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IMPLEMENTATION OF THE COOPERATIVE LEARNING MODEL TYPE MAKE A MATCH TO IMPROVE THE MATHEMATICAL CONCEPT UNDERSTANDING ABILITY IN MULTIPLICATION MATERIAL FOR 2nd STUDENTS

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Abstract

Including mathematics in primary school curricula is a must. The reality that kindergarteners still have a long way to go before they can grasp basic multiplication concepts. The media and learning methods aren't as appealing, which is the main reason. We propose a cooperative learning model based on the make-a-match algorithm. First, we want to know how well the Cooperative Learning Model Type Make a Match helps second graders grasp multiplication ideas. Second, we want to know what kinds of challenges students have when trying to use this model to increase their learning. three difficulties that educators face while using this paradigm in the classroom. This study used a mixed-methods approach. A one-group pretest and posttest based on a sequential explanatory pre-experimental design is used in this study. Second graders served as the subjects of the study. Research tools include interviews, surveys, and tests. The research results indicate that: (1) there is an improvement in the understanding of multiplication concepts after applying the Model Make a Match, (2) students difficulties in using this model include: difficulty in writing down what is known- asked, lack of understanding of the content story problems, time management, difficulty in concluding discussion results, and difficulty in communicating or presenting discussion results. (3) the challenges teachers face in using this model include: classroom management, generating student interest in reading or understanding the content, lack of familiarity with using the model and time management.

Keywords: Cooperative Learning Model Type Make a Match, Mathematical Concept Understanding Ability, Multiplication, 2nd Grade Students.

Abstrak

Memasukkan matematika ke dalam kurikulum sekolah dasar adalah suatu keharusan. Kenyataannya, anak-anak sekolah dasar masih harus menempuh jalan panjang sebelum mereka dapat memahami konsep perkalian dasar. Kenyataan dilapangan kemampuan konsep matematika siswa kelas II materi perkalian masih rendah. Media dan metode pembelajaran yang kurang menarik menjadi alasan utama. Model Cooperative Learning Tipe Make a Match merupakan solusi. Tujuan penelitian ini dilakukan untuk: (1) peningkatan kemampuan pemahaman konsep perkalian siswa kelas II SD dengan penggunaan Model *Cooperative Learning* Tipe *Make a Match*, (2) kesulitan siswa untuk meningkatkan kemampuan konsep matematik materi perkalian siswa kelas II SD dengan penggunaan model ini. (3) Kendala guru untuk meningkatkan kemampuan pemahaman konsep matematik menggunakan model ini. Penelitian ini menggunakan penelitian *Mix Methode*. Jenis penelitian yaitu *the sequential explanatory pre experimental design type one group pretest posttest.* Siswa kelas dua menjadi subjek penelitian. Alat ukur penelitian ini adalah tes, angket dan wawancara. Penelitian menunjukkan bahwa: (1) terdapat peningkatan kemampuan pemahaman konsep perkalian setelah menerapkan Model *Cooperative Learning* Tipe *Make a Match*, (2) Kesulitan siswa menggunakan Model ini yakni: kesulitan menuliskan keterangan yang diketahui dan ditanyakan, kurang paham dengan isi soal

cerita, manajemen waktu, kesulitan hasil diskusi, dan kesulitan mengkomunikasikan atau mempresentasikan hasil diskusi. (3) kendala guru dalam penerapan model ini yakni: pengkondisian kelas, memunculkan daya minat siswa untuk membaca atau memahami isi bacaan, belum terbiasanya menggunakan model ini dan manajemen waktu.

Kata Kunci: Model *Cooperative Learning* Tipe *Make a Match*, Kemampuan Pemahaman Konsep Matematik, Perkalian, Siswa Kelas II.

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INTRODUCTION

It is crucial to educate people in mathematics. Mathematics permeates all spheres of human endeavor, from the classroom to business to building to meeting basic human needs. Therefore, learning mathematics is essential from an early age. Mathematics education begins in elementary school and even in kindergarten. In elementary schools, mathematics is a subject that is taught almost every day.

