PRIMARYEDU PrimaryEdu : Journal of Elementary Education P-ISSN: 2580-9326
Volume 7, Number 1, February 2023 E-ISSN: 2580-7714

Hybrid Learning Assisted Google Site and QR-Code Model on Conceptual Understanding of Multiplication in Primary School Students

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Abstract

The lack of students understanding the multiplication concepts is due to internal factors such as the lack of student motivation and external factors such as the lack of innovative learning media used by teachers. Therefore, the approach using ICT is expected to be impactful for the development of today's education. This study aims to see the impact of hybrid learning assisted by Google Site and QR Code model on understanding the concept ability of multiplication. In order to do so, we used quantitative methods with one group pretest-posttest design. The sample in this study were 34 students on 3rd grade elementary school with a purposive sampling technique. The results shows that the use of hybrid learning assisted by Google Site and QR Code model impacts understanding concept ability of multiplication which is characterized by an increase in the achievement of results from 64,88% to 82,24% with moderate interpretation (N-Gain = 0,54), as well as students' understanding of the multiplication concept and the causes of students' difficulties in understanding the multiplication concept. In the use of hybrid learning assisted by Google Sites and QR Code model, students found difficulties in understanding the concept of multiplication. This is shown by several students who are not being able to distinguish multiplier numbers and multiplied numbers, difficulty in interpreting the language of the problem, and still lacking numeracy literacy. Based on the results, it can be concluded that the impact of using a hybrid learning assisted by Google Site and QR Code model in good category on increasing understanding concept ability of multiplication for several students. This study still need to improve the quality and the use of media in hybrid learning.

Keywords: Hybrid learning, Google Site, QR code, Understanding the Concept of Multiplication

INTRODUCTION

Interactive activities between teachers and students in mathematics learning are carried out by understanding and responding to these activities to achieve learning goals. Unfortunately for students, mathematics is considered a difficult and less interesting lesson (Dewi & Agustika, 2020; Siregar, 2021). Whereas in various disciplines, mathematics plays an important role in improving human thinking (Nunes & Bryant, 2020). Therefore, students need to be supported by teachers in solving the difficulties faced (Mufarizuddin, 2018).

Students learn mathematics which means learning the formation of a mindset to understand an understanding or reason in reason ships or problems. Students also develop their way of thinking so that they can be systematic, critical, creative, logical, and impactful. In addition, students can develop their reasoning power and personality. This is in line with the development of hard skills and soft skills where mastery of science, skills, and technology is

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related to the field of science as well as the development of interpersonal skills and intrapersonal skills.

Understanding mathematical concepts are one of the important parts of the learning process. This is shown by the study's ability to absorb material; remember formulas, and mathematical concepts, as well as theorems to simple cases or in problem-solving (Hendriana dkk., 2021). Students not only need additional material achievements, but understanding concepts need to be mastered from an early age. This is because of the hierarchical nature of mathematics, so mastery of understanding basic concepts is needed at a higher level of education and supports the ability to connect mathematical concepts with other concepts (Siregar, 2021). Every material taught needs to be practiced. Students who cannot solve mathematical problems correctly due to a lack of good understanding of concepts and a lack of mastery of material concepts (Juliani dkk., 2021).

Students are can estimate the truth of a statement by understanding mathematical concepts. Students can also gain meaningful mathematical knowledge from the development of mathematical abilities. Solving mathematical problems and problems in everyday life is also based on the ability to understand mathematics.

In mathematics learning, multiplication must be mastered by students. Multiplication is a prerequisite material so understanding the concept of multiplication will play an important role in the next teaching material or material in higher grades. For example, multiplication by higher numbers, calculating the area of flat wakes, the volume of building space, fractional matter, and so on. In addition, multiplication is often applied in everyday life, such as for pocket money management, trading, application to work, and others.

