**LEMBAR**

**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**
**KARYA ILMIAH : PROSIDING**

Judul Makalah : Teaching Mathematics to 0 – 1 Year Old Babies

Penulis Makalah : Christine Wulandari S., M.Pd

Identitas Makalah
: a. Judul Prosiding : Mathematics Education and Graph Theory
b. ISBN : 978-602-71141-0-4
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e. Jumlah Halaman : 16

Kategori Publikasi Makalah [√] *Prosiding* Seminar Internasional

[ ] *Prosiding* Seminar Nasional

Hasil Penilaian *Peer Review* :

| Komponen yang Dinilai | Nilai Maksimal *Prosiding* | | Nilai Akhir Yang Diperoleh |
|---|---|---|---|
| | Internasional [√] | Nasional [ ] | |
| a. Kelengkapan unsur isi buku (10%) | 1 | | 1 |
| b.Ruang lingkup dan kedalaman pembahasan (30%) | 3 | | 2,3 |
| c.Kecukupan dan kemutakhiran data/informasi dan metodologi (30%) | 3 | | 2,5 |
| d.Kelengkapan unsur dan kualitas (30%) | 3 | | 2,4 |
| **Total = (100%)** | 10 | | 8,2 |

Jember, 03 Agustus 2018
Reviewer

Dr. Susanto, M.Pd.
NIP. 19630616 198802 1 001
Unit kerja: FKIP Universitas Jember

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Jember,

Reviewer

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# TEACHING MATHEMATICS TO 0 – 1 YEAR OLD BABIES

*by* Christine Wulandari

# TEACHING MATHEMATICS TO 0 – 1 YEAR OLD BABIES

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**ABSTRAK**

Matematika mempunyai peluang yang sangat besar untuk dipahami, karena sejak bayi manusia sudah bergelimangan benda-benda geometri. Bersamaan mulai berfungsinya mata seorang bayi yang normal, proses pengajaran matematika sesungguhnya sedang berlangsung. Sejak lahir otak manusia yang terdiri dari milyaran neuron sudah siap dianyam menjadi jalinan akal melalui masukan beberapa fenomena yang datang dari kehidupannya sehari-hari. Jadi tidak ada alasan untuk memisahkan bayi dengan matematika samapi usia sekolah, mengingat keduanya sudah terintegrasi otomatis sejak dini. Anak-anak sudah mengenal bentuk-bentuk geometri melalui benda-benda yang berada dilingkungannya, misalnya bola, kotak, roda dan sebagainya.

Tujuan penelitian ini adalah untuk mendeskripsikan model pembelajaran matematika pada bayi usia 0 – 1 tahun dan untuk mengetahui respon orang tua terhadap pembelajaran matematika pada bayi usia 0 – 1 tahun. Pendekatan yang dilakukan dalam penelitian ini adalah pendekatan kualitatif. Dalam penelitian ini metode pengumpulan data yang digunakan ialah metode wawancara, dokumentasi dan metode observasi. Analisis data yang dilakukan meliputi tahap: (a) reduksi data, (b) penyajian data, dan (c) penarikan kesimpulan serta verifikasi.

Dari hasil analisis data dapat dikemukakan pembelajaran matematika dapat bayi usia 0 – 1 tahun dapat dilakukan dengan memperlihatkan bola dengan ukuran diameter 1 – 5cm yang menyerupai puting ibu, memperdengarkan angka, menambah dan mengurangi jumlah mainan bayi saat bermain dan menyertai kehidupan bayi. Dari hasil wawancara dengan orang tua, mereka berpandapat bahwa pembelajaran matematika sangat baik diterapkan sejak bayi agar anak terbiasa dengan belajar matematika dan tidak lagi menganggap bahwa matematika merupakan mata pelajaran yang sulit saat anak sudah duduk dibangku sekolah.

**Kata kunci:** *Pembelajaran Matematika, Bayi Usia 0 – 1 Tahun.*

**ABSTRACT**

Mathematic has big opportunity to be learnt. Since a baby, human has been encountered with geometry objects. As soon as the eyes of function normally baby, the real teaching of mathematic istake place. Since they were born, the human brain that consist billion of neuron have really attached in to our mind through the existence of number of phenomenon in their daily. Therefore, there is no reason of separating a baby from mathematic and wait until they are ready to go to school, considering both of them have already integrated automatically since they were born. Children have identified geometry shape from things in their environment, such as ball, rectangle, circle, etc.

The purpose of this study is to describe mathematic education model at 0-1 years old baby and to find out the response of parents to mathematic education at 0-1 year old baby. Approach applied this study is qualitative approach. The data collections used are interview method, documentation, and observation. The data analyses applied are (a) reduction of data, (b) presentation of data and (c) giving concluding and verifying the data.

From the data analysis it can be concluded that mathematic education can be done by showing ball with diameter of 1-5 cm which look like mother's nipple, exposing them with number, adding and reducing, the amount of toys when accompanying them while playing. The result of the interview shows that parents are opposed the teach mathematics in the early years since baby, so that children will not consider mathematics as a difficult and complicated subject when they have to encounter it at school.

**Keywords:** *Teaching of Mathematic, 0 – 1 Year Old Babies.*

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## INRODUCTION

Mathematics is a vital subject which is crucial in the educational system all over the world. It is a basic compulsory subject taught in elementary to secondary level of education, from elementary school to senior high school level. However, recent evidence shows that majority, the students of those levels, elementary to secondary levels of education, complain about difficulty of solving problems in mathematics. They consider mathematics as a complicated one and becoming the major fear for them.

