Widen the language development in infants and toddelers

Dwi Nurcahyati[1], Sukmawati Lopo[2], Sahara Nur Fadila[3]

[1]Students of early childhood education study programs, Faculty Of Teacher Training and Education, University Of Muhammadiyah Surabaya, Sutorejo Street Number 06-601113; Surabaya East Java, Indonesia
[2]Students of early childhood education study programs, Faculty Of Teacher Training and Education, University Of Muhammadiyah Surabaya, Sutorejo Street Number 06-601113; Surabaya East Java, Indonesia.
[3]Students of early childhood education study programs, Faculty Of Teacher Training and Education, University Of Muhammadiyah Surabaya, Sukolilo Street Number 04-60122; Surabaya East Java, Indonesia.

[1]dwinurcahyati97@gmail.com
[2]sukmawatilopo@gmail.com
[3]saharanurf0511@gmail.com

Abstract. In the initial stages, speech development is a sensorimotor process that occurs as a result of the child's interaction with parents. The left hemisphere of the brain begins to take part in functional roles as soon as speech becomes a symbol. The development of children's communication actually begins early, when he cries. After the age of 3 years children start dialogue longer and ask abstract things. Most couples communicating children are adults, usually parents. A child's speech ability is influenced by several factors, including the ability to hear, physical development of the mouth, and throat and heredity, history of the mother's womb, childbirth, stages of development of the child, environment, hearing loss, intelligence (cognitive), psychological emotions . Children can express their thoughts through language so that others can capture what is thought by children. Children who talk a lot sometimes become a reflection of an intelligent child. Language development for early childhood aims to enable children to communicate verbally with the surrounding environment. The impact of parenting and the environment are the main causes of children's language development not in accordance with the development of language at their age.

Keywords: Language development in infants and toddlers

1. Introduction

Children are both a gift and a mandate given by Allah S.W.T to a married couple so that it can be said that children are special. According to Dr. Thomas Armstrong, an educational expert from America that every child is born with the potential to enable them to be smart. The inherent traits include curiosity, exploration of the environment, spontaneity, vitality and flexibility. Viewed from this angle, it should be the duty of every parent and teacher to simply maintain the traits underlying this intelligence so that they last until the children grow up.

The most intensive period of children's language and speech development lies in the first five years of their life, a period in which the human brain develops in the process of reaching maturity. This period is known as the golden years of the first five years of childhood, especially in the first 1- 3 years is the second period of brain growth spurt or rapid brain development. The first brain growth period occurs during the baby in the womb, while the second occurs after the baby is born until he is 36 months old. This is in line with Santrock (2002: 181) who said that: "Childhood is an important

period for language learning, if language recognition is not done before adolescence then a lifetime of children will experience an inability to use good grammar." For this reason, language recognition in children from an early age can help children to gain better language and speech skills. [1]

By socializing and interacting with friends and the environment, a child needs language to communicate. The ability to communicate with language is fundamental and is very important in a child's development. With language children will be able to develop social skills with others. One cannot communicate without the important role of language. Children can express and actualize what is in their minds through language with the aim that others can understand what the child is thinking. In establishing a relationship, language has an important role so that it can help children interact with others. Therefore there is no doubt that language is considered as one indicator of success that will be obtained by a child.

Children at the time of formation will usually be influenced by genetic and environmental factors in shaping their personality. In this case, children are imitative or imitators, what they see, feel and see from their environment will be followed because they do not know the boundaries of right and wrong, good and bad as well as inappropriate or inappropriate. Children are still learning to try to correct behavior that is acceptable to their environment. Therefore, a child must be able to be sensitive to the influence of the surrounding environment. In this issue parents as educators at home and teachers as educators in schools must be able to provide the widest possible educative effect on children in order to help develop positive children's behavior.

Based on the explanation above, it will be known that the environment is very influential to shape the child's personality and language development so that it is easier to communicate and socialize in everyday life. In addition, the existence of a conducive environment will bring children in the direction of politeness in speaking and can affect the character, behavior, characterization of a child so that the goal of printing / making children into the next generation who has a morality will be realized.

2. Method

Based on the study of literature in the literature review formed research questions, namely 1). What is meant by language development and 2). How does the language development process in infants and toddlers. The type of data used is secondary data. Data collection method is literature study. The method to be used for this study is the study of literature. The data obtained are compiled, analyzed, and concluded so as to get conclusions about language development in infants and toddlers.

3. Result and Discussion

Language development in children is the detection of symptoms that occur in children in the development process. By knowing the stages of children's language development teachers are expected to know the child's developmental needs and how to stimulate them according to the age stages of the child. In the development of language used to see the child's conversation accompanied by the use of technology to record children's voices. Children's language development is influenced by the environment and the opportunity to interact in the environment. One of the basic principles of early childhood education is the planning and application of a learning environment for children that broadens their development.

Infancy is a period of receptive language development, once the child hears the language used by adults and begins to establish routine communication through sharing the same references and turning communication. Babies begin to learn that all objects have baby names and also learn that certain actions on certain objects will produce results. Generally the term baby is given to children under the age of 12 months, but the definition in various places can vary, some even up to 2 years. In the context of medicine, babies who are under 28 days old are called neonates (from the Latin neonates, "newly born"). Infancy is a period of receptive language development, once the child hears the language used by adults and begins to establish routine communication through sharing the same references and turning communication. Babies begin to learn that all objects have baby names and also learn that certain actions on certain objects will produce results. Early childhood development has

several aspects namely the physical aspects of motoric, language, art, cognitive and social emotional. These aspects cannot develop by themselves, but they are interrelated. If one aspect cannot develop properly then the other aspects also experience developmental disorders.

