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Research Article

The Effect of the Mathematical Puzzle Playing Method on the Subtraction Calculation Ability of Grade 1 Students at SDN 104202 Bandar Setia

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Abstract. This study aims to determine the effect of the mathematical puzzle playing method on the subtraction calculation ability of first-grade students of SDN 104202 Bandar Setia. The type of research used is a quasi-experiment with a pretest-posttest control group design. The research subjects consisted of two classes, namely class IA as the control class (22 students) and class IC as the experimental class (22 students). The research instrument was a subtraction calculation ability test that has been tested for validity and reliability. The results showed that the average posttest score of both classes was 78.86 in the control class and 84.77 in the experimental class where there was a significant difference. The independent t-test of both classes showed a significance value of 0.000 < 0.05, so the hypothesis H0 was rejected and H1 was accepted. Thus, it can be concluded that the mathematical puzzle method significantly improved the arithmetic and subtraction skills of first-grade students at SDN 104202 Bandar Setia.

Keywords: Arithmetic Skills; Mathematics; Puzzle Method; SDN 104202 Bandar Setia; Subtraction.

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1. BACKGROUND

Early childhood education serves as the primary foundation through the development of students' thinking skills. In this stage, students are introduced to basic mathematical concepts essential for their continued education. One concept that must be mastered is the ability to calculate subtraction, a frequently challenging task for first-grade students. Piaget (1973) suggested that at this age, children are in the concrete operational stage, where learning occurs through direct instruction.

Subtraction is a core activity in mathematics, aimed at reducing the value of a number. This skill plays a crucial role for students and is applied in everyday activities, such as shopping or calculating remaining money. According to Hattie (2009), in her book, a fun approach can strengthen students' enthusiasm for learning.

Numeracy skills are a crucial aspect of mathematics learning in elementary school, particularly in first grade. In this early stage, students begin to learn basic arithmetic activities such as addition and subtraction. However, some students struggle to master the principles of subtraction. Therefore, a fun learning approach is needed to help students understand the material more easily. Subtraction, as part of basic arithmetic operations,

often presents a challenge for first-grade students who are new to a structured mathematical perspective.

Difficulties experienced by students in calculating subtraction include confusion in the concept of subtraction, a lack of understanding of the use of appropriate calculation strategies, and a lack of interest in learning due to an uninteresting learning approach. Mathematics learning in grade 1 of elementary school is still dominated by the old teaching approach that lacks variety and does not involve much direct student involvement. In fact, the characteristics of grade 1 elementary school students aged 6-7 years are at a stage of real-world thinking skills that require learning through fun activities and involving direct experience.

Previously, first-grade elementary school teachers primarily used an action-based approach when teaching subtraction. This approach involved utilizing teaching aids that displayed the principles of subtraction with visual aids to facilitate student comprehension. Additionally, tools such as an abacus and concrete objects around students, such as stones, leaves, or everyday objects, were often used to connect numbers to real-life experiences. However, the application of this method lacked variety and tended to be monotonous. Ideally, teachers could introduce more dynamic learning tools to optimize teaching and learning activities and facilitate student understanding of the concept of subtraction in mathematics.

At the elementary school level, especially in first grade, understanding the basics of calculation is crucial as a foundation for future mathematics learning. One basic operation that often presents an obstacle for students is subtraction. Inability to grasp the concept of subtraction can lead to low learning motivation and academic performance. Therefore, creative innovations in learning approaches are needed to make mathematics, particularly subtraction, more engaging, understandable, and enjoyable for first grade students. The playful approach of using math puzzles is relevant because it aligns with the developmental characteristics of elementary school students' thinking skills, who tend to enjoy playful learning activities. This improvement has the potential to increase student engagement, facilitate concrete conceptual understanding, and reduce math anxiety.