Indeed, mathematics has a significant role in our daily life. Mathematics is a pattern of assumptions, organized patterns of logical reasoning and finding evidence. It is a language which is more than utterances, the language of terms define in symbols which are translated carefully and accurately; it is an organized patterns of knowledge, the theories within it are deductively made regarding

to numbers of indefinite elements, *axioms,* theories which have been proven significantly. Mathematics is a science of well-organized patterns or ideas; and is an art which the beauty can be found in its organized and well-arranged harmony within it (Jonson and Rising, in Jihad, 2008:152)

Soedjadi (2000:13) states that mathematics has characteristics, those are : (1) posses abstract fields of study,(2) based on conformity, (3) based on deductive reasoning, (4) having vacant or blank symbols for its meaning, (5) regarding the context and (6) having a consistent or persistence system. Thus, mathematics has important roles in our life.

The learning of mathematics is closely related to its role in all aspects of life. We need mathematics to deal with problems we have every day. When we have to measure or calculate something, we need mathematics competencies dealing with geometry, and when we need to compute or figure something out, we need mathematics competencies dealing with arithmetic. Both, geometry and arithmetic are the foundation of mathematics (Depdiknas, 2001:8)

Most people, especially students, are not fond of mathematics since it is considered to be difficult and even big burden for them, many even think that it is a horror subject which they avoid to encounter. Mathematics is actually having a great chance to be learnt, and mastered. Since a baby, a human being has been surrounded by abundant geometrical forms of the things around him (Kahfi,1996). Children are beginning to encounter different geometrical shapes from the things around them, eg. balls, boxes, wheels, etc.

Mathematics can actually be taught to children in the early ages even to babies. As they are beginning to develop their sense of vision or sight, they also begin to learn mathematics, for the things that are visible to them are closely related to those which have constant shapes or forms, dimensions, and are measurable.

Parents have significant roles to expose those things to their babies. Parents also need to promote more exposure of the things by exposing a lot more varieties of shapes and or dimensions to their babies. A mother, for example, can start to get her babies familiar with the round shapes of the areola or nipples by exposing her baby to the thing which is resembled with the forms. This can stimulate the baby to recognize the shape and begin to identify the form and dimension. The process of introducing these shapes, of course, depends on the character of the baby; therefore, parents must be patient and careful in doing it.

Babies are able to hear anything when they are still in the mother's whom. By the time the baby was born, the mother can start to present the numbers by saying it softly, without hesitation, and in an easy listening tones, so that the baby is not shock and crying. The baby cannot directly understand what does this mean, but he is beginning to record it into their memory. This will then help them to pronounce it more easily when he grows older and start to talk.

Since they were born, human's brain has been equipped with millions of neuron ready to be arranged into braided of mind through the existence of phenomenon that they encounter in their life (Yuliawanto, 2004). Mathematics has been automatically integrated into the baby's brain since the early years, therefore they are inseparable. Initially, the babies acquire the basic of mathematics "unconsciously" through the daily exposures of the things they encounter in their life. However, the basic knowledge of mathematics has been internalized into their memory naturally. Later, this basic understanding is developed and trained more so that the babies are able to recall what they already have earlier to be connected to the present exposures.

Most parents were not aware of the phenomenon that mathematics can actually be introduced and integrated since the early years of the babies. Many of them think that mathematics is a subject which will be taught to children as they start going to school, in a formal education. Parents do not realize that while nursing, playing, bathing and doing other things with their babies at home, has a lot to do with mathematics. Consequently, what parents do really away from mathematics itself, they only do it for the sake of nothing. They do not have any serious effort dealing with how to develop their babies' understanding of mathematics. They only do it when they have some time. This even worse when mathematics is labeled to be a horror, complicated and extremely hard, parents tend to avoid dealing with the teaching of mathematic to their children, not to mention their babies.

The above phenomenon have driven the writers to formulate the following problems; (1) What learning models are appropriate in teaching mathematics for 0 – 1 year old babies?, (2) How are the parents' responses toward the teaching mathematics to 0 – 1 year old babies?. The purpose of the study are the following: (1) to describe the learning model of teaching mathematics to 0 – 1 year old babies and (2) to find out the parents' responses toward the teaching mathematics to 0 – 1 year old babies.

## REVIEW OF RELATED LITERATURE

### 1. The Teaching of Mahematics

Education is a process dealing with two aspects, the first is to learn about what students need to do (learn) and the second is to teach of what the teacher needs to give (teach) to his students (Jihad & Haris, 2008:1). Hamalik (2003:57) states that education is a combination of human entities, subjects, facilities, tools/equipments, and procedures

that are interrelated to reach a goal. In addition, Sudjana (2002:43) mention that education is a process where there is interaction between teachers and students through well-planned activities of learning by the students and teaching by the teacher.

Isjoni (2007:11) mention that education is something done by students, made for students. Education is an effort of educators to help students or pupils to learn something. In a narrower scope, the process of education is said to be the process occurs in schools, therefore, it is so called to be the process of individuals, students, to socialize with the school environment including the teachers, school facilities, and classmates (Jica, 2001: 9)

Education is a process of communication takes place between teachers and students to result in the students changes of attitude (Suherman, in Jihad, (2008:11). Here, the teacher acts as communicator and students as the communicant. In practice, both parties can share roles as either communicator or communicant, they can share information. Based on the concept of communication, education is a process of functional communication between students to teacher and students to students to result in the students' changes of attitude and mind set using knowledge as the media of communication (Jica, 2001:9)

The above theories can be inferred that education is the combination of learning and teaching aiming at easing the process of transferring knowledge from teachers to the pupils which requires teachers' professionalism to have the process running effectively and fun based on the code of conducts.