Ruqoyyah et.al (2020) from elementary school all the way up to college, mathematics is a topic that students study. Math is an important topic to learn, and this is only one piece of proof. By studying mathematics, someone gets used to thinking systematically, scientifically, using logic, critically, and their creativity increases. Then, Handayani (2016) argues that mathematics is a subject that can advance education, as it is a way to develop one's thinking potential. Therefore, mathematics is essential for daily life as well as for facing advancements in science and technology. Due to the importance of mathematics education, every student at every level of education is required to master mathematics. One of the essential skills students need to acquire in mathematics is the ability to understand concepts.

To really grasp mathematics, pupils need to go beyond surface-level knowledge (Ruqoyyah, Murni, & Wijaya, 2020). Concept understanding ability involves the capacity to restate abstract ideas, categorize objectsas examples or non-examples of an idea, know the conditions and procedures of the idea, present the idea in mathematical representations, and apply it to solve real-life problems. The importance of students understanding mathematical concepts, according to Radiusman (2020),is to master various fields of knowledge beyond mathematics. Understanding mathematical concepts will aid students in grasping advanced lessons. One of the topics students need to understand conceptually is multiplication. Multiplication is crucial for students to learn because it is connected to daily life and supports future knowledge and technology. According to Baharand Syahri (Zain et al., 2022) multiplication is essential because it is a prerequisite for learning subsequent arithmetic topics. But the truth is that primary school pupils still have a poor grasp of multiplication concepts. Some pupils did not meet the Minimum Mastery Criteria (KKM), according to data derived from interviews with Padalarang's second grade teacher. Twelve of the thirty children had scores between sixty-five and ninety, far above the KKM eighteen kids or 60% had scores below the KKM.

Based on the above explanation, a suitable solution is needed to improve students' mathematical concept understanding abilities. Educators have a responsibility to tailor their pedagogical approach to each individual student. An approach to education that fosters student engagement via learning approach will improve students' grasp of mathematical ideas while also making mathematics class more engaging. The Cooperative Learning Model Type Make a Match is a great way to help primary school children better grasp mathematical concepts. According to Prasetyo et al. (2023), this technique is based on students utilizing cards to match questions with the proper answers. Points are given to students who discover their pairings within the time limit. The "find the pair" game is a defining feature of the cooperative learning make-a-match strategy, as stated by Putra (2019). The questions and answers in this game are printed on separate cards. Students are less likely to become bored in class and more likely to actively participate in their own learning while using the Make a Match cooperative learning model. Students' capacity to grasp abstract ideas may be enhanced in this classroom setting (Gosachi & Japa, 2020).

The research approach adopted is what makes this study unique when compared to others. Mathematical comprehension was the exclusive emphasis of earlier research that relied on experimental and Classroom Action Research (CAR) methodologies. In contrast, this study employs a mixed-methods strategy to elucidate multiplication as a mathematical concept for primary school pupils in the second grade. Both use the Cooperative Learning Model Type Make a Match to enhance students' comprehension of mathematical ideas; however, there are other commonalities as well as differences. After reading this, you should have a better grasp of how the Make a Match Cooperative Learning Model may help your students grasp mathematical ideas. Consequently, in order to resolve these challenges, the researcher will use the Make a Match Cooperative Learning Model.

METHOD

To answer the research questions posed by this study, the Mix Method was used. Pane et al. (2021) defines Mix Method research as a strategy that integrates quantitative and qualitative data, focuses on data gathering and analysis, and blends or associates qualitative and quantitative forms and procedures. The purpose of this study is to investigate how second-grade primary school children may benefit from using the Cooperative Learning Type Make a Match activity to better grasp the multiplication concept. This research used the Explanatory Sequential Design as its design. Researchers choose this layout when their goal is to collect quantitative data before elucidating qualitative findings. Sugiyono states that sequential explanatory research is a combinatorial approach that sequentially employs quantitative and qualitative research methods. In the first stage, quantitative methods are used, and in the second stage, qualitative methods are used. This setup allows for a more thorough understanding of the

topic at hand. Below is a diagram of the explanatory sequential design stages according to Creswell (Subedi, 2016).