Babies develop receptive bases When they begin to interpret and understand messages communicated by others around them. Children also begin to participate in communicative interactions through the use of body language and vocabulary. So, during infancy, learning activities must focus on developing receptive language and establishing communication with babies through the use of body language and vocabulary. [2]

How to expand language development in infants and toddlers:

1. Eye contact and share the same referral.
   Through eye contact and sharing the same referral, the teacher includes the baby in communication about events or objects. In establishing eye contact, teachers need to position themselves so the baby can see the teacher's face.
2. Timing for interactions 0ne-on-one
   Timing for interacting with babies is very important. When showing a new object and finding it, first establish eye contact and then move the object to attract the child's attention.
3. Observe, wait and listen.
   The teacher's observation of the baby's response to interactions is very important. With close observation of the child's attention focus and facial expression, the teacher will be able to interpret and understand the children's desires and feelings better. When the teacher waits for a while before responding, it provides an opportunity for the child to express his needs and desires.
4. Respond quickly and physically to the baby's emotional needs
   Babies need a guarantee to know their physical and emotional needs will be met by their teacher. The baby's sense of security will build a trusting relationship between the baby and the teacher and provide a basis for positive trust and social development that is important for the cognitive development of the baby.

Exploratory activities for babies are accompanied by teachers who observe and mediate guidelines compared to activities for older children, according to the needs for children's safety and welfare. moreover, teacher mediation can provide verbal naming and mapping, which is important for developing receptive language knowledge for children. (Fowler, 1990). But the teacher should not be forced to use continuous naming or verbal mapping. Babies need time to explore on their own and at their own pace or speed.

In humans, language is a symbol system for communicating with others, including creativity and a regulatory system. Where in this case language development is a fundamental stage for the development of children's lives. Children with good language skills will affect the life of communication and how to interact with others, so that their desires and needs for something can be poured through their ability to speak and speak (Yusuf. 2011). [1]

In the initial stages, speech development is a sensorimotor process that occurs as a result of children's interactions with parents. This speech development begins at the preverbal stage as an interaction between visuospatial and prosody-emotional which is based primarily on the mechanism of the right and subcortical hemispheres. This mechanism is also used for nonverbal contacts such as facial recognition and facial emotional expression recognition. The left hemisphere of the brain begins to take part in functional roles as soon as speech becomes a symbol. In other words, the left hemisphere of the brain begins to play at the age of about two years and when symbols are used in the child's cognitive processes. The development of children's communication actually starts early, first of all crying when the baby feels uncomfortable, for example because of hunger, wet diapers. From here the baby will learn that he will get the attention of his mother or someone else when he cries.

Stages of children's language development from birth to 4 years old. Since the baby is born until the age of 2 months will cry when feeling hungry, and can follow the sound direction; when 2 - 6 months old, babies can chatter, laugh, cheerfully shout, make funny noises; aged 7-12 months, babies begin to say 'ba', 'da', 'ka' clearly, repeat some syllables, begin to understand the word 'no', follow

simple instructions such as 'bye-bye' or play 'peek-a-baa' ; aged 12-18 months, babies begin to say two or three meaningful words, point to objects that are seen in books and encounter them every day, say and imitate simple and often heard words and express them, producing approximately 10 meaningful words; ages 18-24 months, the baby's vocabulary reaches 20 words, starts to frequently ask simple questions like 'where', 'where', and give short answers such as 'no', 'there', 'there', 'where' besides that word the words that are spoken are still often unclear, for example 'balloon' to 'aon', 'bread' to 'oti', start using words that show ownership like 'have sisca', 'mine'. since the child already understands the meaning of ownership, usually the child's selfishness will often appear at the time of behavior and this is still in certain ranks. [3]

Language Development In Batita

Toddlers are a period when a child starts to walk and is the most powerful period of growth and development, namely at the age of 1-5 years. This period is an important period for the development of intelligence and intellectual growth. Toddler is a general term for children aged 1-3 years (toddlers) and preschoolers (3-5 years). At the age of toddlers, children are still fully dependent on parents to do important activities, such as bathing, pooping and eating. The development of speech and walking has improved. However, other abilities are still limited.

During toddler-adult interactions, providing time to wait for toddler responses is important to encourage their responses. When a toddler does not respond quickly to adult speech, it may be due to the reaction of an adult who fills in the blanks, answers all questions, and even gives comments without giving a pause. This lack of sufficient time to wait does not encourage the child to respond because the adults continue as if they do not expect any response. Maintaining the communication cycle with toddlers requires special techniques, because toddlers are just beginning to learn to interact in longer conversations. The teacher can use the following techniques to keep communication going:

1. Use facial expressions that indicate that you are waiting for your child to take turns taking roles.
2. Leaning close to the child to show the child that you pay attention.
3. Point out activities or objects that are noticed by the child so that the child responds.
4. Use words like, "look", "your turn," and "what happened".
5. Repeat what you say with intonation asking.
6. Gunakan pertanyaan yang menunjukkan ketertarikan Anda atau anak dorong untuk membahas proses berpikirnya.