We have interviewed with grade 3rd teachers at an elementary school in Bandung, it is stated that the mastery of multiplication numeracy skills still needs to be improved. This is due to pandemic conditions which have resulted in the interactiveness of student learning. Technical problems were found such as internet signals that are sometimes unstable and learning devices both at school and at home students are inadequate. In non-technical obstacles, the cause is the lack of focus of students due to online learning, shorter school learning time, lack of parental assistance when studying, and lack of student interest in memorizing multiplication. In addition, the impact of online learning is the continuous use of gadgets that can result in something bad for students such as health problems.

The above problem is corroborated by research conducted by Rahmawati, Leksono, & Harwanto (2020) that mathematics is a lesson that students do not like. The cause is abstract

mathematical material that is still difficult to understand. Difficulties that come from within the student such as lack of motivation. Also from the outside of the student self such as a teacher's strategy to present the material and the creation of a pleasant learning atmosphere. (Netson & Ain, 2022) stated the characteristics of students who have difficulty learning mathematics, including frequent mistakes in calculating, not memorizing formulas, and difficulty solving given problems. Amalia & Chan (2022) in her research stated that the cause of students not understanding the concept of multiplication is that the teacher less precisely, does not use concrete examples related to daily life, uses learning media that are less innovative and interactive, the atmosphere of the house and the lack of parental attention to learning and the teacher's approach to students is not intertwined.

The learning situation during the pandemic was carried out by Atsani (2020) who revealed that the problems of online learning include not all students having cellphone facilities, limited quotas, and networks that are not supportive, the material presented is not fully understood by students and students feel bored with an impactive learning system. However, according to research from Mustakim (2020), the solution for students to easily understand the lesson is to use online media. The success of online learning is influenced by various parties, namely the readiness of teachers, students, and parents (Yunitasari & Hanifah, 2020). Praditama dkk. (2022) stated that the advantage of online learning is that students can study at home by relaxing and have time to study independently and do assignments.

The problem of student learning difficulties causes the learning process to be hampered. For this reason, a solution is needed so that the teaching and learning process between teachers and students can be carried out properly even if it must be done at home or school. The way to improve the quality of learning and learning outcomes is to design interesting, meaningful learning, and combine learning media that use ICT (Information and Communication Technologies) media, namely by using a hybrid learning model (Fitri & Zahari, 2019; Olapiriyakul & Scher, 2006). Students can also strengthen the learning material they have learned again by viewing it on the Google Site and using a QR Code.

Currently, online learning can be combined with face-to-face learning or what is called hybrid learning. This strategy can facilitate students to learn concepts that are not yet fully understood in conventional/face-to-face classes (Rorimpandey & Midun, 2021). According to Rahman dkk. (2019), teachers need distance learning media to maximize the hybrid learning model. The existence of utilization in accessing this technology causes the technology to be mastered both by teachers and by students. Hidayatullah & Anwar (2020) stated that by using

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hybrid learning, the development of teacher competencies and the development of information technology can be wider. Similarly, it can allow students to adapt to their development. The impact of hybrid learning is to form independent learners, improve teacher skills and learning management performance, and create an interactive environment for teachers and peers (Hediansah & Surjono, 2020).

The use of the hybrid learning model is expected to be an interesting and impactful learning medium so that students are more motivated to learn and practice multiplication calculation skills. By using ICT (Information and Communication Technologies) technology, students can practice critical (Sholikh dkk., 2019; Wahyuni dkk., 2019; Zulhamdi dkk., 2022), creative (Wahyudi dkk., 2019), logical thinking skills (Riyanti & Nurhasana, 2021) and mathematics resilience (Fitri dkk., 2019). By using the group game method, students can learn independently, interact actively and socialize with friends or people at home so that an honest, sportive, and willing-to-try character is formed and is expected to be a way to create a fun learning atmosphere.

Based on the background above, the purpose of this study is to see the impact of hybrid learning assisted by Google Site and QR Code model on understanding the concept ability of multiplication and knowing students' understanding and constraints in the concept of multiplication.