Theoretically, various studies have demonstrated the importance of using active and contextual learning methods in the field of mathematics education for early childhood students. Vygotsky's (1978) Constructivism Theory emphasizes that children acquire understanding independently through engagement with their surrounding environment. According to Brunner (1960), learning occurs in an active form where students develop new understandings that build on prior knowledge. Playing with mathematical puzzles can be an effective medium for implementing this theory, allowing students to actively construct their understanding of subtraction through object manipulation and problem solving. However, there is still a need to specifically examine the extent to which playing with mathematical puzzles significantly affects the subtraction skills of students in grade 1 of elementary school. A number of studies have focused on the effectiveness of play

methods in general, but in-depth research into the specific impact of mathematical puzzles on subtraction skills in this age group, as well as identifying the specific mechanisms that contribute to the improvement of these abilities, still needs further exploration. Therefore, this study aims to fill this gap by providing observational evidence regarding the success of the mathematical puzzle approach in the context of teaching subtraction in grade 1 of elementary school.

The purpose of this study is to evaluate the impact of using mathematical puzzles on the skills of first-grade elementary school students when performing subtraction activities. This study aims to investigate how effectively a puzzle-based approach can improve students' understanding and skills in handling subtraction exercises. Furthermore, this study will also explore students' motivation and participation levels during learning activities using this approach, as well as compare learning outcomes between students who use a puzzle-based approach and those who practice using a traditional approach. Therefore, the findings of this study aim to enrich the development of a more complete and engaging learning approach in mathematics learning in elementary schools.

This study will be conducted in first-grade elementary school students at SDN 104202 Bandar Setia, with students aged 6-7 years old. Therefore, puzzles are not just for entertainment but can be used as a learning tool to develop students' numeracy skills. Through puzzles, students can learn mathematical concepts in a more enjoyable and interactive way.

2. THEORETICAL STUDY

Definition of Game Approach

The play approach is part of a learning approach that focuses on play activities as a vehicle for children's learning . The play method is a learning method that emphasizes play activities to achieve specific learning objectives. Meanwhile, Montolalu (2009) defines the play method as a way of presenting learning material through various forms of games designed to meet learning objectives.

Play can be defined as an activity undertaken voluntarily, without pressure, and involving imagination. According to experts, play serves an important purpose in child development, such as improving social skills and creativity (Siti Nurhayati & Khamim Zarkasih Putro, 2022). Play serves as practice for adult life, while play is an activity governed by mutually agreed-upon rules.

Play plays a crucial role in children's social development. Through play, children develop interactions with peers, improve communication, and understand social rules. Play fosters attitudes such as cooperation, sportsmanship, and mutual respect, which are essential for building positive social interactions. Furthermore, play helps children express emotions and resolve conflicts, strengthening their social skills. Thus, play is not only enjoyable but also educational, shaping children's social character.

Playing provides various social values that are important for children's development, including:

a. Cooperation: Students learn to work together to achieve common goals in group games.
b. Sportsmanship: Children are taught to respect opponents, recognize the superiority of others, and be fair.
c. Compliance with rules: Games teach children to obey agreed rules, which are important in social life.
d. Empathy and solidarity: Through interactions in play, children learn to understand each other's emotions and create good social interactions.
e. Communication development: Children improve their speaking and listening skills when interacting with peers.

In mathematics learning activities in grade 1 of elementary school, the play method can be interpreted as a learning method that uses games to facilitate understanding of mathematical concepts and skills through a fun approach and in line with the characteristics of student progress.

Understanding Mathematical Puzzles

Math puzzles are a form of game used as a learning tool aimed at improving students' math skills. These puzzles require perseverance and patience to solve and directly relate to mathematical concepts and operations.

Puzzle games are activities that require problem-solving skills and the use of logical thinking to achieve optimal results. Generally, puzzles are presented in the form of images or pieces that must be assembled to form a complete whole. Puzzles are games that challenge children's thinking skills. In an educational context, puzzles tailored to the subject matter can be used as a learning medium. Math puzzles for subtraction typically consist of problem pieces and answers that must be matched. Generally, in the context of subtraction learning in first grade, puzzles can take the form of number cards, value blocks, subtraction boards, or other forms designed to facilitate understanding of the concept of subtraction through fun activities.

The researcher's basic consideration in using puzzle media is because this media is easy to understand and can be applied concretely and clearly in learning subtraction operations. On that basis, this study is entitled "The Effect of the Mathematical Puzzle Playing Method on Subtraction Calculation Skills in Students in Grade 1 of Elementary School". Thus, an appropriate and reliable development measurement tool is needed in assessing numeracy skills , as well as conducting analysis related to aspects that need to be improved in the numeracy skills of grade 1 elementary school students.

