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Growing the Concept of Multiplication at Blabak 3 Primary School; Exploratory Study

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ABSTRACT

This study aims to find out at what grade the concept of multiplication begins to grow at the elementary school level, using marbles as a visual aid. Marbles were used to facilitate students' understanding of multiplication in a more concrete and interactive way. Through the grouping of marbles, students can see the relationship between numbers and objects directly, making it easier for them to understand multiplication as repeated addition. This research was conducted at Blabak 3 State Elementary School by observing from the early grades to classes that have begun to grow the concept of multiplication at the elementary school level. The method used in this research is descriptive qualitative. The results showed that the concept of multiplication began to grow clearly and develop more deeply in grade 3, where students began to be able to apply this concept in a broader context. The use of marbles media proved to be effective in helping students understand multiplication, so that researchers can find out from which grade the concept of multiplication began to grow at the elementary school level. From the results of the study, it can be seen that the concept of multiplication began to grow in grade 3 elementary school students.

Keywords: Multiplication Concept, Marbles Media, Elementary School

INTRODUCTION

Education is one of the fundamental aspects of nation building, where basic education plays an important role in shaping the foundation of students' knowledge and skills (Oktarina et al., 2024a). A country can achieve progress if education in that country is of good quality (Mariam & Kelana, 2020). Sundayana (2014) states that, mathematics is one component of a series of subjects that have an important role in education (Mariam & Kelana, 2020). The national education system consists of a set of education elements that are linked comprehensively to achieve national education goals (Diah & Siregar, 2023 in Dwi Nanda & Wandini, 2024). The purpose of Indonesian National Education, as explained according to the National Education System Law Article 3 Number 20 of 2003, is to explore the maximum ability of students so that they become individuals who are faithful, devoted to God Almighty, healthy, have good morals, are skilled, knowledgeable, independent, creative, and responsible, and build noble character and culture for the nation in an effort to improve the intelligence of the nation's life (Ardian et al., 2022 in Dwi Nanda & Wandini, 2024). The purpose of education is so that humans can be more faithful and devoted to God Almighty, have noble character, be intelligent, have high will, innovate, socialize, and be cultured (Sujana, 2019 in Rahman Jayadi, 2022).

The success of an education is associated with the high and low learning outcomes achieved (Riyanti et al., 2021). Initial knowledge is important for students' learning process at school. Such as elementary school because counting, dividing, adding, and subtracting form the basis for many learning and teaching processes at school (Kurniani Ningsih et al., 2021). The primary school level plays a very important role in the introduction of basic sciences (Armin et al., 2022). Learning mathematics must go through a gradual process from simple concepts to more complex concepts (Wahab & Junaedi, 2023). Mathematics is one of the fields of study that exist at all levels of education, starting from elementary school (SD) to college (Bakior et al., 2020 in Author al2024)et ., . mathematics is part of several subjects that play an important role in education throughout the country (Andriana et al., t.t.). Math lessons are often considered difficult by most students so they are not motivated to learn math Murni et al., 2023). Many primary school children in grade six, especially today, do not understand how to multiply correct numbers. This contributes to the idea that learning math is challenging and scary (Fatimah et al., 2020 in Nurul Mutmainna, 2023).

One of the subjects that plays an important role in the education of insight, skills and scientific attitudes from an early age for students is mathematics (Maria, t.t.). Mathematics is one of the most important subjects in basic education, because it not only equips students with numeracy skills, but also trains them to think logically and systematically. Basic education is the basis on which students can learn various skills such as reading, writing, and mathematics, which includes counting activities as part of mathematics learning (Sukma ELviani, 2022 in Dwi Nanda & Wandini, 2024). Given the importance of mathematics (Afriansyah, et al., 2019), mathematics is taught starting from the level of elementary school to higher education (Kusmaryono et al., 2020). Mathematics, as one of the core subjects in basic education, plays an important role in shaping students' logical and analytical thinking skills. Mathematics is one of the disciplines that has made a major contribution to the advancement of science and technology (Rohmah et al., 2024 in Oktarina al2024b)et ., . One of the basic concepts in mathematics that must be understood from an early age is multiplication. This concept is the foundation for further math learning, such as division, fractions, and algebra. However, many students at the primary school level face difficulties in understanding multiplication, especially in the early grades, so they need a more concrete and fun approach to facilitate their understanding. Mathematics learning in elementary schools has such an important role that its purpose is to provide numeracy skills according to the level of development and the function of mathematics is as a medium or means for students to achieve predetermined competencies (Elsani et al., t.t.-a).