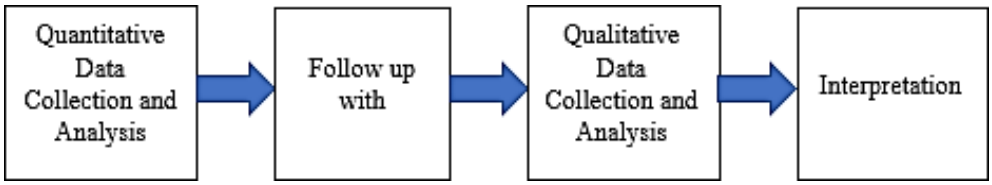


Figure 1 *Explanatory Sequential Design*

Using pre- and post-tests on the same group, this research followed the one-group pretest-posttest style of quantitative pre-experimental design. According to Arikunto (Aslami et al., 2019), a one-group pretest-posttest entails giving a first test prior to evaluation before to treatment (pretest) and one subsequent to treatment (posttest). According to Sugiyono, the study pattern for the one-group pretest-posttest design is as follows (Aslami et al., 2019):

O1 x O2

O1 = Pretest (initial test before the treatment)

X = Treatment (treatment)

O2 = Posttest (final test after the treatment)

Modification of the stages of explanatory sequential design used by the researcher is as follows:

1. Preparation Stage

The preparation stage was the initial phase of the research that included several activities, namely: preliminary study, selecting the research location, formulating the problem, theoretical foundation and hypotheses, and developing research instruments.

2. Implementation Stage

Here, the researcher put the strategy into action by collecting and analyzing quantitative and qualitative data in accordance with the following steps :

a. The first stage in the implementation of this research used a quantitative method, in line with Creswell's statement (Patmawati, 2021) that quantitative research is a way to test an objective theory by examining the relationship between variables. The steps in quantitative research were as follows:
    1) The researcher collected quantitative data in three steps: distributing pretest questions or initial tests before the treatment, offering instruction in the area of cooperative learning-based multiplication Unite in four periods to form a match, and finally distributing posttest questions to assess mathematical concept understanding, along with observation sheets and response questionnaires for teachers and students.
    2) The researcher prepared the collected data from observations, response questionnaires from teachers and students, pretest and posttest questions on mathematical concept understanding, and performed quantitative data analysis.

3) In this first stage, results served as the foundation for carrying out the subsequent study phase, which included answering the research questions.

b. Throughout the second part of the study process, a qualitative approach was applied. In this phase, we aimed to do qualitative research to back up and supplement the quantitative data we had collected in the previous phase. We did this by making an inventory of research informant questions, conducting interviews, and analyzing the collected data. The second stage analyzed the qualitative results using the quantitative data and worked with the previous stage's findings to answer the research questions. It also generated findings.

3. Evaluation Stage

The data obtained was used to evaluate the second graders' multiplication learning process throughout the assessment stage. In order for the second grade primary class to reach the indicators of grasping the mathematical idea of multiplication, the assessment findings identified the required adjustments and designs.

The collected data was used to measure the second graders' progress in learning multiplication as the examination progressed. The evaluation results revealed the necessary modifications and plans for the second grade primary class to achieve the indications of understanding the mathematical concept of multiplication.

RESULTS AND DISCUSSION

Results

The following are the research results obtained according to the formulated research questions:

1. **Improvement of Grade II Elementary Students' Concept Understanding Ability after Using the Cooperative Learning Model Type Make a Match**

a. Effectiveness of Using the Cooperative Learning Model Type Make a Match to Improve Grade II Students' Mathematical Concept Understanding Ability

As a pilot study, thirty second graders used the Cooperative Learning Model Type: Make a Match to see how well it worked. The implementation of this model and media took place over four days, following the pre-arranged Lesson Plan (RPP). The purpose of this implementation was to observe the responses and feedback from both teachers and students regarding the conducted learning activities.