Mathematics is a basic science that has significant and vital roles in our life. Mathematics is Mathematics is a pattern of assumptions, organized patterns of logical reasoning and finding evidence. Mathematics possesses numbers of characteristics (Soedjadi, 2000:13);

1. having abstract scope or field of study
2. based on conformity
3. based on deductive reasoning
4. having vacant or blank symbols for its meaning
5. regarding the context
6. having a consistent or persistence system

The aims of learning mathematics are not merely the mastery of the conceptual and procedural knowledge, but more on the mastery of the analyses and synthesis process toward received information. The implication is that the activities done independently by the learners or pupils are more emphases as the basic actions to understand a concept.

The teaching of mathematics is essentially aimed at increasing the ability of the learners to think critically, systematically, logically, logically and to cooperate with others. Nurhadi (2004:2003) mentions that the teaching of mathematics covers the following purposes:

1. Train the learners' ability to think and have logical reasoning to conclude. For example, having a thorough investigation, exploration, experiments showing similarities, differences, and consistency.
2. Develop creative activities which involved imagination, intuition, and discovery by developing divergent thinking, originality, curiosity, making prediction and hypotheses and trials and errors.
3. Develop the problem solving capacity.

To develop the ability of conveying information or to communicate ideas, pupils do it orally through exploring notes, graphs, maps, diagrams.

In the teaching of mathematics, teachers are demanded to make the students actively participate during the lesson. Teacher is not the one who "knows everything", and students as those who know nothing about the lesson. An effective teaching and learning process will take place when teachers are creative and innovative, also always knows how to serve the students learning styles by varying the techniques and activities in delivering the lesson. Through these the boredom and frustration of the pupils can be minimize for they have varied and different learning styles.

It is in line with Winataputra (1992:97) statement that in the teaching of mathematics it is advisable to have teaching strategies which involve students actively during the lesson, both mentally and physically, and also socially. The activeness of the students is not only in terms of their being actively involved in solving the mathematics problems, but more on their involvement in discovering and understanding the concepts. It is therefore, the teaching of mathematics concepts should not be only on the definitions, but further on the relevant implementation of the concepts through the problems solving practices.

## 2. The Teching of Mathematics

### The Teaching of Mathematics for 0 – 1 Year Old Babies

#### 2.1.1 Developing The Concept of Numbers for Children Below 3 :

**a. Baby ( 0 – 8 Months Old)**

The following suggested activities are advisable for parents to do with their 0 – 8 months old babies:

1. While helping their babies putting on their socks, parents can smile gently and say "Here is one sock for your left foot and one more sock for your right foot. Two socks for your both feet".
2. While feeding up some biscuits to their babies, parents can smile gently and say " It's biscuits time." And when the babies look happy, parents can say " You must be hungry, you want some more biscuits?"

**b. 8 – 12 Months Old Babies**

The following suggested activities are advisable for parents to do with their 8 –12 months' old babies:

1. Provide some containers with each of its lids or caps near containers. Invite the babies to put the lids on each of the containers.
2. Provide two different toys in front of the babies, let them choose the toy that they prefer and get them reach the it by themselves.

### 2.1.2 Introducing The Concept of Patterns and Correlations to Babies Below 1 Year Old

Pattern means the arrangement of objects or things based on its color, shapes and numbers. To promote child's capability in recognizing the correlations of patterns, he needs to be given opportunities to manipulate the objects. (Lestari, 2011: 12)

The following activities are to help babies develop the concept of correlations and patterns:

**a. 0-8 months babies**

1. Have the babies put on bright and colorful outfits, and let them observe and watch its motif or patterns closely.
2. While preparing their milk, get the bottle on the baby's sight; let him give their hands to reach the bottle.
3. Place your babies onto the clean carpet and let him feel the texture of the carpet with his feet. (Lestari, 2011: 12)

**b. 8- 12 months babies**

1. Take a spoon, and get it closer to the baby's mouth. Let your baby open his mouth.
2. Prepare some cups of different sizes, let your baby play with them and try to arrange them by piling them up neatly.
3. Prepare numbers of soft boxes or cardboards boxes on the floor. Guide them to gather and arrange the boxes into a line.

### 2.1.3 Introducing The Concepts of Geometry and Space to Children Below 3 Years Old

It means that a child is recognizing shapes of geometry (triangle, rectangle, square, and circle) and its position in a space or room. Child will comprehend the concept of space when they realize their position toward things around them. They learn about location/place and position/arrangement, such as above, under/below, on, inside, outside. Besides, child will also learn to comprehend the meaning of distances; such as close, far, etc. (Lestari, 2011: 14)

**a. 0-8 months babies**

The following are suggested activities for parents with their 0-8 months babies to introduce the concepts of geometry and space.

1. Prepare a milk bottle in front of your baby. Let him grasp and feel the surface to feel its shape with his both hands.
2. Cover up your baby with a blanket and let him touch and feel the entire surface.
3. Let your baby move and crawl around the table, and let him fell the shape of the table.

**a. 8 – 12 babies**

The following are suggested activities for parents with their 0-12 months babies to introduce the concepts of geometry and space.

