

Introduction of early childhood mathematics through online learning (e-learning) during the covid-19 pandemic period

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Abstract. Mathematics is an exact science that is systematically organized, which learns about numbers, sizes, space and time, and interprets various ideas and conclusions. Mathematical abilities that are introduced to early childhood include: understanding the concept of numbers, algebraic concepts, classification abilities, understanding patterns, geometry, and measurements. During the covid-19 pandemic period, learning was carried out at distances like the implementation of online learning. In this study, a literature study of various sources was carried out relating to the introduction of mathematics on early childhood through online learning. The result of the literature study shows that the introduction of mathematics on early childhood through online learning can be done by learning through educational games media, Play Kids, social media, and video conference

1. Introduction

Early childhood is a child who is aged 0-6 years. At this stage children need a lot of stimulus to develop aspects of their development such as religious and moral values, physical motorics, language, cognitive, social emotional, and art. Aspects of cognitive development include general knowledge, science, concepts of shape, color, size, patterns, and mathematics. Mathematics is an exact science that is systematically organized, which learns about numbers, sizes, space and time, and interprets various ideas and conclusions[1]. the characteristics of introducing mathematical concepts of early childhood including: mastery of the concept of numbers, understanding concepts, counting, distinguishing numbers by showing numbers or numbers with symbols or symbols[2]. Mastery of the concept of number is the basis for children to be able to use the concept of numbers or numbers using concrete media, for example 3 oranges, 5 books.

Children aged 4-6 years generally have mathematical abilities that include understanding of the concept of many little, say many objects, recognize the concept of numbers 1-20, recognize symbols of numbers, match numbers with symbol numbers, calcify objects based on size, shape, or color, recognize AB-AB and ABC-ABC patterns, sort objects based on 5 size seriations, geometries, and measurements[3]. The National Council of Teachers of Mathematics (NCTM) 2000, states the mathematical concepts that can be taught to early childhood include[4]: (a) Concept of Numbers. One of the important mathematics to understand is the introduction of the concept of numbers. The ability to understand the concept of numbers is not only the ability to recognize numbers and counting but includes the ability to understand quantity and one-on-one suitability. (b) The Concept of Algebra. NCTM in Smith states, the introduction of the concept of algebra can be started by teaching children to sort, classify, compare, and arrange mass objects based on size, shape, number, color, and so on. (c) Classification Ability. Classification is the process of grouping objects based on certain properties (color, size, number, shape). The ability of classification is one of the important abilities developed to understand the concept of numbers. In the process of classification children will do the activity of comparing and compiling. Comparing is a child's process to build a relationship between two or more objects according to certain characteristics. Early childhood often makes a difference, especially if the comparison involves them personally. Composing is a higher level of comparison. Arranging involves comparison of more objects, placing objects in one order. Arranging activities can be done inside and

outside the room, for example arranging blocks from the shortest to the longest, or arranging stones from the smallest to the largest stones. (d) Understanding Patterns. Identifying and creating patterns associated with classification and sorting. Children begin to see the same and different attributes in pictures and objects. Children like to make patterns in their surroundings. (e) Geometry. Building the concept of geometry in children begins with identifying shapes, investigating, building and separating ordinary images such as rectangles, triangles, and circles. (f) Measurement. Measurement involves assigning numbers of units to physical quantities (such as length, height, weight, volume) or to non physical quantities (such as time, temperature, or money). Physical quantities such as the length of table may be measured by repeated application of the unit directly on the object. This process is called iteration. Nonphysical quantities such as time use an direct method. Clocks and calendars are two intruments used to measure time. Temperature measures use a thermometer. Money measures worth or value, and coins and bills are used. Young children discover the ptoperties of formal measuring system by using informal or arbitrary units. These units may be body units: thumbprints, hands, feet, or the length of their arms. Or they may measure I paper clips, blocks, unifix cubes, beans, or paw prints of common animals. Older children begin to use customary (English) units or the metric system. With either system the method is the same. However, it takes many years before a secure foundation, or a way of thinking regarding measurement, is in place.

Early childhoodhave problems in understanding mathematics such as children having difficulty recognizing the symbol of numbers, classifying objects, sorting objects based on 5 seriations of size, geometry, and measurement. The child's inability is usually caused by the lack of teacher variation in teaching, the use of learning methods that are not appropriate, teacher learning is less attractive, and the teacher does not use instructional media[1]

The ability to think mathematically at an early age can be characterized by the child being able to present a mathematical understanding through understanding symbols based on a combination of symbols found themselves that can be reflected in the culture around the child. Children have the ability to create symbols to help them understand the concept of numbers

According to Schwartz (2005) suggested there are several characteristics of children learning mathematics including [5]: (a) The child uses his knowledge, but cannot express that knowledge. (b) Children get knowledge from social activities and children's interactions with others. From this explanation can be concluded that children learn mathematics through playing and exploring activities. These activities make children more interested and fun to be actively involved in learning activities.

Early Childhood Math Games among other things: (a). Playing numbers. Playing numbers children are expected to be able to recognize and understand the concepts of numbers, transitions and symbols according to the number of objects and can match sesai with symbol numbers. (b). Playing Patterns. Playing patterns, children are expected to recognize and arrange the patterns that are around children sequentially. Children are able to make their own sequence of patterns according to their creativity after understanding 2 or 3 patterns shown by the teacher. (c) Play Classification. Classification play activities of children are expected to group or choose objects based on the type, function, colour, shape, pair according to the example determined and assigned by the teacher. (d). Playing geometry. The activity of playing geometry for children is expected to be able to recognize and mention various objects based on geometric shapes by observing the objects around them. (e). Play Measurement. The measurement game for children is expected to be able to recognize the concept of standard measurement which is informal or natural, such as length, large, height, and contents through non-formal measuring devices such as hand span, rope, fingers, steps. Formal measuring instruments such as rulers, meters, thermometers and others.