Ujaran yang disetujui kepada anak. dalam ujaran yang disetujui pada anak, orang dewasa membangun oercakapan sesuai dengan tingkat pemahaman anak. Saat bahasa percakapan menjadi terlalu rumit, bsatita akan menarik diri. Berikut ini adalah beberapa cara untuk Menyelesaikan percakapan Anda untuk melengkapi pemahaman dan respons batita (kratcoski & Katz, 1998; Greenberg, 2002): [3]

1. Say not too many words. Use shorter sentences and not too much grammar and vocabulary.
2. Use prosody and intonation. Emphasize important words and use expressive intonation with a slightly higher tone.
3. Repeat certain words and phrases
4. Speak slowly and clearly.
5. Build the same referral. Talk about events and objects in the closest environment and use body language to refer to the event or object.

Verbal mapping is often used with toddlers to link ongoing events. When you use language to describe an ongoing event, children learn that language is used to refer to events and begin to attach names to concepts and schemata. Mediation is another pattern of interaction that extends children's language development during infancy. Mediation occurs When toddlers use language to simplify complex events so toddlers can understand it. This mediation occurs individually for certain children and certain joint book reading events.

Using symbolic language with toddler signs When talking, while encouraging children to use body language to express their wants and needs. Although toddlers have developed a vocabulary of

listening and showing understanding through nonverbal responses, expressive vocabulary is still small. Toddlers are just beginning to produce units that are similar to words they find or create themselves and some words that are commonly used.

Exploratory activities give toddlers time to investigate the environment that is prepared for them. At present, conceptual developments in activities that involve active participation with practice provide opportunities for both receptive and productive language development. Toddler activities are more than just playing they are involved in trial and error learning, they test their hypotheses about how things work, and they explore causal relationships. They also develop social interaction skills and begin to engage in short conversations with classmates.

4. Conclusions

Language development in children begins in the 7th month, children learn to scream and babble. In this stage the child will try to make a sound to stimulate the child himself with the natural way that children do. Expanding language development in children by stimulating children so that children are active in babbling or shouting in the early days of children learning to make sounds. Parents need to be aware of this development in order to be detected from the beginning of an undesirable possibility in the future. The development of language here as a sensorimotor process is the result of interactions with parents. Children will pass the time of censorship when parents invite children to talk, even at the age of under 5 months the child can not understand what is said by his parents, but the child will receive sensor stimulation from parents who provide new vocabulary to remember as vocabulary stock when the child is going to talk.

5. Acknowledgment

6. References

[1]   Otto, Beverly.2015. *Development Language in Early Childhood* Jakarta: Prenadamedia Group.
[2]   Setyowati, Endang Buda.2012. *Language Development in Pre-School Age Children (4-6 year) With Mother's Education.*Griya Husada Midwifery Academy.
[3]   Basuki Prima Birawa A, & Amalia L. *Development of language skills in children*. Part Neurologi FK UNPAD.

287

Implementation of the Numeracy Literacy Program in Learning Mathematics Remaining Class IV in Muhammadiyah Elementary Schools

Beti Istanti Suwandayani[1], Yahya Fakhruddin[2], Leny Suryaning Astutik[3]

[1]University of Muhammadiyah Malang, Saptorenggo Pakis, Malang, 65154, Indonesia
[2]University of Muhammadiyah Malang, Purworejo, Pasuruan, 67116, Indonesia
[3]State University of Malang, Ngunut, Tulungagung, 66292, Indonesia

beti@umm.ac.id

Abstract. Government programs in fostering a culture of reading and making students literate individuals are welcomed by the implementers of the education program. The purpose of this study was to analyse the implementation of the numeracy literacy in mathematics learning, to analyse the supporting and inhibiting factors of numeracy literacy program in grade IV mathematics learning in elementary schools. This research use descriptive qualitative approach. Data collection uses observation, in-depth interviews, and documentation studies. This study also uses research instruments to guide data collection. This research was conducted in several Muhammadiyah elementary schools, they are SD Muhammadiyah 1 and SD Muhammadiyah 5 Kota Malang. The subjects in this study were the principal as policy makers, class IV teachers, students and parents. The results showed that in learning numeracy literacy was good enough in contextual and problem-based concept planting, but rarely used projection based learning. Facilities and infrastructures that need to be improved, learning motivation is also an inhibiting factor in learning, but there are supporting factors such as the allocation of funds themselves for numeracy literacy programs and the existence of teacher training for literacy programs able to correct existing problems.