METHOD

The type of research used is quantitative. According to Creswell & Clark (2015), the quantitative research design is a set of logical procedures for collecting, analyzing, and reporting numerical data to answer research questions and hypothesis tests about specific variables. This study is aimed at testing the impacts of treatment or describing the tendencies and relationships between variables.

The research design was carried out with one group pretest-posttest design, which was carried out on one group that had been randomly selected without a test of the clarity and stability of the group's condition before being treated. Research design is measured by comparing the situation before and after being treated on learning so that the results will be accurate. In this study, a sample group was used using a hybrid learning assisted by Google Site and QR Code model. The design of the study is depicted in Table 1.

Table 1. Research Design

Group	Pre Test	Treatment	Post Test
Experiment	O_1	X	O_2

In Table 1, X is a multiplication learning using a hybrid learning assisted by Google Site and QR Code model using pre-test and post-test. The goal is to compare the improvement of students' understanding concept ability of multiplication before and after learning.

Participant selection and data collection are key elements of a study. In quantitative research, there are special considerations that need to be carried out by the research objectives. Researchers can select a large number of participants representing the group, collect numerical information about the variables of interest, use instruments with predetermined questions and responses to obtain objective information, and use standard procedures to collect information (Creswell & Clark, 2015). The population in this study were grade 3 elementary school students. From purposive sampling techniques, 34 students were determined as research samples. The consideration is that the sample has a research critique.

Research instruments in the form of pre-tests and post-tests with description questions and essay questions using the HOTS (High Order Thinking Skill) question type regarding understanding the concept ability of multiplication. Indicators of understanding the concept ability of multiplication are presented in Table 2 (Clements & Sarama, 2009; NCTM, 2000; NRC, 2001; Steffe, 1990; Van de Walle dkk., 2013).

Table 2. Indicators of Understanding Mathematical Concepts of Multiplication

Mathematical Understanding Indicators	Student Achievement Indicators
Re-state a concept that has been learned	Students can determine the results of multiplication by using the concept of multiplication Students can make mathematical sentences based on the given story problems and state the reason
Classifying objects based on whether or not the requirements that make up the concept are met	Students can calculate the results based on the analysis of the classification of objects Students can determine the correct form of multiplication/according to the concept of multiplication from the classification of objects

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Mathematical Understanding Indicators	Student Achievement Indicators
Identify the properties of the operation or concept	Students can express opinions based on an understanding of the properties of multiplication operations, namely commutative
Applying concepts logically	Students can analyze and solve a given multiplication problem Students can make multiplication story questions and solve the problems they make

Data analysis techniques are carried out with descriptive analysis, namely by comparing test results before and after learning using a hybrid learning assisted by Google Site and QR Code model. The inferential analysis is carried out through the processing of data on pre-test and post-test results expressed with the category of interpretation of the N-gain value in table 3.

Table 3. N-Gain Score Criterion

N-Gain Score Range	Interpretation
<0.2	Low
0.2-0.49	Medium
>=0.5	High

RESULTS AND DISCUSSION

Results

After students conduct learning using a hybrid learning assisted by Google Site and QR Code model, students work on questions consisting of cognitive domains C3 to C6 based on Bloom's Taxonomy regarding understanding the mathematical concepts of multiplication. From the pretest and post-test questions given to students, students' achievements (grades) were obtained against indicators of understanding mathematical concepts in multiplication (Table 4).

Table 4. Student Achievement Based on Understanding Concept Ability of Multiplication Indicators

	Mathematical Understanding Indicators	Scores
Indicator 1	Re-state a concept that has been learned	89,61
Indicator 2	Classifying objects based on whether or not the requirements that make up the concept are met	81,65
Indicator 3	Identify the properties of the operation or concept	78,82
Indicator 4	Applying concepts logically	77,31

Based on the results of the student's post-test, it can be seen understanding the concept of student multiplication from the answers to the questions and solving the problem (Figure 1).