Before implementing the learning model, the researcher conducted an initial test (pretest) to assess the student's understanding of multiplication concepts before the treatment. This pretest was given on May 7, 2024. Using the Cooperative Learning Model Type Make a Match and question/answer cards, the learning sessions were spread out across four meetings after the pretest. The research implementation began on May 11, 2024, focusing on introducing the concept of multiplication. The second session took place on Monday, May 13, 2024, covering further multiplication concepts from 1 to 3 using everyday classroom items. The third session was held on Tuesday, May 14, 2024, addressing multiplication concepts from 4 to 6 using ice cream sticks as manipulatives. The fourth and final session occurred on Wednesday, May 15, 2024, focusing on multiplication concepts from 6 to 10 using finger math (jarimatika). Finally,

a posttest was administered to evaluate the improvement in students' understanding of multiplication concepts after the treatment.

1. **Improvement in Understanding Multiplication Concepts Using the Cooperative Learning Model Type Make a Match**

Using the Cooperative Learning Model Type Make a Match as a baseline, students in second grade took a multiplication understanding test before and after class. Observation sheets and student and instructor reaction surveys provided further evidence of this enhancement. Thirty second graders had their pre- and post-test scores compared to determine the extent to which their conceptual comprehension had improved. Here are the average results from the 30 students' pretest and posttests:

Table 1. Average Scores of Pretest and Posttest

Average Score		Maximum Score
Pretest	***Posttest***	
52	79	90

The pretest and posttest scores were then subjected to normality testing, hypothesis testing, and N-Gain testing to determine the improvement in conceptual understanding among the 30 Grade II elementary school students.

1) Normality Test

Scores on both the pretest and posttest were found to be normally distributed, as follows :

Table 2. Normality Test Results for Pretest and Posttest Scores

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.127	30	.200*	.962	30	.340
Posttest	.103	30	.200*	.939	30	.088

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The pretest and posttest scores were then subjected to normality testing, hypothesis testing, and N-Gain testing to determine the improvement in conceptual understanding among the 30 Grade II elementary school students.

Both the pretest and posttest scores were found to follow a normally distributed distribution, with significance values greater than 0.05 for both the pretest and posttest (0.340 and 0.088, respectively), according to the table showing results of the normality test using the Shapiro-Wilk test. Consequently, the t-test may be used to examine hypotheses based on this data.

2) Hypothesis Testing

Once the results of the normalcy test confirm that the data follows a normal distribution, the next step is to test the null hypothesis using a paired sample t-test in SPSS version 25.

Testing the null hypothesis using a paired sample t-test in SPSS version 25 is the next step after confirming that the data follows a normal distribution using the normality test :

Table 3. Hypothesis Testing Results (Output 1)

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	52.33	30	11.412	2.084
	Posttest	79.47	30	6.010	1.097

A paired sample t-test with a p-value (Sig.) of 0.000—less than the significance threshold of 0.05—indicates a noteworthy disparity between the pre- and post-test scores. This provides strong evidence that the student's grasp of multiplication ideas was much enhanced by using the Make a Match Cooperative Learning Model:

Table 4. Hypothesis Testing Results (Output 2)

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-27,133	8,332	1,521	-30,245	-24,022	-17,836	29	0,000

The significance level is 0.000, which is lower than the accepted threshold of 0.05, as seen in the table above. Since the Cooperative Learning Model Type Make a Match significantly improves students' grasp of multiplication concepts, we may infer that H0 is rejected and H1 is approved based on the hypothesis test.

2) N-Gain Test

To evaluate the efficacy of the Cooperative Learning Model Type Make a Match in enhancing students' conceptual comprehension skills, the N-Gain exam was administered. Here are the findings of the N-Gain test :