1. Introduction

Indonesia has great potential to deliver into developed countries. Indonesia's potential is its main capital. But there is still homework to be done. One of them is the field of education. Quality human resources are demonstrated through an educated community. Through the Organization for Economic Co-operation and Development (OECD) the Indonesian government received appreciation in increasing access to Indonesian education. This can be seen from the increase in the percentage of people who go to school. Since 2000, only 29% of the 15-year-old population attends junior or senior high school. While in 2018, this percentage will increase to 85% [1]

Learning activities are certainly widely obtained in various places and other learning resources, currently education in Indonesia has carried out the National Literacy Movement [2]–[4] or abbreviated as GLN. GLN aims to increase the quality of life of the Indonesian people ranging from family, community, to education through literacy culture. The statement, according to Kemendikbud (2017) states that the purpose of the national literacy movement is to develop a culture of literacy in the education ecosystem, starting from the family, school and community in the context of lifelong learning as an effort to improve the quality of life. According to the results of a survey conducted by the Indonesia National Assessment Program (INAP) in 2016 which measured reading, math and science skills for elementary schools [5] that 77.13% for the mathematics category, 73.61% for science and reading skills 46.83% [6] of the results the survey developed a government literacy culture based on Permendikbud No. 23 of 2015 concerning the growth of manners. This is reinforced by the results of the Program for International Student Assessment (PISA) published in 2019 showing that in a row, the scores obtained from the fields of reading, mathematics and science in 2018 are 371,

379, and 396 [7], [8]. This value has decreased compared to the test in 2015[7], where successively reading, mathematics, and science, we scored 397, 386, 403. Of all the scores, Reading has the lowest score decline, and even below the score in 2012, namely 396. The following is a graph of the conditions of literacy from 2012 to 2018.

Figure 1. Graphic Achievement in Literacy Scores in Indonesia
Source: [9]

From the graphic images obtained by Indonesia in the fields of reading, mathematics and science show that this year has decreased. The results of the PISA data can describe Indonesia's ranking from other countries [10]. The score can also be used to monitor the quality of national education. According to the Minister of Education and Culture said that the results of the 2018 Program for International Student Assessment (PISA) study released in 2019 were a good step through different perspectives. Through these different perspectives, the government formulated a strategic step in the equal distribution of education. Literacy activity is also effective in growing reading ability.

Literacy is a necessity that everyone must have it. In this 21st century, literacy skills need to be improved [11], because literacy is fundamental for students. Literacy is not just reading and writing, according to the times and technology at this time there are some literacy that was developed. This is in agreement with Albert [12] explained that literacy is not just the ability to read and write, but adds knowledge and skills and knowledge skills and abilities that can make people have the ability to think critically able to solve problems in various contexts, able to communicate effectively and be able to develop the potential and actively participate in community livelihoods. Permendikbud Policy No. 23 of 2015 concerning the growth of character implements a literacy program to foster character and foster literate individuals.

Now, literacy is not only the ability to read and write, but at this time a lot of literacy skills and skills have been developed to increase knowledge in community and educational attainment. One literacy developed in education is numeracy literacy. Numeracy literacy is applying the concept or calculation operations and mathematical tools in students' daily activities in work or activities that use calculation data in making decisions. Numeracy literacy is defined as a person's ability to use reasoning[13]. Mathematics learning is not only aimed at increasing the ability to count. This ability has not been able to deal with increasingly complex problems in daily activities [14]. Literacy helps to improve counting from an early age with examples of problems that exist in everyday life. This is certainly in line with the current Ministry of Education and Culture program with numeracy literacy. The results of the preliminary study indicate that in SD Muhamadiyah 5 Malang is quite new. The program starts in 2018 in 2 classes, namely class I and class IV. Whereas in Muhammadiyah Elementary School 5 literacy has only begun in 2019.

Learning mathematics and numeracy literacy is not just about memorizing and memorizing. Mathematics learning and numeracy literacy have in common, which involves mathematical abilities, the use of the ability of knowledge and reasoning to solve problems in a variety of circumstances and needs. Mathematical literacy is able to make us a literate who is able to predict and interpret information, solve problems by giving reasons through graphs, tables and communicate using mathematics [15]. Schools use numeracy literacy as an effort to turn individual students into

numerical or mathematical literacy. Numerical literacy is literacy that is able to make individual literates who can solve everyday problems with mathematical language. Numeracy literacy is knowledge and skills to (a) use various numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life and (b) analyze information displayed in various forms (graphs, tables, charts, etc.) then uses the interpretation of the results of the analysis to predict and make decisions [16]. The implementation of the School Literacy Movement (GLS) through 3 stages is carried out so that the sustainability of the implementation runs well and is long-term in its implementation. The stages of literacy in these elementary schools are habituation, development, and learning[17], [18].

The results of previous studies also showed that the application of literacy movements in SD Muhammadiyah 1 Ketelan Surakarta was able to foster a culture of reading and its implementation carried out 15 minutes before learning, literacy activities were not only on general learning but there were some religious activities to foster student religious attitudes[19]. Based on the results of previous research conducted by [20] that numeracy literacy is carried out in the lower classes. Teachers prefer to use computers, pictures and videos in numeracy literacy classes. The implementation of the numeracy literacy program shows that students are educating this activity. Based on the explanation, this research needs to be examined in SD Muhammadiyah as an Islamic-based private school. Literacy program that is being carried out now there are many problems faced, literacy teachers at this stage are still evaluating and developing numeracy literacy to get better. This literacy is also able to bring students to the ease of solving mathematical problems with existing concepts. Numeracy literacy activities are expected students no longer memorize formulas but by learning mathematical concepts with problems that exist in everyday life. The implementation of this research will make it easier to describe how the implementation of numeracy literacy programs relates to mathematics learning in class IV at SD Muhammadiyah 1 Malang and SD Muhammadiyah 5 Malang.