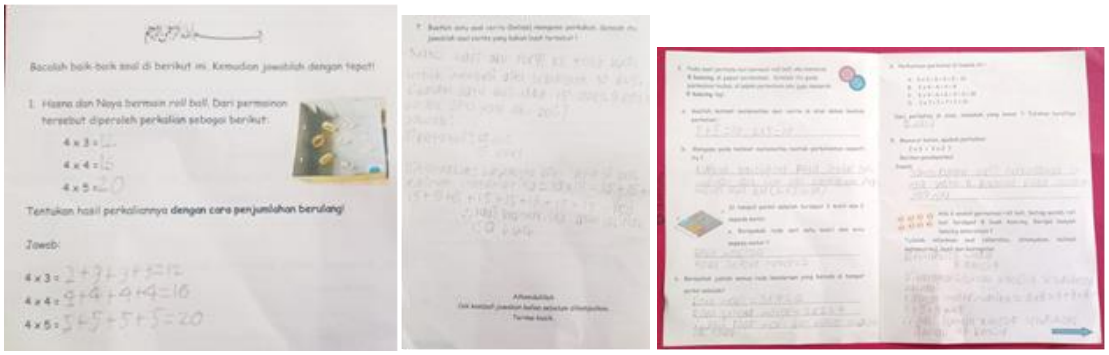

Figure 1. Examples of Post-Test Work Results with Paper Test Pencils

Based on Table 3 and the Figure1 above, shows that students can understand the concept of multiplication:

1. Answering the multiplication results using repeated additions
2. Providing the reason for the problem formulation made based on the problem/problem given
3. Separating objects so that they can calculate according to their concept
4. Analyze the answers by recognizing the error of the concept of repeated addition to the problem.
5. Identifying the nature of the multiplication operation, which is commutative, and the reason, namely that the multiplication result of the commutative nature is the same, and what distinguishes it is the way/process of working it
6. Solving the problem by writing down the problem information (known, asked), making a problem formulation (mathematical sentences), analyzing the problem (calculating and

P-ISSN: 2580-9326
E-ISSN: 2580-7714
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writing down the result of the multiplication form), and drawing conclusions (answering the problem)

7. Making a simple story about the problem of multiplication

The difficulties or obstacles experienced by students in the understanding of mathematical concepts in this multiplication:

a. Inability to understand the concept of multiplication so that it cannot convert multiplication into repeated addition (Figure 2)

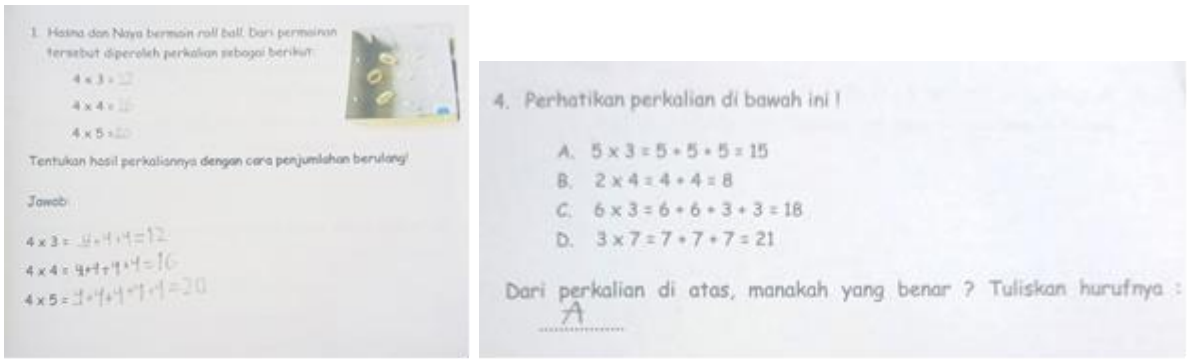

Figure 2. Errors in the Understanding of the Concept of Multiplication

b. Have not been able to distinguish multiplier numbers and multiplied numbers (Figure 3)