Table 5. N-Gain Score Results

Average N-Gain Score	N-Gain Score Category
0,69	Sedang

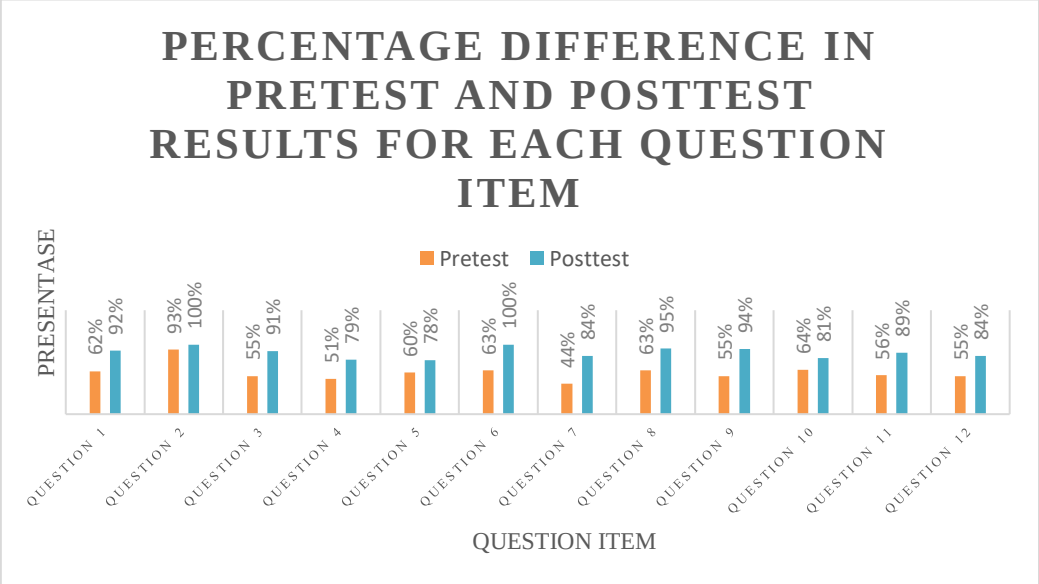
The results show that the Cooperative Learning Model Type Make a Match had a medium impact on improving the conceptual understanding of second grade primary children, with an average N-Gain score of 0.69.

Here is a rundown of how students' conceptual thinking skills improved from the pretest to the posttest for each question item, in addition to the N-Gain test results:

Table 6. Recapitulation of Pretest and Posttest Scores

Pretest Percentage	Posttest Percentage	Improvement
60%	89%	29%

Results show a 29% increase in conceptual knowledge between the pre- and post-tests, according to the table's averages. This indicates that students' conceptual knowledge was enhanced by the use of the Make a Match Cooperative Learning Model. The following bar chart provides a more visual representation of the disparity in the enhancement of conceptual understanding :



Graph 1. Difference in Pretest and Posttest Results

Below is a graphic that shows how kids in second grade primary school performed before and after receiving therapy utilizing the Cooperative Learning Model Type Make a Match. The findings show a clear improvement.

1. **Difficulties of Grade II Elementary Students in Using the Cooperative Learning Model Type Make a Match to Improve Mathematical Concept Understanding**

From the first to the fifth meeting, the researcher administered pretests, learning sessions, and posttests. Additionally, answer questionnaires were sent to instructors and students. "Implementation of the Cooperative Learning Model Type Make a Match to improve Grade II students' understanding of mathematical concepts." The goal was to discover how both students and instructors responded to the topic. The results of the student response survey are as follows :

Table 7. Percentage of Student Response Questionnaire Results

Percentage of Student Questionnaire Response Results	Criteria
73%	Good

From the data in the table above, we can deduce that out of 30 students, an average answer of 73% meets the "Good" standard. The 30 students' affirmative responses show that the Make a Match Cooperative Learning Model is effective in helping them grasp mathematical ideas.

The table below shows some of the challenges that second graders in primary school have while learning division and multiplication utilizing the Make a Match kind of cooperative learning model.

Table 8. Summary of Student Difficulties in Understanding Multiplication Concepts

Difficulty					
Students Difficulties in Understanding the Content of Problem Statements	**Students Difficulties in Determining Multiplication Operations in Solving Story Problems**	**Difficulty in Time Management**	**Summarizing Discussion Results**	**Presenting Discussion Results**	**No Difficulties**
6	8	6	2	4	4

The results show that 6 students struggled to grasp the problem statements' substance, while 8 students struggled to determine the multiplication operations when answering narrative problems (see table above), 6 students faced challenges with time management, 2 students who had difficulty summarizing discussion results, and 4 students who had difficulty presenting discussion results. However, 4 students reported having no difficulties.