1. Get the baby to crawl into a short tunnel and let him feel what is like to be inside room, but he is still able to see and reach the other side of the room (outside) with his both hands.
2. Get the baby to throw some balls into basket.

### 2.1.4 Introducing The Concepts of Sorting and Clustering to Children Below 3 Years Old

To sort and to cluster involve the ability to observe and to record similarities and differences. Children learn through observing, listening, touching, tasting, smelling the objects they are playing with in their environment, so that they are able to find out and recognize similarities and differences of the objects.

**a. 0 – 8 months babies**

1. When your baby is crying, say to him, "Mommy hears you, mommy's coming dear." Your baby will learn to recall your voice.
2. Give your baby two different noisy toys. Let him choose which one he prefers to play.

**b. 8 – 12 months babies**

1. Prepare two kinds of fruit for example apple and orange, give 3 for each kind. Put the fruit into a container. Get them sort and take out the fruit from the container.
2. Provide some noisy but safe kitchen utensils, such as pan lid, glass or cup lids, metal plates, etc. Let your baby pick up his favorable objects and make them sounded using chopsticks.

## RESEARCH METHODOLOGY

The study took place in a medical and health services for mothers and babies in a village called as Posyandu; Posyandu Seruni 04 Desa Tamansari Kecamatan Mumbulsari Jember East Java.

The phases or stages of the study are as follow:

1) Preparation, team discuss about preparations needed in conducting the study.

2) Setting the location of the study, Posyandu Seruni 04 Desa Tamansari Kecamatan Mumbulsari Jember East Java.
3) Interview the staffs of the Posyandu.
4) Defineing the sample of study, the children of the Posyandu participants whose ages are 0 – 1 year old.
5) Collecting the Documents
6) Conducting the teaching of mathematics to the 0 – 1 year old babies.
7) Analyzing the data.
8) Discussing the result of the data analyses
9) Drawing conclusion.

The study is aiming at describing the teaching of mathematics toward 0 – 1 year old babies. The approach applied in the study is qualitative for the following reasons: (1) the researcher acts as the main instrument, here she involves in both; gathering the data and running the study, (2) having a natural setting, it means that the data being studied is reported as what has happened during the study, (3) the results of the study is descriptive ones, the data is not in the form of numbers (quantity) but, it is of the descriptions, (4) Emphasis more on the process rather than results, (5) there is the scope and limitation of the study, and (6) data analyses tend to be inductive.

The design of the study is qualitative design, for it possesses numbers of characteristics; having a natural setting, descriptive and using human as the main instrument. Having natural setting means that the qualitative study deals with the objects of the study, and describe it as what it is without any changes, that is by conducting the teaching of mathematics to 0-1 year old babies.

In collecting the data needed, the researcher has done the following activities; (a) conducting interviews on the staff of posyandu. This is done as the initial phase to find out the numbers of 0 – 1 year old babies; whether the parents knows anything about teaching of mathematics to 0 – 1 year old babies or not, whether they, the parents, have done anything about it or not, (b) collecting the documents necessary for the study to find out the exact number of the 0 – 1 year old babies. Here, the researcher observed what the babies were doing during the process of teaching mathematics.

Moelong (2001 : 190) states that the initial process of analyzing the data starts from recording the whole data from the whole sources; interviews, observations, in the form of descriptions, personal documentations, legal documentations, pictures and photographs, etc.

Based on the above statement, the data analysis is conducted during and after collecting the data. The whole data is then analyzed using *flow model*. Milles and Hubermen (1992:16) states that the *flow model* consists of: (a) data reduction, it means that there is a sorting phase, clustering and simplifying the data from the initial phases, preparation up to the completion of the study into a study report. This is done to get the precise and exact data so that the researcher is able to draw a conclusion. (b) Data description or data presentation, it is done by organizing the result of the data reduction into a narrative exploration to allow the researcher to draw conclusion and take any further necessary actions. The presented data is then interpreted and evaluated to determine the necessity of taking any further actions. The result of the data interpretation can be in the form of; differences between planned and actions, the necessity of making changes in actions, providing any precise alternative actions, the perception of the researcher, teacher, colleges and those involved in observation and record of any actions taken, and the obstacles and its alternative solutions. (c) Drawing conclusion and verifying the data. Drawing conclusion means to give conclusion on the result of data interpretation and evaluation. It involves defining and clarifying the data. Verification means validating the data from the conclusion. Here the researchers discuss bout the findings with her colleagues.

The validity of the data is very essential, therefore to assure the validity of the data, the researcher need to employ numbers of techniques; (a) Triangulation, is a technique used to assure the validity of the data by employing the components or elements outside the data as the comparison. Later, the discussion is held among the colleagues to decide any further action necessary. (b) a thorough monitoring, it is done carefully, simultaneously, and continuously during the teaching and learning process. The interview is then held to avoid the respondent from reclining or concealing the data. (c) Peer checking, it is the action where the researcher discusses the process and the result of the study with the colleagues and mathematics teachers. It is aimed at getting some suggestions and feedback either from the methodology or the context of the study. By doing so, it is expected that the data resulted from the study is valid. (Moloeng, 2002:175)

## FINDINGS AND DISCUSSIONS

### Teaching of Mathematics to 0 – 1 Year Old Babies

As babies are beginning to function their eyes as the organ of vision or sight, normal babies are beginning to be able to see things around them. Here, the process of learning mathematics is initially occurring. It is due to the vision of what they see has been clear and is clearly defined by the sizes of the objects. The following are what we can do to teach mathematics to babies.