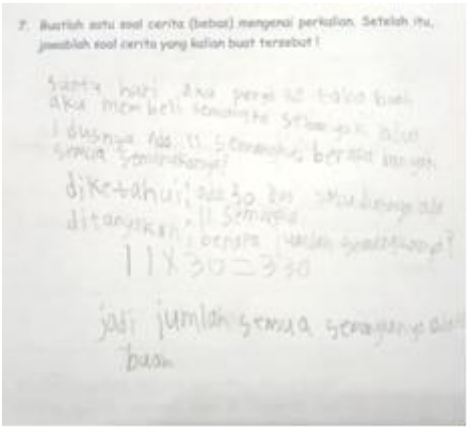

Figure 3. Errors in Multiplier Numbers and Multiplied Numbers

c. Difficulty in understanding the sentences on the question or interpreting the language of the question (Figure 4)

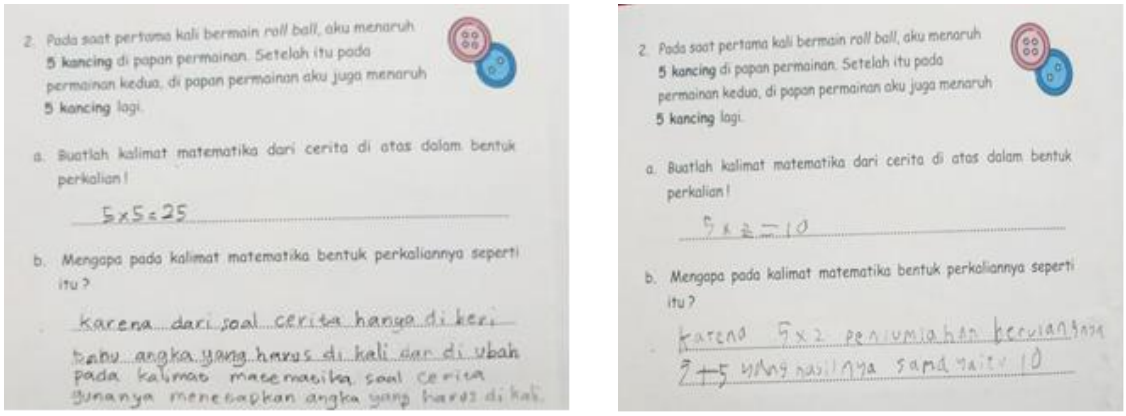

Figure 4. Errors in the Interpretation of The Problem

d. It is necessary to strengthen numeracy literacy. This is intended so that students are familiar with mathematical stories so that they can make good, appropriate, and appropriate story questions with the material being studied (Figure 5)

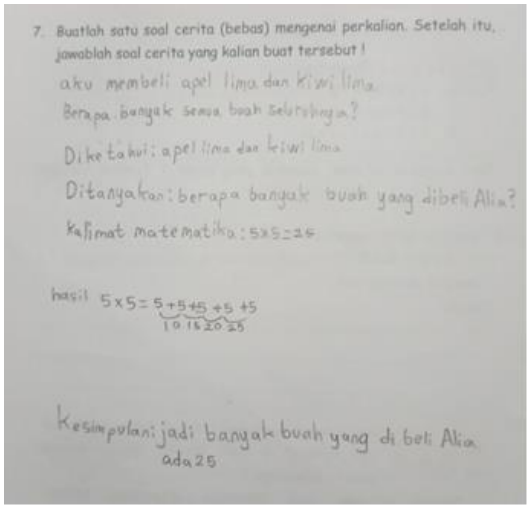

Figure 5. Student Mistakes in Making Multiplication Story Questions

The impact of the hybrid learning assisted by Google Site and QR Code model can be seen in the form of an increase in the average student learning outcomes on understanding mathematical concepts in the multiplication material after using the learning media. The calculation is carried out by processing data on the results of pretests and post-tests that have been completed by students.