The detailed explanations of the problems or difficulties faced by the students are as follows:

a) Students' Difficulties in Understanding the Content of Problem Statements

Students still experienced difficulties in understanding the content of problem statements, specifically in identifying what is known and what is being asked. This is a problem since students usually just want to put down the answers without considering the information that is already known or requested from the challenge. Additionally, another contributing factor is the students' low willingness to read the given problems, or in other words, their low literacy skills.

b) Students' Difficulties in Determining Multiplication Operations in Solving Story Problems

When students were given story problems that required multiplication operations, several students had difficulty determining the answers. Based on their responses during interviews, these students expressed confusion about how to solve the multiplication problems. They were unsure about which numbers they needed to multiply.The pupil is having trouble since they don't fully grasp the challenges that have been provided. As was indicated in the prior challenge, students still struggle to comprehend what is known and what is being asked in a story problem. To help students easily determine the appropriate mathematical operation, the

teacher provided keywords indicating that problems requiring multiplication operations often include phrases such as "total number" or "amount altogether" in the question. This strategy helps minimize students' difficulties in identifying the correct operation to use for solving the given problems.

c) Time Management

Another difficulty faced by students is time management. Students felt that the allotted time was too short, especially when they had to write down what was known and what was being asked before providing the answers. This made the problem-solving process longer as they had to note these details before answering the questions. This difficulty arises because students are not accustomed to writing down the knowns and unknowns while solving multiplication problems. They are more used to directly answering the questions without showing their work. Consequently, students found it challenging to complete the multiplication problems given by the teacher within the limited time frame, feeling that the time was insufficient and too short.

Therefore, to help students get used to writing down the knowns and unknowns when solving multiplication problems, the researcher directed the students throughout the study to always write these details before answering the multiplication questions. This practice aimed to make students accustomed to this process, enabling them to manage their time better and estimate how long it would take to complete the multiplication problems.

d) Difficulty Summarizing Discussion Results

The fourth difficulty students faced was in summarizing the results of their group discussions. This issue arose because each group member had different opinions. As a result, students need either instructor assistance or direction in drawing inferences about the multiplication information covered in the Make a Match Cooperative Learning Model.

e) Difficulty Presenting Discussion Results

The fifth difficulty was that students found it challenging to communicate or present their discussion results. This was due to a lack of confidence in presenting their group's discussion outcomes in front of the class. Students' self-assurance and the quality of their group presentations were both bolstered by the constant encouragement from the instructor throughout this process.

The researcher's first-hand knowledge and experiences, backed up by student interviews, provide the basis of the issues described. Students shared their struggles with the Cooperative Learning Model Type Make a Match in their interviews on multiplication classes. In spite of these challenges, students also highlighted several favorable features. They found the story problem format challenging and engaging, which motivated them to persist in finding solutions. Additionally, the use of question-and-answer cards was a new and interesting experience for students.

2. Challenges Faced by Grade II Teachers in Using the Cooperative Learning Model Type Make a Match to Improve Students' Mathematical Concept Understanding

During the implementation of the learning process, the researcher, acting as the teacher, encountered several challenges. These challenges were consistent with those expressed by the Grade II teacher during interviews conducted throughout the learning sessions.

Displayed in the table below are the findings of both the student and instructor answer questionnaires :

Table 9. Teacher Response Questionnaire Results

No	teacher's Name	Score from Questionnaire	Maximum Score	Percentage	Criteria
1	MRS. N	63	80	79%	Excellent

According to the data in the table, the teacher's answer received a score of 79%, which is considered "Very Good." Thus, it is safe to say that the instructor had nothing but praise for the Make a Match Cooperative Learning Model's ability to help pupils grasp mathematical ideas.