**a. Exposing Balls**

Exposing some balls of similar materials and of dark colors in front of the babies, mothers can move them to different positions for several times. The

diameter of the balls is between 1 to 5 centimeters. It is done to represent the size of the mother's nipples and areola which the babies encounter while they are nursing to their mothers.

Similar thing is expected when a baby is given a doll, he is expected to recognize the shape similar to the ball (mother's nipple and areola) from the doll. The baby will grasp the nose and try to put it into his mouth for he think that it is his mother's nipple which he used to nurse on. Here, we can assume that the baby is beginning to acquire the concept of sameness, the shape of the doll's nose and the mother's nipples.

The exposure of the balls should be graded; meaning that it stars with the balls of similar sizes and then gradually mix them with those of different sizes to get the baby familiar with the objects. In time, when the baby is ready, he is then able to recognize that there is difference in sizes of the balls and he is beginning to acquire the concept of differences in sizes when he is exposed with balls of different sizes. In the end, he is finally able to distinct that thing are similar or different in sizes.

The instrument used is circular in shape because, it will not change when it is projected in any different medium, its shape is similar. We can then have the instrument in many different colors; the baby is beginning to recognize a new concept; that is color. When he is exposed to numbers of balls of different sizes and colors, he then recalls what he has acquired previously about the sizes. Next, he will combine the concept that he has got, with the new concept he learns; colors, into sizes, and colors.

**b. Additions and Subtractions**

The initial action of introducing additions and subtractions can be done by providing the babies with five balls of similar sizes which they can hold in their hands. For subtractions, we can start by exposing the five balls all together and gradually take the balls one by one from the baby's hands. The other way around is done with additions, we can have the baby hold the ball gradually from one ball, two balls, three balls, and finally he holds all the five balls in their hands. Here, the baby will notice that there are changes occurred when mother add or take the balls from the baby's hands. He will recognize the different in the quantity of the balls he has in his hands. He is then staring to notice that things are "increasing" and "decreasing" in numbers by seeing the difference changes of the volume or space of his fists when he hold the balls in his hands. This understanding will grow stronger when we apply with the balls of different sizes. His understanding is even clearer when he see not only from the sizes (quality) but more on the number (quantity) of the balls on his sight.

The baby will feel insecure and lonely when he does not hear any sound around him; he will usually cry to have somebody accompanied him. Here, he begins to understand the concept of subtractions, when he cannot find anyone beside him. When somebody gets closer and holds him, he begins to feel secure and start to internalize as the concept of additions into his mind. He no longer feels lonely and alone, for there is somebody else around him. As the baby internalized the concepts; sizes, numbers and shapes, we can then continue with the different objects of different sizes by doing similar steps. The duration will of course shorter than the initial phase, for the baby has acquired the skills and internalized them into his mind.

When babies are beginning to play, parents can start to introduce them with geometric shapes with the toys. Babies unconsciously learn new things while playing. Through the exposure of the geometrical objects in form of toys, unconsciously babies begin to internalize and store the concepts of geometry into their mind. This is in line with Kahfi (1996) that geometry is a part of mathematics which can easily be found in many visual objects of everyday life.

**c. Accompany and Monitor the Baby's Development**

It means that we need to accompany and always monitor the baby's life development, especially in guiding the baby to recognize the things around them, the things that he encounters every day. While putting on the baby's socks, we can smile at him and say," Here is one sock for your right foot and another one for your left foot. Two socks for two feet."

Babies are familiar with mother's breasts, and its nipples. When they are exposed to two balls and some square boxes, they will then recall the concept of sameness and differences from his intuition. Parents can also introduce the concept of geometry by letting their babies to touch and feel the shape of the milk bottle when the babies hold it, or by letting their babies to feel the surface of the carpet with their feet when crawling along the carpet. Parents can also let the babies recognize the shape of the table when they crawl or walk around the table.

Children ability to internalize the mathematics concepts when they start to school at the elementary level is not only due to their intelligence, but also their pre-school exposures on the recognizing the objects around them; how frequent they were dealing with those objects. Experts say that a child's pre-school experience and exposure will determine his future potential creativity, critical potential and activeness. Babies brain has a remarkable ability to store any experience that he has gone through, therefore, we as parents need to be completely carefully in treating him, including how to teach him. Parents need to understand their babies' characters, in order to find the right style of teaching them.

**d. Expose The Baby's Audio Channel to Numbers**

In line with the baby's hearing development, since he was still in the mother's whom, mother of a newly born baby can expose the numbers through the baby's audio learning channel by pronouncing the numbers orderly and repeatedly. Have it with a nice and gentle tone, so that the baby will feel safe and secure. Baby might not understand why parents do that to him, but he will get used to it and eventually get the tone recorded and stored into their mind. By the time he starts to talk, he will easily be able to utter the numbers.

Parents only need to utter the numbers in a series of chronological order. By doing so, babies will record and store it into their long-term memory. Parents need to do it softly and gently, so that the babies will not feel as if the mother is angry, besides, it can also make the babies scared and cry, and eventually they cannot record anything into their mind. Parents can start to have this when the baby is about a year old. This will be the basis or foundation for their ability and competency to deal more with mathematics when they start to school later on.

**e. Introducing the Concept of Pattern**

Pattern means arrangements consist of colors, shapes and quantity. To help children learn more about patterns and its connection, parents need to give them more chances to manipulate objects. Introducing the concept of shapes as a part of mathematics can initially be done to 0 – 1 year old babies. Most parents choose bright and colorful outfits for their 0 – 1 year old babies, and this is one of the ways to get the babies familiar with the concept of pattern. When a mother offers a bottle of milk and the baby tries to reach it, it is also way of introducing patterns to children.