Puzzles are defined as activities that involve assembling pieces to form a complete picture. The purpose of puzzles is to train children's precision, patience, concentration, and cognitive development. Puzzles also serve as tools for improving fine motor skills and logical thinking, as well as helping children understand shapes and object combinations. Thus, puzzles are an effective educational tool for early childhood development.

Using the mathematical puzzle method in learning subtraction offers various benefits for students. According to Suyanto (2005), the benefits of playing puzzles in learning mathematics include:

a. Guiding students in learning mathematical concepts in a real and easy to understand way.
b. Develop interest and enthusiasm for learning mathematics.
c. Develop logical thinking and problem prevention skills.
d. Facilitate various student learning styles.
e. Building a learning environment that is fun and not stressful.
f. Maximizing students' independent counting skills.
g. Provides hands-on experience in understanding mathematical concepts.

Learning Steps Using the Mathematical Puzzle Playing Method

Learning subtraction using the mathematical puzzle playing method can be carried out in the following stages:

Preparation Stage:

a. Researchers prepared mathematical puzzles that were appropriate to the subtraction material.
b. Researchers designed a learning scenario that involved puzzle playing activities.
c. Researchers prepare worksheets and evaluation instruments.

Implementation Stage:

a. The researcher explained the learning objectives and rules for playing math puzzles.
b. Researchers demonstrate how to use math puzzles for subtraction operations.
c. Students are given independent math puzzle game worksheets.
d. Students complete a worksheet containing subtraction problems found in the picture of each puzzle piece and put the pieces of the math puzzle together.
e. Researchers provide guidance and facilities during the learning process.

Evaluation Stage:

a. Researchers and students discuss the results of solving subtraction problems.
b. Students demonstrate how to solve subtraction problems through math puzzles.
c. Researchers provide feedback and support for the plans used by students.
d. Researchers conducted an evaluation to measure students' understanding of the concept of subtraction.

Numeracy Skills

Understanding Numeracy Skills

Arithmetic is the practice of using mathematical calculations, such as addition, subtraction, multiplication, and division, to determine the value or sum of a number. In an educational context, arithmetic is an important foundation for learning mathematics, especially for children. The ability to count helps students understand the concept of numbers and basic operations, which are the foundation for more complex mathematics learning later in life. Numeracy is a fundamental skill in mathematics that encompasses the

ability to complete mathematical learning activities, including addition, subtraction, multiplication, and division. For students in grade 1 of elementary school, the main focus is on addition and subtraction.

Numeracy skills in preschool children are an essential prerequisite for developing further mathematics learning activities and preparing them for the next level of education. These skills encompass various aspects, from counting to understanding number concepts. Mathematics learning in preschool children should begin with concrete and interactive experiences. Three core skills form the foundation of basic numeracy skills: understanding number structures, applying one-to-one adjustments, and understanding the total sum of a set. Students begin by acquiring the ability to understand basic mathematical operations such as adding and subtracting numbers. According to Susanto (2019), numeracy is the ability to utilize reasoning, logic, and numbers. Meanwhile, the Ministry of National Education (2007) defines numeracy as an innate ability in every child that plays a role in developing further skills through the concept of numbers, number symbols, and then connecting them to real objects.

Numeracy skills are part of mathematics. By learning to count, children will become familiar with the concept of numbers, develop basic mathematical skills, and develop problem-solving skills. Observations at school indicate that numeracy skills are less appealing to students, and numeracy learning appears low, as evidenced by their tendency to remain silent when asked questions. This impacts learning outcomes, particularly numeracy skills, as evidenced by daily assessments and final assessments. For first-grade students, mastery of numeracy from 1 to 10 is still largely based on memorization. When faced with addition and subtraction exercises, students struggle to grasp the underlying concepts.

As part of mathematics, subtraction is a fundamental operation in arithmetic. In the context of first-grade mathematics learning, subtraction skills can be defined as students' ability to solve problems involving the application of subtraction of whole numbers according to their cognitive developmental stage.