The learning process of multiplication at the elementary school level is highly dependent on the approach used by the teacher in delivering the material. Many factors affect students' mathematics learning achievement, both factors from within the students themselves and those from outside the students (Handayani & Alamsyah, 2017). In addition, students' success in understanding multiplication is also influenced by various factors, such as teaching methods, the use of learning media, and interactions between students, teachers, and parents. Understanding the concept of multiplication, basically, students must first master the concept of addition (Faujiah & Muhammadiyah Hamka, 2022). Therefore, it is important to explore more deeply how the concept of multiplication is taught and understood by students in the elementary school environment. Problems encountered in learning activities for mathematical multiplication operations in elementary schools, usually occur because of the

perception of students who think that math is difficult so that it makes them feel bored and understanding of mathematical concepts becomes low (Attalina & Irfana, 2020 in Silvia et al., 2023).

Effective multiplication teaching requires learning media that can clarify the concepts taught. One of the media that can be used is marbles. Marbles allow students to see and feel the multiplication process directly through the grouping of objects that can be counted. In this way, students not only understand multiplication as an abstract mathematical operation, but can also relate it to real life, namely grouping objects that are equal in number. Marbles as learning media can make it easier for students to visualize the concept of multiplication, where they can count in a more concrete way, such as counting the number of marbles in each group. Students' understanding of mathematical concepts can be seen when students are able to master the indicators of understanding mathematical concepts (Dwi Nanda & Wandini, 2024). Indicators are references to measure changes in an activity (Inaya Rizkki khaesarani, 2023 in Dwi Nanda & Wandini, 2024).

Multiplication is the repeated addition of the numbers being multiplied (Dewi et al., 2020 in Ishak al., t.t.) et. The concept of multiplication, as one of the basic materials in mathematics, has a very important role in the development of students' mathematical skills at the primary school level. A good understanding of the concept of multiplication will provide a strong foundation for the development of students' mathematical skills in the future (Oktafia et al., 2024 in Oktarina et al., 2024). The concept of multiplication is needed by students to build their critical thinking skills and to perform repeated addition in their daily lives (Febriyanto et al., 2018 in Wati & Purwanti, 2022). A strong understanding of multiplication will make it easier for students to learn advanced math topics such as division, fractions, and algebra. The concept of multiplication obtained by students often experiences errors in processing information and its application (Indriani et al., 2022). This is in accordance with Gradini's opinion quoted by Amugrahana (2020), that continuous misunderstanding of concepts and not immediately straightened out will result in learning problems and subsequent learning processes (Indriani et al., 2022). Students' low mastery of the concept of multiplication will make it difficult for students to learn higher mathematics material, such as measurement of flat shapes (Suherdi & Mujib, 2020 in Wati & Purwanti, 2022).

Therefore, it is important to know at what grade students begin to understand and use the concept of multiplication well. The introduction of the concept of multiplication in primary school is done after students have mastered the basics of addition and subtraction operations. Teaching multiplication starts as early as grade 2 or grade 3 depending on the curriculum and methods applied in each school. However, the right time to introduce multiplication to students is not always easy to ascertain, because many factors affect students' ability to absorb this concept, one of which is the use of appropriate learning media.