The results of the surveys given to both students and teachers indicate that they are in favor of using the Cooperative Learning Model Type. Help your kids grasp complex mathematical ideas with Make a Match. Students learnt to break down issues into its component parts, get a thorough understanding of those parts, and then come up with their own solutions. This made the learning process more student-centered, as students actively engaged in solving problems independently following the provided steps. Additionally, the responses indicated that the media used in this model fostered enthusiasm for learning, increased active participation in the learning activities, and helped minimize student boredom during the lessons.

The following are the challenges encountered during the implementation of the multiplication and division lessons using the Cooperative Learning Model Type Make a Match:

a. Classroom Management

During the learning process, classroom management was the primary challenge. The noisy classroom environment made it difficult for students to focus on the material being presented by the teacher. This often occurred because students began to feel bored with the learning activities. Since lower-grade students often learn through play, the teacher needed to find ways to keep the classroom environment conducive to learning and not too noisy.

b. Generating Student Interest in Reading or Understanding the Content

The low interest of students in reading or understanding the content posed a significant challenge for the teacher. This issue affected students' ability to comprehend the problems. It was evident when students were asked to write down the knowns and unknowns from the given problems, and the answers were actually included in the problem. However, students were still confused and frequently asked how to answer them.

The teacher had already provided guidance on how to write down the knowns and unknowns by referring to the available questions. However, students were often reluctant to read through the questions again, leading them to repeatedly ask the teacher for answers. Therefore, it can be said that students' independence in answering questions and their willingness to read or understand the problems were still very low.

c. Lack of Familiarity with the Cooperative Learning Model Type Make a Match

The teacher-centered learning approach resulted in some students having very low comprehension abilities. These students struggled to remember or understand the material, indicating that their retention of previously taught concepts was poor. This issue became evident the next day when the teacher reviewed the previous lesson and found that the students had forgotten what had been taught during the prior session.
Based on interviews with the class teacher regarding the factors contributing to the low conceptual understanding and the models and media used in teaching, the teacher acknowledged that some students have poor comprehension or memory retention. These students might understand the material on the day it is taught, but they forget it by the next day when questioned. Regarding the teaching model used, the teacher admitted to frequently using conventional methods or lectures and had never applied the Cooperative Learning Model Type Make a Match due to unfamiliarity with its syntax and flow. For teaching media, the teacher typically used easily available items, such as broomsticks or straws for arithmetic lessons. These factors contribute to the low comprehension abilities of the students. Aside from internal factors, external factors, particularly the teacher's teaching methods, also play a significant role. While conventional methods are not inherently wrong, they are less suitable for lower-grade students who can easily become bored, leading to lower comprehension skills.

Based on the challenges mentioned, such as students' low reading abilities and low comprehension skills, these factors significantly contribute to their poor understanding of the material taught by the teacher. Consequently, the content delivered by the teacher is easily forgotten by the students. This situation necessitates that the teacher come up with creative ideas for each lesson to maintain a conducive learning environment and implement strategies to address areas of learning that are not yet optimal.

d. Time Management

The use of this model requires a considerable amount of time due to the card-matching game involved. When students are matching their cards, they tend to engage in extensive discussions with each other, which naturally takes a significant amount of time to complete the tasks or match the cards. Therefore, the teacher must be thoroughly prepared for the implementation. If the discussion activities or waiting for turns to present take too long, the children are more likely to start chatting in class. And the time spent on the presentation activity is not short. This is because students' proficiency levels vary; some are skilled at directly expressing opinions and are easily understood, while others merely read question or answer cards without elaborating on the detailed solutions. This certainly serves as a reference for researchers to be further developed in more detail.

Discussion

The following is a discussion of prior research findings based on the researcher's own research and data processing from the collected data on second graders' ability to understand mathematical concepts through the use of the Make a Match Cooperative Learning Model :

1. **Improvement in Mathematical Concept Comprehension of Grade II Elementary School Students Using the Make a Match Cooperative Learning Model**

A hypothesis test using pre- and post-test scores from 30 second-grade elementary school students found that using the Make a Match Cooperative Learning Model significantly improved students' mathematical concept comprehension abilities on multiplication topics.