2. Method

The type of qualitative research used is descriptive research. In this study using descriptive qualitative research in order to describe the numeracy literacy program activities in mathematics learning for class IV in SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang.

The role of researchers in this study as participatory observers is that researchers make observations that are within the activities carried out by groups, researchers create their own roles without participating in the interests of the observed group activities. The place of this research is SD Muhammadiyah 1 SD and Muhammadiyah 5 Malang.

The data sources used in this study are primary data sources and secondary data sources. Primary data sources in this study are the principal, grade IV teachers, and grade IV students of SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang. Secondary data sources are sources of data obtained directly from observations made or other sources such as books and documentation.

Collection techniques in this study researchers used interview techniques, observation, documentation studies. Interviews are the main technique in descriptive qualitative research, interviews are conducted by answering verbally with respondents in meetings or face to face. The interview used is structured interview. That is the question the researcher will ask has been prepared beforehand to look for answers in the hypothesis. In this study, interviews were addressed to grade IV teachers and grade IV numeracy literacy teachers conducted face-to-face. The interviews or questions asked are adjusted to the interview guidelines relating to numeracy literacy programs in grade IV mathematics learning at SD Muhammadiyah 1 Malang and SD Muhammadiyah 5 Malang.

Observation technique is done by jumping directly into the field to see or observe the ongoing activities. Observation activities in this research are observing the facilities and infrastructure to support numeracy literacy program activities and its application in learning mathematics in class IV in SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang. While the documentation study in this research was carried out by collecting or analyzing written documents, images and electronics. In this study the documentation study was used to collect documents or letters supporting the numeracy literacy program, taking pictures of numeracy literacy program activities and mathematics learning,

stabilizing pictures of student activities as well as facilities and infrastructure to support class IV numeracy literacy programs.

The instrument in this study used interview guidelines, observation guidelines, study documentation guidelines. Interview guidelines were conducted to present topics about the implementation of numeracy literacy movements in mathematics learning. This interview was sourced from the school principal, class teacher and students. This interview was conducted to answer the problem formulation.

Table 1. interview guide grid

Aspects	Indikators
Implementation of numeracy literacy movement in mathematics learning in class	Literacy program design
	Implementation of literacy program
	Effect of numerical movements on learning outcomes of mathematics
	Mathematics learning with numeracy literacy movements
	The effect of numeracy literacy movements in understanding mathematics learning
	Student motivation in learning mathematics
Supporting and Inhibiting Factors of Numeration Literacy Movement Implementation in Mathematics Learning class IV	Factors supporting numeracy literacy movements in mathematics learning
	Factors that inhibit numeracy literacy in mathematics learning

Source: [21]

Observation guidelines are carried out to see directly in the field about the implementation of numeracy literacy movements in mathematics learning. These observational guidelines to fit the title of the study at the time the observation was carried out. Guidelines for observing the implementation of literacy movements in learning mathematics are as follows.

Table 2. observation guide grid

Aspects	Indikators
Implementation of Class IV Literacy Numeration Movement	Appropriate learning theme
	The use of learning resources varies
	Student participation
	The ability of students to solve tasks or problems
Implementation of Numeration Literacy Movement in Mathematics Learning class IV	Contextual and problem-based learning
	Student participation

| | The ability of students to complete assignments or problems |
| | Student learning outcomes above a predetermined average |

Source: [21]

Documentation study lattice to collect and analyze data from sources in numeracy literacy activities in mathematics learning to support literacy movement activities. The study documentation grid is as follows.

Table 3. Study documentation guide grid

Aspects	Indikators
Implementation of Class IV Literacy Numeration Movement	RPP in mathematics learning
	Number of literacy teachers
	Results of project assignments
	Student learning outcomes
Supporting and Inhibiting Factors in the Implementation of the Numeracy Literacy Movement in Mathematics Learning class IV	Learning Resources
	Student library / reading corner
	Wall literacy numeracy magazine
	Cleanliness and neatness of class

The research procedures for the implementation of the numeration literacy movement in Mathematics Learning for Grade IV at SD Muhammadyah 1 Malang and SD Muhammadyah 5 Malang were carried out as follows.
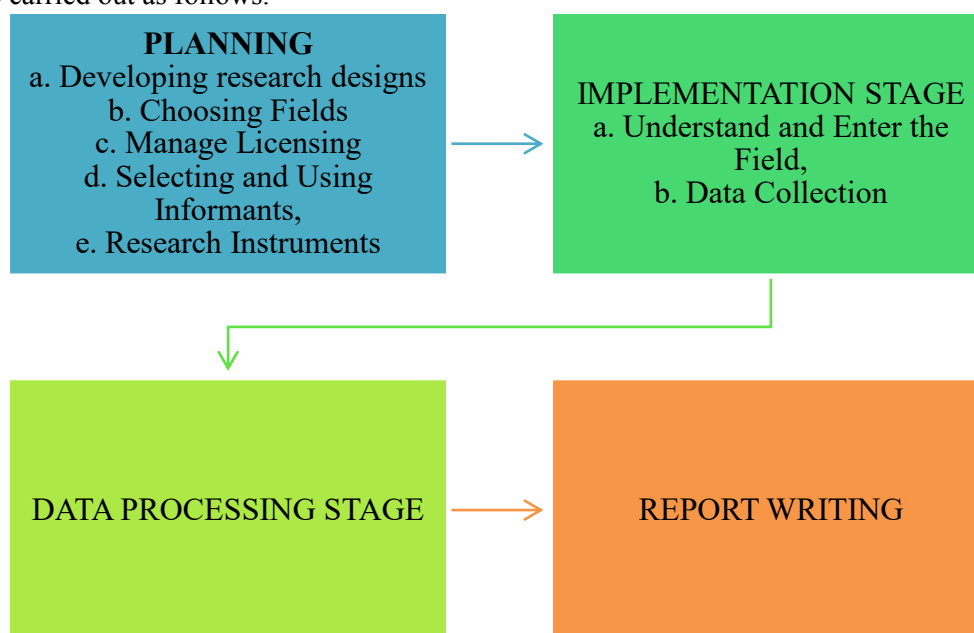