At Blabak 3 State Elementary School, the concept of multiplication is introduced since grade 2 even semester. Although the understanding is introduced from grade 2, but this concept is just beginning to be seen in grade 3. Therefore, this study aims to find out more clearly at what grade students begin to apply the concept of multiplication properly and correctly. The use of concrete media such as marbles, which allow students to group objects and count their number, can help students understand the concept of multiplication more clearly and practically. This media is expected to help students recognize multiplication as repeated addition and strengthen their understanding of how the numbers in multiplication are interconnected. By seeing, touching, and counting the marbles directly, students not only learn

multiplication as a mathematical operation, but also see its application in everyday life.
This research focuses on observing the developmental stages of the concept of multiplication in students at Blabak 3 State Elementary School, especially to find out from which grade the concept of multiplication begins to grow in students.

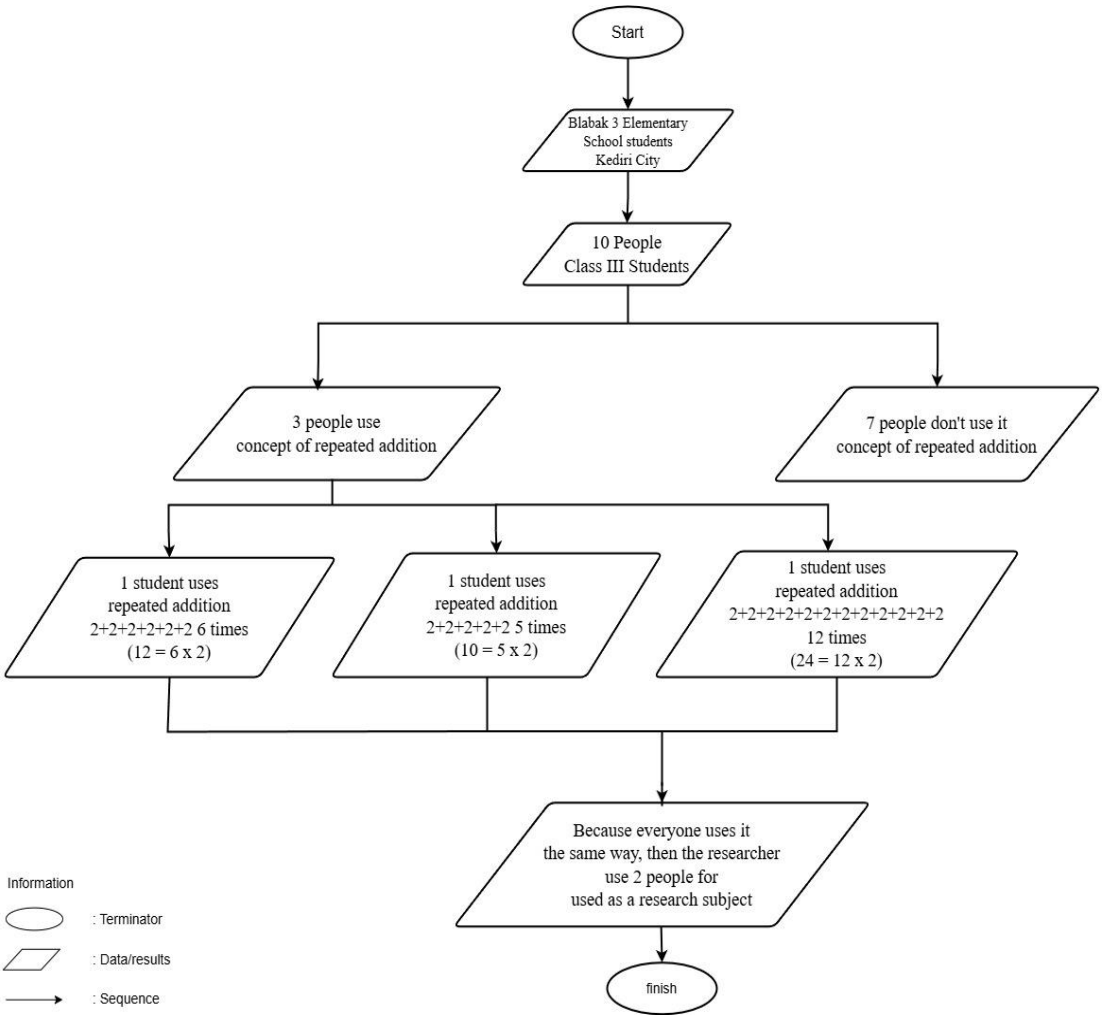
MATERIALS & METHODS

The method used in this research is descriptive qualitative. According to Sugiarto (2015: 8) "Qualitative research is a type of research whose findings are not obtained through statistical procedures or other forms of calculation and aims to reveal symptoms in a holistic-contextual manner through data collection from natural settings by utilizing the researcher as the key instrument" (Elsani et al., t.t.-b). Meanwhile, Sugiyono (2016: 9) argues that qualitative research methods are research methods based on the philosophy of postpositivism to study the state of natural objects, researchers act as key holders, data collection techniques are qualitative through triangulation, data analysis, findings focus more on meaning than generalization (Pamungkas et al., 2022).
This method was chosen to investigate students' understanding of the concept of multiplication at Blabak 3 State Elementary School in Kediri City in an in-depth and comprehensive manner. This type of research is a descriptive research because it aims to describe and analyze when the concept of multiplication begins to grow for students. This research uses three data collection techniques; 1) interviews conducted with class teachers and students to obtain information about understanding the concept of multiplication, 2) observation conducted to observe when the concept of multiplication begins to grow in students, 3) documentation which includes data collection from records, reports and related documents. The stages in this research consisted of four stages; 1) preliminary stage for title selection and consultation with lecturers, 2) planning stage for requesting research permission and preparing research instruments, 3) implementation stage for data collection through