Improvements in pupils' comprehension skills between the pre- and post-tests show this difference.

2. **Challenges of Grade II Elementary School Students in Using the Make a Match Cooperative Learning Model to Improve Conceptual Understanding**

When the researcher used the Make a Match Cooperative Learning Model to teach division and multiplication, she noticed that the issues were presented as narrative problems. Piaget theorized that children's cognitive development may advance when they engage with their surroundings to find solutions to difficulties (Saomah, 2017). Hence, problem-solving-based learning activities have the potential to greatly impact this growth.

Students have trouble addressing problems when problem-based learning was implemented. Specifically, they struggled to understand the content of story problems when determining multiplication operations to answer them. Students still found it challenging to articulate what is known and what is being asked in these problems, largely due to their low comprehension of the story problem content, or in other words, their low literacy skills. Another difficulty students faced was time management; they felt the time allocated for writing answers based on what was known and what was being asked was too short. Furthermore, students had difficulty summarizing group discussions. In this process, students required the teacher's assistance to conclude the discussion outcomes. The final challenge experienced by students was presenting their group discussion results. This occurred because students lacked confidence in presenting their group discussion outcomes in front of the class.

Based on the difficulties experienced by students, the solution implemented by the teacher to address these challenges is creating an enjoyable learning atmosphere and fostering good communication with the students.

3. **Challenges Faced by Grade II Elementary School Teachers in Implementing the Make a Match Cooperative Learning Model to Improve Students' Mathematical Concept Comprehension**

When it comes to the learning activities, the biggest struggle instructors have is making the classroom a good place for children to learn. This becomes a major roadblock for students' education and highlights the need for effective classroom management on the part of educators. Another challenge is generating students' interest in reading or understanding the reading material, indicating low literacy skills among students. During problem-solving processes, students show minimal enthusiasm for reading and understanding the given problems, despite the teacher's instructions or guidance. Many students still ask numerous questions and prefer the teacher to provide direct answers. Another difficulty faced by teachers is the inadequate allocation of time for learning, resulting in suboptimal learning processes at various stages. The most challenging aspect of the learning activities for teachers is creating an environment conducive to learning for their students. This underscores the requirement of teachers having strong classroom management skills and becomes a big obstacle to kids' education. This affects students' comprehension levels as there may be some steps or explanations that have not been adequately conveyed. These challenges ultimately lead to lower levels of student comprehension, which is a significant concern for teachers in the learning process. Low student comprehension abilities can be attributed to several factors, both internal and external. Internal factors are based on the students themselves and typically relate to attitudes and motivations towards learning, while external factors originate from outside the students, such as teaching methods, learning strategies, or in other words, how teachers conduct their classes.

Based on these challenges, teachers need to determine learning activities that align with the characteristics of these students. If students tend to be active during learning, teachers can use media as tools and channels to foster student activity, thereby achieving all learning objectives. Providing story-based questions should also be encouraged to improve students' literacy skills and interest in reading, leading to better comprehension of concepts. Additionally, presenting learning materials in the form of story problems or giving students problems aims to hone students' critical thinking skills, starting from understanding the issue, analyzing it, thinking of solutions, and reaching a resolution.

CONCLUSION

Students' conceptual grasp of multiplication concepts may be enhanced via the application of the Make a Match Cooperative Learning Model, as evidenced by the application of the model resulting in a moderate N-gain. This conclusion is supported by survey responses from both teachers and students, indicating a positive agreement that the model effectively improves students' mathematical concept comprehension.

Students face many obstacles during Make a Match Cooperative Learning Model sessions. Firstly, they find it difficult to articulate what they know and what is being asked in problem-solving tasks. Secondly, many students struggle to grasp the content of story problems.

Additionally, managing time effectively proves to be another hurdle. Moreover, students face challenges in summarizing the outcomes of group discussions and feel uneasy about communicating or presenting their discussion results.

Teachers encounter difficulties with classroom management, time management, student engagement in reading and comprehension, and the Make a Match Cooperative Learning Model while implementing it in their classrooms.

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