The N-gain test is an improvement test with gain index analysis. The data is processed using Microsoft excel. Overall N-gain Test results are presented in Table 5.

Table 5. Testing Average Increase N-gain

Data	Average	Difference	N-gain	Criteria

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Pre-Test	64,88	17,35	0,54	medium
Post Test	82,24			

Based on Table 4 above, an N-gain value of 0.5 with a moderate interpretation of criteria is obtained. The result of pre-test and post-test data after students learn multiplication material using a hybrid learning model assisted by Google Site and QR Code is that students experience an increase in learning outcomes. In this case, students are given reinforcement of multiplication material regarding the understanding of mathematical concepts, students can repeat the learning of multiplication anytime and anywhere by opening and viewing the Google Site. In addition, at the time of learning, students play games in a way that is fun, active, and meaningful learning.

Discussion

Multiplication is a calculating operation that must be mastered by students. Multiplication material is given after mastery of the concepts of addition and subtraction. Multiplication is a prerequisite material to be able to understand the next mathematical material such as solving problems in the KPK and FPB, the volume of space building, and so on.

Based on the results of this study, there is an impact on the use of hybrid learning assisted by Google Site and QR Code model because students can understand the concept of multiplication based on the achievement of the indicators achieved. But some students still have difficulty understanding these mathematical concepts. This is in line with research conducted by Nanga (2020) that students who can meet the category of understanding the concept of multiplication are students who can interpret multiplication as repeated addition.

Amalia & Chan (2022) suggests that students' difficulties in numeracy skills are due to students not being able to in the basics of counting such as summation and inaccuracy of counting. Tiyas (2017) found that when writing story questions, students did not write down story information (known and asked). This is due to students' incomprehension in interpreting sentences on the questions or difficulty interpreting the language on the story questions. As a result, students cannot determine the steps in solving the problem correctly so students are not able to solve the problem correctly and correctly.

Students' lack of understanding of the concept of multiplication and lack of understanding of the mathematical language cause students difficulty in making meaningful

relationships between concepts and relationships. This can be seen from the students' answers, as in the multiplication questions presented in the form of stories.

Tohet dkk. (2021) suggest that hybrid learning is very easy to implement but not as impactful compared to in-person learning. This is because online learning is very dependent on the student's situation. Research from Rorimpandey & Midun (2021) shows that hybrid learning has a significant influence on learning outcomes in understanding and applying concepts.

From the description above, hybrid learning assisted the Google site and QR Code model has cognitive benefits, namely, it can improve learning outcomes. This shows that during the learning process, hybrid learning assisted by Google Site and QR Code model has an important role. This means that the model can encourage student learning, make it easier for students to learn and understand the material provided, train independence, and help learning efficiency.

CONCLUSION

It can be concluded that the use of a hybrid learning assisted by Google Site and QR Code model affects the understanding of mathematical concepts in the multiplication material of grade 3 elementary school students, namely by increasing the average student learning outcomes to understanding the concept of multiplication. This is due to the learning process of strengthening the understanding of mathematical concepts, doing fun, active, and meaningful games, and repetition of multiplication learning by opening and viewing Google Sites using QR Codes.

The use of hybrid learning assisted by Google Site and QR Code model can help students understand the concept of multiplication. This can be seen from students can interpret the concept of multiplication as repeated addition, separating objects according to the concept and calculating them, identifying the multiplication properties and their reasons, can also create problems and solve multiplication problems. In addition, there were obstacles experienced by students such as students not understanding the concept of multiplication where they could not distinguish multiplier numbers and multiplied numbers, difficulty in understanding sentences on the given questions or interpreting the language of the questions, and making story questions that were not good or with by the material being studied so that strengthening numeracy literacy was needed..

P-ISSN: 2580-9326
E-ISSN: 2580-7714
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ACKNOWLEDGMENTS

Place Acknowledgments, including information on the source of any financial support received for the work being published. Place Acknowledgments, including information on the source of any financial support received for the work being published.

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