In formal education, teachers continually strive to find strategies to engage students in arithmetic. To achieve this, various methods, both traditional and modern, are employed to ensure that students not only enjoy arithmetic but also develop skills in it. Creative teachers are often able to present learning in engaging ways, such as utilizing playful approaches, which are considered effective in increasing motivation and facilitating students' understanding of arithmetic concepts. Play itself can be understood as an activity that provides a sense of satisfaction and enjoyment, where the process of play is the source of satisfaction, not the end result. According to psychologists and educational experts, play is a child's activity that can stimulate their full intellectual potential and reflects the growth process they are undergoing.

Thus, mathematics learning should be structured to be more engaging and meaningful for students. One way to create such learning is by presenting relevant and real-life problems, specifically those frequently encountered in students' daily lives. To improve the quality of mathematics learning, one approach is to design learning media using a play-based presentation concept. This effort arose because some students tend to forget about their studies when they are too engrossed in playing games. However, if games are designed as learning tools, they can actually be an option to create a more enjoyable learning environment.

Stages of Development of Children's Counting Skills

The development of children's numeracy skills follows certain stages in line with their cognitive development. Numeracy skills in children aged 5 to 6 years include naming numbers 1 to 10, calculating using number symbols, matching objects with numbers written on them, recognizing letter and consonant shapes, and arranging numbers sequentially. Numeracy skills at the elementary school level apply basic mathematical implementations such as addition, subtraction, multiplication, and division, as well as problem solving involving numbers and mathematical concepts. According to Piaget (in Santrock, 2011), the growth of thinking skills in children aged 6-7 years (first grade students) is in the developmental stage of early concrete thinking activities, when children begin to have the ability to use logic but are limited to things that can be observed directly.

Indicators of Subtraction Counting Ability

Based on the independent curriculum for grade 1 of elementary school, the indicators of subtraction calculation skills that students must master include:

a. Get to know the concept of subtracting whole numbers 1-10.
b. Determine the result of subtracting two whole numbers 1-10.
c. Complete picture essay questions on subtracting whole numbers 1-10.
d. Using the correct subtraction counting strategy for whole numbers 1-10.

In this study, the four benchmarks were used to measure the subtraction arithmetic skills of first grade elementary school students.

Aspects That Influence Subtraction Counting Skills

The ability to calculate and subtract in first-grade elementary school students is influenced by various factors, both internal and external. Aspects that influence students' arithmetic abilities include:

Internal Factors:

a. Students' cognitive maturity.
b. Ability to fulfill mathematical concepts.
c. Motivation and interest in learning.
d. Learning styles and logical-mathematical intelligence.

External Factors:

a. Learning methods and approaches used.
b. Available media and learning resources.

c. Learning environment and family support.
d. Teacher competence and creativity in learning.

According to Gelman and Gallistel (2020), the theory of numeracy skills explains that there are five principles applied when performing calculations. The first three principles relate to the use of numeracy approaches or strategies. Mastering these three principles is crucial for children to be able to calculate comprehensively.

a. The one-to-one relationship principle is the basis of counting, where each object is counted once and only once. Two key skills are associated with this principle: matching numbers to objects and distinguishing between objects that have been counted and those that have not. Common errors include ignoring a number entirely and counting the same number more than once.
b. The ordinalist principle emphasizes the importance of using the correct number sequence for accurate calculations. Maintaining a stable number sequence is a fundamental principle of calculation that students naturally possess. Students need to understand number sequences specifically to be able to perform calculations.
c. The principle of cardinality is a concept related to the understanding that explains that the total number of objects in a group forms a group based on the last number mentioned when counting.
d. The principle of abstraction is a concept that states that every type of component, regardless of its nature, can be expressed in terms of calculations.
e. The concept of irrelevant order; explains that a component can be calculated based on the order or without affecting the total result.

Characteristics of Mathematics Subjects

The term mathematics is derived from the Greek "mathein" or "manthenein" which means to learn. The term mathematics is thought to be closely related to the Sanskrit word, mudna or widya which means intelligence, knowledge, or intelligence. Subarinah (2006:1) sees the term mathematics as a way of thinking, a method for organizing logical proofs, and structured knowledge characterized by thinking that is arranged using an approach using reasoning from the general to the specific with undefined components known as axioms, or characteristics and approaches that have previously been proven true.