Figure 2. Research Procedure

This study uses descriptive analysis to describe the results of interviews with sources, describing the results of observations made. This study uses descriptive analysis to describe the results of interviews with sources, describing the results of observations made. Data analysis process according to the model of Miles and Huberman that includes data collection activities, data reduction (data reduction), data display (data presentation), and conclusion drawing or drawing conclusions / verification [22]. This research reduces the important data in the processed interviews that have been conducted with the source and reduces the observed observation data. This stage sort out or concurrently important things in the stabilization of data in accordance with the initial topic, namely the implementation of numeracy literacy in learning mathematics grade IV. Presentation of data in this study using descriptive or tables and graphs in explaining the results of data that has been reduced regarding the implementation of numeracy literacy movements in mathematics learning class IV. The last is data conclusions. This stage is to provide conclusions or results obtained after data reduction and data presentation. Shows various results that have been obtained after interviews, observations, documentation studies regarding the implementation of numeracy literacy movements in mathematics learning class IV. The validity of the data in this study uses 3 techniques, namely data triangulation and member checking techniques to test the validity and validity of the data. Triangulation of techniques to test the credibility of the data is done by checking the data to the same source with different techniques. For example data obtained by interview, then checked by observation, documentation. The purpose of member check is to find out how far the data obtained is in accordance with what is provided by the data giver. If the data found is agreed by the data giver means the data is valid, so it is increasingly credible / trusted.

The result of this research is consist of two part. First is implementation of literacy program in mathematics learning and second is supporting and inhibiting factors in the implementation of the numeracy literacy movement in mathematics learning.

Implementation of Literacy Program in Mathematics Learning

The application of literacy requires human resources, at Muhammadiyah Elementary School, only 2 teachers started using grade 1 and 4 teachers, but currently there is a literacy team and all teachers are literacy teachers. The initial research activities carried out were interviews with resource persons including school principals, literacy teachers, IV grades mathematics teachers. Interviews to find out information on the implementation of numeracy literacy movements in learning mathematics. The interview was conducted in a structured manner after the interview was carried out observation, documentation study.

Numeracy literacy is the effort of the Ministry of Education and Culture to make students literate-cultured individuals in the daily lives of students, especially in terms of calculation. This was conveyed by the principal after an interview.

"*Literacy culture is carried out to foster student interest in reading and introduce students to the literacies in school*" (Interview/KS/01112019)

The results of interviews with the school principal illustrate the purpose of the numeracy literacy movement in SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang. Students are introduced and one of the efforts to make individuals literate culture. Literacy is also one of the school's efforts to foster student interest in reading. The application of numeracy literacy in schools has indicators in its implementation, namely indicators on the basis of class, school, and community [16]. The application of classroom-based literacy is done by increasing efficiency and applying numeracy in learning. Numeracy literacy in this class helps develop mathematical abilities by contextual presentation [23]. While the implementation of school numeracy literacy in the two elementary schools is demonstrated through the increasing number and variety of numeracy literacy reading materials. For the community base, literacy literacy is demonstrated by the involvement of parents in developing numeracy literacy in schools. For example, students are allowed to bring a reading book from home. The book has also been communicated by parents and teachers through a contact book. This parental support is important given that the child's learning environment is not only in school. At home parents can provide relevant reading resources for students to read [24].

Based on the findings in the field, in SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang have implemented numeracy literacy movement since June 2018 and February 2019. The numeracy literacy movement has been implemented in mathematics learning in class. This is in accordance with the Ministry of Education and Culture Regulation No. 23 of 2015 concerning the Development of Characteristics to build a culture of literacy in all school educational institutions.

The implementation of numeracy literacy in SD Muhammadiyah 5 Malang City has been carried out according to schedule every day. Implementation of numeracy literacy movements applied to mathematics learning is very important for teachers to motivate students in understanding mathematical material. Problem-based methods and projections are one way to foster student enthusiasm for learning. On a classroom basis the teacher applies problem-based or projection learning. Findings in the field when observing teachers more often use the problem base and rarely use the project base. The results of interviews with school staff also found that learning was not entirely problem based or projected.

Numeracy literacy is also applied in learning mathematics in class. Mathematics learning is problem based in learning. Students are more active in problem based learning with numeracy literacy and problem based mathematics learning. The inculcation of mathematical concepts with problems makes it easier for students to solve the problem of numbers in their students' daily lives.

