compare the weight of the object being weighed. If the positions of the two scales are the same, then the weights of the two objects are equal.

The ability to recognize differences in simple mathematical concepts is a child's ability to know about the dissimilarity of things easily, including thoughts, symbols, reasoning, and problem-solving. Mathematical concepts that are introduced to children are such as measuring the length and short, big and small, empty and full, or more or less, for example, numbers are heavier or lighter (Sriningsih, 2008). So what is meant by the ability to recognize the difference between simple heavy and light concepts is the child's ability to know about the dissimilarity of something easily.

According to (Keliat & Ananda, 2022) said that the benefits of thinking children have mathematical abilities in measurement are to help solve problems, namely to help find solutions to the problems they face, and make it easier to take action. Each individual will choose the action or action that is as effective and efficient as possible in achieving goals. Expanding the ability to think or insight through various activities to seek and find various knowledge around them. Do everything according to your ability.

B. Stages of Children's Mathematical Ability in Measurement

In building simple concepts that are still abstract (time, space, and size) for children, thinking or cognition is needed which includes aspects of the intellect structure, yes, to know something. Thus the child's stages in understanding simple concepts cannot be separated from mental functions which include thinking, symbols, reasoning, and problem-solving. The stages that children go through in the ability to understand simple concepts (Aisyah, Amini, Chandrawati, & Novita, 2008).

1. Sensorimotor stage (0 – 2 years)

During the sensorimotor period, thinking activities that influence children's understanding of concepts are centered on the aspects of the five senses (sensory) and motion (motor). This means that in this stage the child is only able to do an introduction to understand the concept through the five senses and their movements. This situation is the basis for the process of developing children's thinking. At this stage, the child's visible behavior is

mainly dominated in the form of physical movements. At this stage, children have not yet internally represented various events or events, and they think conceptually even though various schemata within themselves have begun to form (Nugraha, 2008).

2. **Pre-operational stage (2 – 7 years)**

   At this stage, the child has shown a clear thought process activity. Children are already able to understand the reality around them by using signs and symbols. The way of thinking of children at this level is unsystematic, inconsistent, and illogical. The child's way of thinking at this stage is marked by the child's lack of clarity in connecting cause and effect, the child only focuses his attention on something he considers interesting and has fairly high egocentricity. At this stage, initially, the child can solve problems by thinking about them first through mental impressions, not long after (at a later stage), children can study problems before acting and are directly involved in activities (Cahyani & Suyadi, 2018).

3. **Concrete operational stage (7 - 11 years)**

   At this stage, children begin to think logically and can apply their logical thinking to solve concrete problems (Nugraha, 2008) At this stage, the child has been able to think logically about situations or concrete things. This stage gives children the ability to see logically the similarities of a group of objects and choose them based on the same characteristics. Children at this age will be able to solve various problems better from real objects and events (Enjelika, Marlina, & Putri, 2022).

4. **Formal operational (11 years and over)**

   At this stage, the child's thinking structure is fully developed and they can apply logical reasoning to various types of problems. At this stage, individual children can think hypothetically and differently from facts, understand concepts, and consider the possibility of a broad scope of narrow matters. The way of thinking of children at this stage has a higher rank. This thinking rating is very necessary for problem solving (Zhan, He, Yi, & Ma, 2022).

C. Factors affecting mathematical ability in measurement

The focus on developing knowledge is intended so that the goal of developing learning is directed so that children master concepts adequately but not concepts that are abstract but more concrete and meaningful. In understanding a concept in learning at school, of course, not everything runs smoothly as expected. Many factors influence the child in the process of getting to know a concept.

1. The factors that influence the development of learning to understand simple concepts related to learning mathematics in early childhood education are:

a) There are still variations in the understanding and ability of teachers to understand the concept of educational development and its application to learning in schools.
b) Factors that influence early childhood in thinking using their cognition so that they are capable of mathematics in measurement activities are: (Sujiono, 2009).
c) Hereditary or hereditary factors where psychologists Loehlin, Lindzey, and Spuhler argue that the level of intelligence of a child's thinking, namely 75-80%, is a hereditary and environmental factor. The conscious development of his thinking intelligence is largely determined by the experience and knowledge he gets from his environment.
d) The maturity factor of each organ (physical and psychological) can be said to be mature if it has achieved the ability to carry out its respective functions. This is related to chronological age.
e) Formation factors are all circumstances outside of a person that affects the development of intelligence. There are two formations, namely intentional formation (formal school) and accidental formation (the influence of the environment) (Susanto, 2020).
f) Interest and talent factors are where interest directs action towards a goal and is an impetus for that action to be more active and better. A person's talent will affect their level of intelligence. Someone who has certain will find it easier and faster to learn something.
g) The freedom factor is the freedom of humans to think divergent (spread) which means humans can choose certain methods in solving problems as needed (Van de Vliert, 2013).

Conclusion

Early childhood is an individual figure who is undergoing a process of rapid and fundamental development for the next life. Mathematics is not just calculating mechanically and procedurally (using the left brain), but also reasoning and thinking creatively and innovatively.

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