When mother feeds the baby with a spoon, and he opens his mouth, it shows that the baby has already understood that the spoon is for eating. And indeed it is a pattern. A lot of parents however, do not realize that it is a part of mathematics concepts. Knowing this, makes them realize that the teaching of mathematics is actually simple as they can have it with their children in their daily life.

**f. Introducing the Concept of Sorting and Clustering**

Sorting and clustering include the ability of observing and recording the sameness and differences of objects around them. Children learn through their senses; sights by looking at the objects, hearing by listening to the sound produced by the objects, touch or tectile by touching or feeling the objects with their hands, smell by smelling the objects with their nose. Children learn to distinguish things with their senses, and by doing so, they can sort which ones have similar characteristics and which ones do not (different).

When your baby is crying, say "Mommy hear you. Mommy's coming dear." Your baby will recognize your voice. In fact, most mothers do not do this, they just directly come closer without saying any words, therefore, babies will only recognize their mother from the smell of her body, not her voice.

When the baby is awakening from his sleep, the mother will provide him with her breast to be feed on the baby. And the baby can directly find the nipple even without looking at it, this is because he has recognized the smell of the breast he has every day. It is evidence that babies are able to recognize and sort things from its smell.

Prepare to different noisy toys and let the baby listen to the noise. Next, let him choose which one he prefers to play with based on its noise so that he will be able to sort things or object based on its sound. When we find a baby playing some cooking utensils in the kitchen by banging them on the floor or hitting the objects, he actually learns how to sort or group things from its sound. Most parents, unfortunately, are not pleased with that. They consider this act as "noisy" and want their baby to stop it, or even prevent the baby from doing so. This actually will prevent their baby from developing his hearing organ to recognize objects from its sound.

Another thing parents can do to develop the baby's capacity of sorting and clustering things is by giving them three different kinds of fruits in different sizes, shapes, and colors but of similar number. Invite the baby to pick up the fruit, and guide them to pick the fruit of the same kind. By doing so, the concept of sorting objects based on the colors, shapes and size has been internalized into the baby's mind.

**Mothers Teaching Mathematics to 0 – 1 Year Old Babies.**

The observations toward 5 different mothers on the teaching of mathematics to 0 – 1 year old baby show the following results:

**1. Mother 1**

a. Exposing the baby to the balls

Parents' Actions:

1) Exposing the baby to brown circular objects of 1 to 5 cm in diameter.
2) Exposing the baby to colorful balls of different sizes (small – big)
3) Feeding the baby with nipple like texture meal
4) Playing the doll with the baby
5) Feeding the baby with brown nipple size meal

The Baby's Response:

1) Looking at the circular objects and smiles
2) Trying to reach the ball and play with it
3) Pick it up and squeeze it in their hands
4) Frequently bite the nose of the doll
5) Smile, take the meal and eat it

b. Addition and Subtractions

Parents' Actions:
1) Mother leaves the baby alone when playing with him
2) Gradually pick out the baby's toys
3) Gradually add up the balls the baby pays with
4) Add up more biscuits when he ate up his

Baby's response:
1) Cry when left alone
2) Look puzzled looking for his toys
3) Look happy to find more toys
4) Look happy to have more biscuits.

c. Accompany and monitor the baby's development

Mother's actions:
1) While bathing the baby, she tells him he has two hands, two eyes, two ears, two legs, and one nose.
2) While dressing up the baby, she says come on put your head in, put your right hand on and then your left hand on. She does the same things while putting on the baby's socks
3) Gives the baby varieties of toys, such as balls, toy cars, used bottles, etc.

Baby's response:
1) Busy playing and splashing the water
2) He directly raises his hand when his mother asked him to put his hand on to his clothes
3) He put the wheels of the toy cars while playing with his toys

d. Exposing baby's audio channel to the numbers

Mother's action:
1) Have the baby to the utterance of numbers by counting fingers.
2) Count the balls
3) Show the colorful symbols of numbers and pronounce them
4) Count the toys

Baby's response:
1) Refuse to count on the fifth number
2) Enthusiastically pick out and throw the ball
3) Look happy looking at the colorful symbols of numbers

e. Introducing the Concept of Pattern

Mother's action:
1) Provide spoon, bottle and plastic glass
2) Put on bright and colorful clothes and socks
3) Provide cardboard boxes which are set tower like

Baby's response:
1) Put the spoon into his mouth as if he were eating
2) Try to pull out the socks from his feet
3) Try to arrange the cardboard randomly

f. Introducing the Concept of Sorting and Clustering

Mother's action:
1) When the baby's crying, she says," Yes dear, mommy's coming"
2) Provide varieties of toys
3) Provide spoons, plastic bottles, and glasses
4) Alternatively feed the baby with her hand and spoon

Baby's response:
1) Start to stop crying when he hears his mother's voice
2) Choose similar toys
3) Able to arrange the plastic glasses
4) Prefer to be feed using his mother's hand to be spoon

**2. Mother 2**

a. Exposing the baby to the balls

Mother's action:
1) Expose one brown circle of 5 centimeters in diameter to the baby
2) Exposing the baby to colorful balls of different sizes (small – big)
3) Playing the doll with the baby