The application of numeracy literacy culture to thematic learning has been carried out in accordance with numeracy literacy indicators. According to [16] numeracy literacy indicators that are implemented in schools are one of them on a class basis:

a. Teacher Training in Mathematics and Non Mathematics

Implementation of the literacy movement is supported by the presence of teachers who have participated in literacy training programs. Mathematics and non-mathematics teacher training aims to strengthen facilitators in learning literacy that is outside the subjects as well as in the subjects.

b. Problem Based Learning and Project Based Mathematics Learning

Interviews with several sources found that students were more motivated when learning numeracy or mathematical literacy on a problem basis, so the teacher did not use projection based learning. According to the opinion [25] problem-based learning is a learning approach that uses daily activities as a context for students in solving problems, as well as providing concept knowledge in a learning material. The finding of the above results is that numeracy literacy learning uses problem-based learning in providing a learning material and does not use projection based learning for student skills.

c. Improved Mathematical Value

The numeracy literacy program in mathematics helps in students' readiness in accepting mathematics material that will be given by the teacher. Improved results of some students in the class prove that the existence of numeracy literacy in mathematics learning helps motivate students in learning activities. This is in accordance with [26] the movement of school literacy towards learning outcomes shows that the results are not significant in improving learning outcomes so that learning outcomes can be influenced by internal and external factors.

Supporting and Inhibiting Factors in the Implementation of the Numeracy Literacy Movement in Mathematics Learning

The results of the numeracy literacy movement research data contained supporting and inhibiting factors, the results of the study were discussed as follows. The numeracy literacy program at the Muhammadiyah elementary school has supporting factors in its activities. Facilities and infrastructure certainly become a major factor in supporting learning or activities. [27] They show that facilities and infrastructure have important factors in learning activities in addition to the problems faced by fewer students, facilities and inscriptions that make them also make learning activities interesting and learning outcomes increase. Another supporting factor is funding to add and maintain existing facilities and infrastructure. Funding in education is one of the factors to add and maintain facilities and infrastructure, teacher allowances and so on, if there is no adequate funding for teaching and learning processes and school progress is not met in serving the community to be educated[27].

Supporting factors carried out in the literacy of facilities and infrastructure numeracy is an important factor in the activities of a learning activity. Funding is also an important factor in the school environment or education in serving teaching and learning activities. Both of these supporting factors affect the quality of schools in serving education after other supporting factors.

One factor in the implementation of numeracy literacy is one of students' motivation to learn which is the main factor in the learning process. Increase student motivation by using stories in conveying student material will arise a sense of curiosity then various questions arise that lead to student activity in the teaching and learning process [28]. The application of numeracy literacy that has implemented problem-based learning with stories around is able to motivate students. The reading corner or mini library is still not well established in the means of numeracy literacy, it includes factors inhibiting numeracy literacy. The teacher in increasing students' reading interest by innovating to create a mini library in the classroom [29]. This opinion reinforces that in the literacy movement aimed at making literate culture there should be a reading corner to increase reading interest, especially the numeracy literacy of students with different references every month so that students don't get bored with the desire to read.

3. Conclusions

Based on the results of the research data concluded. The implementation of numeracy literacy programs and mathematics learning are done in contextual and problem-based concept planting, but teachers rarely use projection-based learning in instilling learning concepts in students. The application of numeracy literacy in schools of SD Muhammadiyah 1 and SD Muhammadiyah 5 Malang have indicators in its implementation, namely indicators on the basis of class, school, and community. Field findings during active student observation in participating in learning mathematics or literacy, this shows that the literacy movement is able to motivate student learning. The inhibiting factors in the implementation of the literacy program are (1) from the lack of facilities and infrastructure, (2) students' learning motivation is also an inhibiting factor in the implementation of the literacy program. Supporting factors of the literacy program are (1) the existence of own funding sources for the literacy program, (2) the existence of teacher training for the literacy program which will later be able to correct the deficiencies in the implementation of the numeracy literacy program. The result of the research

4. Acknowledgment

5. References

[1]   K. P. Perempuan, "Profil anak indonesia 2018," *Jkt. ID KPPA*, 2018.

[2]   L. Hidayah, "Implementasi Budaya Literasi Di Sekolah Dasar Melalui Optimalisasi Perpustakaan: Studi Kasus Di Sekolah Dasar Negeri Di Surabaya," *JU-Ke J. Ketahanan Pangan*, vol. 1, no. 2, pp. 48–58, 2017.

[3]   L. Nopilda and M. Kristiawan, "Gerakan Literasi Sekolah Berbasis Pembelajaran Multiliterasi Sebuah Paradigma Pendidikan Abad Ke-21," *JMKSP J. Manaj. Kepemimp. Dan Supervisi Pendidik.*, vol. 3, no. 2, 2018.

[4]   Y. Wandasari, "Implementasi Gerakan Literasi Sekolah (GLS) Sebagai Pembentuk Pendidikan Berkarakter," *JMKSP J. Manaj. Kepemimp. Dan Supervisi Pendidik.*, vol. 2, no. 2, 2017.

[5]   M. Habibie, "IMPLEMENTASI PEMBELAJARAN BERKONTEKS KEARIFAN LOKAL JAMBI DENGAN PENDEKATAN SAINTIFIK TERHADAP LITERASI SAINS DAN SIKAP SISWA DI SMPN 7 MUARO JAMBI," PhD Thesis, Pendidikan Fisika, FKIP, 2020.