Understanding mathematics is important to be taught in early childhood. The teaching can be obtained from parents, the surrounding environment and if they are already in school age, they will get a stimulus from the school environment. During the covid-19 pandemic required all parties to stay at home in order to break the chain of distribution of covid-19. So that educational activities are carried out online, both from the level of early childhood education to tertiary level. Children's learning activities at home involve parents in controlling children's learning. When learning is done at

school teaching and learning activities only involve teachers and children, but because during the covid-19 pandemic learning is done at home, learning activities do not only involve teachers and children but also parents. Parents have a very big role in children's learning activities at home, parents oversee children's learning and ensure the tasks given by the teacher are done well by the child. Covid-19 pandemic has an impact on various aspects of the main aspects of education. In the aspect of education the main impact seen is that online learning must be carried out. Online learning makes various parties feel difficulties both from the school, teachers or students. Many of the schools and teachers are not ready to carry out online learning due to the low mastery of technology from educators, limited infrastructure, costs, and internet networks[6]. The problem is also experienced by students, which becomes the obstacle of students in implementing online learning is the limited infrastructure, costs and networks. These three points are the most common problems experienced by children. Children who do not have a device that is able to support the online learning process will tend to be left behind. Likewise for networks, children who live in difficult-to-use areas cannot participate in online learning smoothly.

This change in civilization requires educators to prepare themselves to follow technological developments, because if they are unable to master technology, they will be left behind, as will educators in early childhood education. Early childhood education educators must be more creative in stimulating six aspects of child development, especially mathematical abilities. Knowledge about mathematics is an important knowledge to be introduced to early childhood, because in everyday life we often use mathematical abilities such as to see time, count objects, count money, recognize shapes, classify objects and so on. This example is a small part of the use of mathematics in everyday life. Mathematics is able to penetrate into all fields of life. Thus it is important to introduce mathematics to children from an early age. During the covid pandemic 19, the introduction of mathematics in early childhood must still be taught as a whole without exception even though it must be done through online learning. Online learning or e-learning is information and communication technology to enable students to learn whenever and wherever[7]. Learning system on e-learning is done online or commonly called open source, a learning system using web applications. Learning through e-learning has many benefits including: (a). Make students become more independent in learning, and students become more active in gathering materials according to their needs. (b). Reducing Institute operating costs. (c). Learning can be done anywhere and anytime so it is not limited by distance, space and time. (d). The ability to take responsibility from each teacher and learning has increased in the teaching and learning process. Based on the explanation above, the writer intends to know in depth about how to introduce mathematics to early childhood through online learning

2. Method

The type of research used is literature review. The purpose of this research is to find out deeply about how to introduce mathematics to early childhood through online learning. The procedures for carrying out a study of literature are: a) Organize, is organizing the literature that will be reviewed / reviewed. The literature reviewed is relevant / in line with the problem. b) Synthesize, which unites the results of the organization of literature into a summary in order to become a unified unity, by looking for links between literature. c) Identify, namely identifying controversy issues in the literature. d) Formulate, namely formulating questions that require further research[8].

3. Result and Discussion

Based on the results of the literature review shows online learning that can be done to introduce mathematics to early childhood among other things:

- b. Educational game media. Educational game is a technology that is used as an innovative learning media to support teaching and learning activities. Educational games can be made with the Adobe Flash CS6 Professional application[9]. Learning mathematics through games designed by the teacher for example to introduce the concept of numbers to children. Children can recognize the concept of numbers by counting images of objects in games that have been set to make the display more interesting. In the activity of recognizing the concept of patterns and relationships can be

done by arranging patterns based on large-small or small-large sizes in the game application by drawing images in sequence[10]. Besides that, children can arrange patterns based on the color or shape of objects. For material concepts of numbers and patterns as well as relationships done by the animation simulation method on a computer or laptop, so students can easily understand the subjects in the mathematics learning presented. Children try interactive multimedia learning about number recognition, the concept of patterns and relationships, geometry, and measurement. they are able to operate the buttons in the multimedia without the help of the teacher. Children can learn independently using multimedia interactive learning, but even though children are able to use themselves when learning online parents must still assist so that learning activities can be in accordance with the planned learning goals. Presentation of online learning materials through interactive learning multimedia is complemented by images and animations that are presented in an interesting manner, so that children are indirectly involved auditively and visually. Thus, the material presented is more easily understood by children. Text that is presented simultaneously with images allows the information received to be easily understood by children[11].Educative application as a learning media for early childhood mathematics introduction uses play and learning methods that can attract children's attention to enjoy learning

- c. Play Kids. play kids is a learning media that contains a series of activities that children can do in learning a certain material. Play kids is able to create interactive learning such as the introduction of mathematics in early childhood will be more effective than conventional learning. In online learning the presence of learning media like this will help children to get to know the concepts and materials being taught. Play kids media also makes it easier for parents to stimulate aspects of children's cognitive development and other aspects of development.
- d. Learning mathematics through social media. Learning mathematics through social media can be done by giving worksheets or projects uploaded on whatsapp, line, telegram, email, Instagram, or youtube. Children with parental assistance will do the task and upload the results on agreed social media
- e. Video Conference. Video conferencing that is widely used is zoom, google meet, and cisco webex. Learning with video conferencing is able to create learning conditions through face to face directly, so that the teacher is easier to convey learning material and the material is also easier to understand by children

4. Conclusions

Mathematical abilities that are introduced to early childhood include: understanding the concept of numbers, algebraic concepts, classification abilities, understanding patterns, geometry, and measurements. Introduction to early childhood mathematics through online learning can be done by learning through educational games media, Play Kids, social media, and video conference.

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