interviews, observation, and documentation, 4) completion stage for data analysis and report writing. The subjects of this research were students of Blabak State Elementary School Kediri. Data analysis is carried out through three stages; 1) data reduction to simplify data in order to facilitate analysis, 2) data presentation to present data in the form of graphs or tables, 3) conclusion drawing to draw conclusions based on data analysis. To ensure the validity of the data, this research uses triangulation techniques, namely comparing data from various sources and methods. This research was conducted at Blabak 3 State Elementary School, Kediri City.

RESULTS AND DISCUSSION

The researcher chose Blabak 3 State Elementary School as a place of research because there were indications that most students in the school still had difficulty and understanding the concept of multiplication. Based on observations made by researchers during the Teaching Campus Program Batch 7, it was found that many students did not fully understand the basic concepts of multiplication, which resulted in their difficulty in working on more complex multiplication problems.
In the selection of subjects, researchers sought information about students who had understood the concept of multiplication at Blabak 3 Kediri City State Elementary School in 2024 starting from grade 1 to classes that had begun to understand the concept of multiplication. Researchers held a meeting with the school to take care of permission on November 21, 2024 at Blabak 3 Kediri City State Elementary School and began conducting research on November 25, 2024 to November 26, 2024. On November 25, 2024 researchers conducted research in class I and class II because they did not find data results, on November 26, 2024 researchers continued research in class III to find data. Based on

this data, there are 3 male students in class III who have understood the concept of multiplication. Based on the criteria for the concept of multiplication, 3 students were found who could calculate using the concept of multiplication by repeated addition. Because the three students used the same method, finally the researcher chose 2 students as subjects for research. In order to get more valid data, researchers conducted research again on Friday, December 13, 2024. The subject selection process can be seen in the following figure:



Selection of Research Subjects

Based on this process, the research on the first person, namely students who calculate using the concept of repeated addition 2+2+2+2+2+2 as many as 6 times taken, research on the second person, namely students who use the concept of repeated addition 2+2+2+2+2 as many as 5 times taken, and research on the third person, namely students who use the concept of repeated addition 2+2+2+2+2+2+2+2+2+2+2+2 as many as 12 times taken. Because the three students used the same method, the researcher chose two students to be the research subject.