[6]   K. Kurniasih, "Development of Multiliteration and Higher Order Thinking Skills Through Integrated Learning," in *International Journal of Science and Applied Science: Conference Series*, vol. 3, no. 1, pp. 69–74.

[7]   M. Tohir, "Hasil PISA Indonesia Tahun 2018 Turun Dibanding Tahun 2015," 2019.

[8]   E. D. Agustiani, "Guru IPA dan Calon Guru IPA Menghadapi Soal-Soal Berkarakter PISA," *J. Studi Guru Dan Pembelajaran*, vol. 3, no. 1, pp. 67–86, 2020.

[9]   A. Aditomo and N. F. Faridz, "Ketimpangan Mutu dan Akses Pendidikan di Indonesia: Potret Berdasarkan Survei PISA 2015," 2019.

[10]   A. Tjalla, "Potret mutu pendidikan indonesia ditinjau dari hasil-hasil studi internasional," 2010.

[11]   Y. Yuliati, "Literasi sains dalam pembelajaran IPA," *J. Cakrawala Pendas*, vol. 3, no. 2, 2017.

[12]   I. Malawi, M. P. Dewi Tryanasari, and H. S. Apri Kartikasari, *Pembelajaran Literasi Berbasis Sastra Lokal*. CV. AE MEDIA GRAFIKA, 2017.

[13]   D. W. Ekowati, Y. P. Astuti, I. W. P. Utami, I. Mukhlishina, and B. I. Suwandayani, "Literasi Numerasi di SD Muhammadiyah," *Elem. Sch. Educ. J.*, vol. 3, no. 1, pp. 93–103, 2019.

[14]   R. Idris, "Mengatasi kesulitan belajar dengan pendekatan psikologi kognitif," *Lentera Pendidik. J. Ilmu Tarb. Dan Kegur.*, vol. 12, no. 2, pp. 152–172, 2017.

[15]   Y. Abidin, "dkk. 2017," *Pembelajaran Literasi Jkt. Bumi Aksara*.

[16]   G. L. N. Tim, "Materi Pendukung Literasi Numerasi Gerakan Literasi Nasional," *Jkt. Kemendikbud*, 2017.

[17]   A. Alfarikh, "Menumbuhkan Budaya Literasi Di Kalangan Pelajar," 2017.

[18]   I. W. Antasari, "Implementasi Gerakan Literasi Sekolah Tahap Pembiasaan di MI Muhammadiyah Gandatapa Sumbang Banyumas," *Libria*, vol. 9, no. 1, 2017.

[19]   I. F. Rini and S. A. Minsih, "Penerapan Kebijakan Gerakan Literasi Sekolah di SD Muhammadiyah 1 Ketelan Surakarta," PhD Thesis, Universitas Muhammadiyah Surakarta, 2018.

[20]   C. F. Peng, "Pelaksanaan Program Literasi Dan Numerasi (Linus) Di Sekolah Rendah (The Implementation of Literacy and Numeracy (LINUS) Program at Primary School)," *J. Pendidik. Bhs. Melayu*, vol. 5, no. 2, pp. 1–11, 2016.

[21]   Y. P. Astuti, "Program Literasi Numerasi Di Sd Muhammadiyah 1 Kota Malang," PhD Thesis, University of Muhammadiyah Malang, 2018.

[22]   D. S. Winarni, "Analisis kesulitan guru paud dalam membelajarakan ipa pada anak usia dini," *Edu Sains J. Pendidik. Sains Dan Mat.*, vol. 5, no. 1, pp. 12–22, 2017.

[23]   A. K. Kenedi, "Literasi Matematis Dalam Pembelajaran Berbasis Masalah," 2018.

[24]   I. W. Antasari, "Dukungan orang tua dalam membangun literasi anak," *Edulib*, vol. 6, no. 2, 2016.

[25]   P. Ita, D. Handy, M. P. ST, and S. Eti, "Penerapan Model Pembelajaran PBL (Problem Based Learning) Terhadap Hasil Belajar Siswa Pada Materi Gerak Lurus Berubah Beraturan Di Kelas X Sma Negeri 3 Bengkayang," PhD Thesis, IKIP PGRI Pontianak, 2019.

[26]   P. D. Wahyuni, E. T. Djatmika, and A. R. As'ari, "Pengaruh Full Day School dan Gerakan Literasi Sekolah terhadap Hasil Belajar dengan Mediasi Motivasi Belajar," *J. Pendidik. Teori Penelit. Dan Pengemb.*, vol. 3, no. 5, pp. 679–684, 2018.

[27]   B. Selvia, B. Lian, and A. P. Sari, "Penerapan Pembinaan Ekstrakurikuler Dalam Kegiatan Pembelajaran Full Day SchooL," *JMKSP J. Manaj. Kepemimp. Dan Supervisi Pendidik.*, vol. 5, no. 2, 2020.

[28]   M. M. Syaripuddin, *Sukses Mengajar Di Abad 21:(Keterampilan Dasar Mengajar Dan Pendekatan Pembelajaran K13)*. Uwais Inspirasi Indonesia.

[29]   F. Ahmadi and H. Ibda, *Media Literasi Sekolah: Teori dan Praktik*. CV. Pilar Nusantara, 2018.