Baby's response:
1) Look at the circle and smile happily
2) Try to reach the ball and play with it
3) Put the doll's nose into his mouth

b. Addition and subtractions

Mother's action:
1) Suddenly leave her baby while playing
2) Adding the number of the balls while the baby is playing
3) Adding the biscuit when the baby has eaten his biscuit

Baby's response:
1) Cry when he found his mother is not around
2) Look happy to have more balls
3) Feel happy to have some more biscuits

c. Accompany and monitor the baby's development

Mother's action:
1) While dressing up the baby, she says come on put your head in, put your right hand on and then your left hand on. She does the same things while putting on the baby's socks
2) Gives the baby varieties of toys, such as balls, toy cars, used bottles, etc.
3) Sing songs that has numbers on the lyrics
4) Count the house lizard on the walls

Baby's response:
1) When his head is out, he says "boo…" as if he were playing with his mother
2) Put the wheels of the toy cars when playing with them.
3) Fall asleep when his mother is singing the songs
4) Point at the house lizard on the walls

d. Exposing baby's audio channel to the numbers

Mother's action:
1) Pronounce number one to ten
2) Show the symbols of numbers and pronounce them
3) Count the baby's toys

Baby's response:
1) Feel happy with the activity
2) Look happy looking at the colorful symbols of numbers

3) Feel happy looking at her mother counting the toys

e. Introducing the Concept of Pattern
Mother's action:
1) Provide spoon, bottle and plastic glass
2) Provide varieties of fruit
3) Put on bright and colorful clothes and socks
4) Provide a bottle of milk
Baby's response:
1) Put the spoon into his mouth as if he were eating
2) Pick up the fruit randomly
3) Try to pull out the socks from his feet
4) Take the bottle from his mother's hand

f. Introducing the Concept of Sorting and Clustering
Mother's action:
1) When the baby's crying, she says," Yes dear, mommy's coming"
2) Provide varieties of toys
3) Provide spoons, plastic bottles, and glasses
4) Provide fruit toys
Baby's response:
1) Start to stop crying when he hears his mother's voice
2) Choose similar toys
3) Able to arrange the plastic glasses
4) With the mother's guidance, baby picks up the fruit toys that have similar shapes.

**3. Mother 3**

a. Exposing the baby to the balls
Mother's action:
1) Expose brown balls of 1 to 5 centimeters in diameter to the baby
2) Exposing the baby to colorful balls of different sizes (small – big)
3) Playing the doll with the baby
4) Feed the baby with a nipple like shaped meal
Baby's response:
1) Take the ball and put it into his mouth
2) Try to reach the ball and play with it
3) Put the doll's nose into his mouth
4) Smile and eat it

b. Addition and subtractions
Mother's action:
1) Suddenly leave her baby while playing
2) Gradually pick out the balls
3) Adding the number of the balls while the baby is playing
4) Adding the biscuit when the baby has eaten his biscuit
Baby's response:
1) Cry when he found his mother is not around
2) Look confused
3) Look happy to have more balls
4) Feel happy to have some more biscuits

c. Accompany and monitor the baby's development
Mother's action:
1) While dressing up the baby, she says come on put your head in, put your right hand on and then your left hand on. She does the same things while putting on the baby's socks
2) Gives the baby varieties of toys, such as balls, toy cars, used bottles, etc.
3) At lunch time, mom says, " You have eaten two times today, breakfast and lunch"
Baby's response:
1) Enjoy his mother's story while playing with water
2) Put the wheels of the toy cars when playing with them.
3) Seems happy looking at his mother

d. Exposing baby's audio channel to the numbers
Mother's action:
1) Pronounce number by counting fingers
2) Count the balls from one to ten
3) Show the symbols of numbers and pronounce them
Baby's response:
1) Refuse to count fingers
2) Enthusiastically pick out and throw the balls
3) Look happy looking at the colorful symbols of numbers

e. Introducing the Concept of Pattern
Mother's action:
1) Provide spoon, bottle and plastic glass
2) Put on bright and colorful clothes and socks
3) Put on bright and colorful clothes to the baby
4) Provide cardboard boxes to be arranged
Baby's response:
1) Put the spoon into his mouth as if he were eating
2) Try to pull out the socks from his feet
3) Take the bottle from his mother's hand
4) Arrange the cardboard boxes randomly

f. Introducing the Concept of Sorting and Clustering
Mother's action:
1) When the baby's crying, she says," Yes dear, mommy's coming"
2) Provide varieties of toys
3) Provide spoons, plastic bottles, and glasses
4) Alternatively feed the baby using hand and spoon
Baby's response:
1) Start to stop crying when he hears his mother's voice
2) Choose similar toys
3) Take the bottle's tube and try to put it back
4) Prefer to be fed with hand to spoon.

4. Mother 4

a. Exposing the baby to the balls
Mother's action:
1) Expose one brown circle of 1 - 5 centimeters in diameter to the baby
2) Exposing the baby to colorful balls of different sizes (small – big)
3) Playing the doll with the baby
4) Feed the baby with nipple like shaped meal
Baby's response:

1) Pick up the ball and put it into his mouth
2) Try to reach the ball and play with it
3) Put the doll's nose into his mouth
4) Pick it up, smile and eat it

b. Addition and subtractions
Mother's action:
1) Suddenly leave her baby while playing
2) Adding the biscuit when the baby has eaten his biscuit
3) Adding and subtracting the balls
Baby's response:
1) Cry when he found his mother is not around
2) Feel happy to have some more biscuits
3) Look happy to have more balls

c. Accompany and monitor the baby's development
Mother's action:
1) While dressing up the baby, she says come on put your head in, put your right hand on and then your left hand on. She does the same things while putting on the baby's socks
2) Gives the baby varieties of toys, such as balls, toy cars, used bottles, etc.
3) At lunch time, mom says, " You have eaten two times today, breakfast and lunch"
Baby's response:
1) When his head is out, he says "boo…" as if he were playing with his mother
2) Put the wheels of the toy cars when playing with them.
3) Look at his mother and smile

d. Exposing baby's audio channel to the numbers
Mother's action:
1) Pronounce numbers one to ten by counting fingers
2) Count balls from one to ten
3) Show the symbols of numbers and pronounce them
Baby's response:
1) Feel happy with the activity
2) Enthusiastically pick out and throw the ball
3) Seem happy looking at the colorful symbols of numbers

e. Introducing the Concept of Pattern
Mother's action:
1) Provide spoon, bottle and plastic glass
2) Put on bright and colorful clothes
3) Provide noisy toys
4) Provide a bottle of milk
5) Provide cardboard boxes
Baby's response:
1) Put the spoon into his mouth as if he were eating
2) Play with the bright and colorful clothes
3) Hit they toy to each other
4) Take the bottle from his mother's hand
5) Randomly arrange the cardboard boxes

f. Introducing the Concept of Sorting and Clustering
Mother's action:
1) When the baby's crying, she says," Yes dear, mommy's coming"
2) Provide varieties of toys
3) Provide spoons, plastic bottles, and glasses
4) Provide fruit toys
5) Feed the baby with spoon
Baby's response:
1) Start to stop crying when he hears his mother's voice
2) Choose similar toys
3) Pick out the bottle's tube and try to put it back
4) With the mother's guidance, baby picks up the fruit toys that have similar shapes.
5) Prefer to be fed with hand

**5. Mother 5**

a. Exposing the baby to the balls
Mother's action:
1) Expose one brown circle of 1 to 5 centimeters in diameter to the baby
2) Exposing the baby to colorful balls of different sizes (small – big)
3) Feed the baby with the nipple like texture
4) Feed the baby with the nipple like shaped
Baby's response:
1) Pick up the ball and put it into his mouth
2) Try to reach the ball and play with it
3) Pick up the meal and squeeze it in his hands
4) Pick it up, smile and eat it

b. Addition and subtractions
Mother's action:
1) Suddenly leave her baby while playing
2) Adding the number of the balls while the baby is playing
3) Adding the biscuit when the baby has eaten his biscuit
Baby's response:
1) Cry when he found his mother is not around
2) Look happy to have more balls
3) Feel happy to have some more biscuits

c. Accompany and monitor the baby's development
Mother's action:
1) While dressing up the baby, she says come on put your head in, put your right hand on and then your left hand on. She does the same things while putting on the baby's socks
2) Gives the baby varieties of toys, such as balls, toy cars, used bottles, etc.
3) Sing songs that has numbers on the lyrics
4) Count the house lizard on the walls
Baby's response:
1) When his head is out, he says "boo…" as if he were playing with his mother
2) Put the wheels of the toy cars when playing with them.
3) Fall asleep when his mother is singing the songs
4) Point at the house lizard on the walls

d. Exposing baby's audio channel to the numbers
Mother's action:

1) Pronounce number one to ten
2) Count the balls
3) Show the symbols of numbers and pronounce them

Baby's response:

1) Feel happy with the activity
2) Enthusiastically pick out the ball and throw it
3) Look happy looking at the colorful symbols of numbers

e. Introducing the Concept of Pattern

Mother's action:

1) Provide spoon, bottle and plastic glass
2) Put on bright and colorful clothes
3) Provide baby with noisy toys
4) Provide a bottle of milk
5) Let the baby move around the edge of the table

Baby's response:

1) Put the spoon into his mouth as if he were eating
2) Try to pull the ornaments on his clothes
3) Choose the toys with similar sound
4) Take the bottle from his mother's hand
5) Move around the edge of the table and try to climb on to it

f. Introducing the Concept of Sorting and Clustering

Mother's action:

1) When the baby's crying, she says," Yes dear, mommy's coming"
2) Provide varieties of toys
3) Provide wooden sticks that the baby can hit on the toys
4) Provide spoons, plastic bottles, and glasses
5) Alternatively feed the baby with hand and spoon
6) Provide toy cars of different colors

Baby's response:

1) Start to stop crying when he hears his mother's voice
2) Choose similar toys
3) Put the wooden sticks into the bottle
4) Put the spoon into his mouth as if he were eating
5) Prefer to be fed with hand to spoon
6) Pick out two toy cars of similar colors.

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## CONCLUSION

Most parents of 0 – 1 year old babies do not realize that the teaching of mathematics is relevant for these ages. Aware of this, parents welcome the teaching method for the babies of 0 – 1 year old for it takes place naturally. They realize that mathematics which they consider as something difficult can be very fun and easy.

The teaching of mathematics to babies can be done through everyday activities; playing and interacting with family members. Doing so, the concepts of mathematics will be internalized into the babies' long-term memory which will be activated later on when they start to school. The conviction that mathematics is a difficult subject will no longer acceptable, yet, it is an easy and fun one.

The results of the study show that mathematics subject can be initially started to the babies of 0 – 1 year old. It can be done by exposing balls, introducing simple addition and subtractions, accompanying and monitoring baby's development, and Exposing baby's audio channel to the numbers. This will help children to learn the basis of mathematics as they start to study at school.

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