Based on the process obtained subject-1 research namely "Nino (pseudonym)". Nino was born in Kediri on October 30, 2015, one of the students from the State Elementary School Blabak 3 Kediri City which is located on Jl. Kapten Tendean No.285a, Blabak, Kec. Pesantren, Kota. Kediri, East Java 64135. Nino is currently in grade 3. Nino lives in District X of Kediri City. When going to school Nino is delivered by his parents by riding a bicycle. The journey

from Nino's house to school takes approximately 18 minutes. During math lessons in class Nino is an active child and understands math lessons.

While the subject-2 of the research is "Gino (pseudonym)". Gino was born in Kediri on August 21, 2015, one of the students from the Blabak 3 State Elementary School in Kediri, located on Jl. Kapten Tedean No.2851, Blabak, Kec. Pesantren, Kota. Kediri, East Java 64135. Gino is currently in grade 3. Gino lives in District X of Kediri City. When going to school Gino is delivered by his parents by riding a motorcycle. The journey from Gino's house to school takes approximately 7 minutes. During math lessons Gino is one of the children who is active and easy to understand math lessons.

Researchers held the first meeting on November 26, 2024 at Blabak 3 State Elementary School, Kediri City to introduce and examine the subject's understanding of the concept of multiplication. Then held another meeting on December 13, 2024 to examine further understanding of the subject's understanding of multiplication concepts. Furthermore, the schedule of research activities can be seen in table 4.1 below:

Table 1. Nino and Gino's Counting Research First Meeting

Name	Number of Marbles	Description
Nino	12 20 22	In the first test, Nino counted 12 marbles by adding 2 6 times (12 = 6 x 2). In the second test, Nino counted 20 marbles using repeated addition if 2 10 times (20 = 10 x 2). In the third test, Nino also used the same method of repeated addition of 2 as many marbles (22 = 11 x 2).
Gino	8 22 30	In the first test, Gino counted 8 marbles by repeatedly adding 2 4 time (8 = 4 x 2). In the second test, Gino counted the marbles by adding 2 11 time (22 = 11 x 2). In the third test, Nino also used the concept of repeated addition (30 = 15 x 2).

This data shows that Nino and Gino have started to understand the concept of multiplication, although they still use the concept of repeating 2 in the 3 tests. Nino and Gino tried to calculate the number of marbles in the cup in a very simple way, namely by successive addition. Nonetheless, the use of this method reflects a basic understanding of how multiplication is used in the context of larger numbers.

Table 2. Nino and Gino's Counting Research Second Meeting

Name	Number of Multiples	Description
Nino	Multiples of 2, 3, 4, and 5	Nino showed a good understanding of the concept of multiples of 2, 3, 4, and 5. This study also showed that Nino successfully calculated the multiples of these numbers on the number of marbles provided in the cup using the repeated addition concept strategy.
Gino	Multiples of 2, 3, 4, and 5	From the result of the multiplication research, Gino managed to count the marbles in the cup correctly. He used the repeated addition strategy to count the marbles in the cup.

Based on Table 2 below regarding multiples of 2,3,4 and 5, it can be seen that Nino and Gino have understood the concept of multiplication. They understand the concept of multiplication by using the repeated addition method. This means that the growth of the concept of multiplication in students is when they are in grade 3, grade 1 to grade 2 have not understood the concept of multiplication.

CONCLUSION

From the results of observations and interviews with grade 3 students named Nino and Gino, it can be concluded that the growth of the concept of multiplication in

students starts from grade 3 of elementary school. Based on the observation of students in grade 1 to grade 2 they do not understand the concept of multiplication. They still count one by one without the concept of multiplication. From the results of these data, it can be concluded that grades 1 to grade 2 are not ready to be taught multiplication material, because they do not understand the concept of multiplication.

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