Mathematics, particularly arithmetic, is a fundamental subject taught from the time students enter elementary school. It aims to develop systematic, critical, logical, creative, and analytical thinking skills, as well as foster collaboration skills. These skills are crucial for students to acquire, process, interpret, and utilize information effectively. However, mathematics is often perceived as a daunting or unpopular curriculum topic among students. This fear or disinterest typically arises from the abstract nature of mathematics, making it difficult to understand. These difficulties and aspects can be influenced by both internal and external factors, including teacher strategies in delivering material and managing the learning environment in the classroom.

From the explanation of mathematics presented previously, it can be concluded that mathematics is a branch of knowledge based on logic, a way of human reasoning that is correct and helps understand and solve existing problems. Therefore, it is hoped that students will be able to utilize the knowledge they have acquired in their daily routines.

Success in the learning process is not only demonstrated through students' academic achievement at school, but also through the ability to develop the knowledge gained in school and apply it to everyday life. According to Suherman (2001:8), learning is a change in student behavior that tends to be stable due to experience, while teaching is an effort to create a supportive environment so that learning activities can grow and develop optimally.

In this way, learning activities are something that tends to be in itself and unique to each student, in contrast, external learning has been specifically designed and aims to shape behavior. Therefore, mathematics learning at the elementary level includes broad and in-depth knowledge of the mathematics learning material being taught, as well as students' skills in utilizing the mathematics material effectively, knowing the appropriate mathematics learning methods by applying appropriate learning strategies, being able to understand, and utilizing media as a learning support.

Based on the explanation above, it is important for mathematics learning activities in elementary schools to use media that are appropriate to the teaching material so that students can more easily understand abstract mathematical concepts.

Learning Theory

Learning theory is an important foundation for understanding how students learn and develop skills, including in the context of mathematics learning activities. In this study, several relevant learning theories will be discussed, particularly cognitive theory and active learning approaches.

Cognitive Learning Theory

Cognitive learning theory emphasizes the crucial role of mental processes in learning activities. One of the key figures in this approach is Jerome Bruner. Bruner (1960) explained that learning is an active activity in which students develop new understanding based on prior knowledge. This study divides learning activities into three stages:

a. Enactive, learning through direct action. In the context of the puzzle method, students can physically manipulate puzzle pieces to understand the concept of subtraction.
b. Iconic, learning through visual representation. Math puzzles often feature images that help students visualize the relationships between numbers in subtraction operations.
c. Symbolic, learning through abstract symbols, such as numbers and operation signs. Once students understand concepts through direct and visual experience, they can associate them with mathematical symbols.

Lev Vygotsky (1978) formulated a theory of constructivism that emphasizes the importance of interpersonal relationships in learning and the growth of thinking skills that occurs through social and cultural interactions. Vygotsky believed that knowledge is constructed through collaboration with others and then internalized by the individual. The main concepts in this theory include:

a. Zone of Proximal Development, the distance between what students can observe and what they can learn with help from someone more knowledgeable.
b. Scaffolding is support provided by teachers or more competent peers to help students master skills within their ZPD. This support is gradually reduced as students become more independent.
c. Cultural tools, language, number systems and memory aids that facilitate thinking and learning.

Active Learning Approach

The dynamic learning approach emphasizes student participation throughout the learning process. Bonwell and Eison (1991) explain that active learning is a way in which students are directly involved in engaging and interactive activities.

There are several advantages of this approach, namely:

a. Increasing motivation: fun activities can increase students' interest in learning mathematics.
b. Social skills development: playing with classmates can improve social and collaboration skills.
c. Better understanding: active engagement supports learners to understand concepts more deeply through real-life experiences.

Learning Through Games

Games as a learning method have been proven to improve students' mastery of mathematical concepts. According to Pivec (2009), games can provide a relevant and engaging context for students, enabling them to more effectively grasp learning concepts. In the context of teaching subtraction, math puzzles can be used to connect abstract concepts with concrete experiences.

3. RESEARCH METHODS

Research Categories

The research conducted is a quantitative study because the information collected is in numerical form and analyzed using statistics by applying a quasi-experimental approach without randomizing the research subjects. According to Sugiyono (2017:114), a quasi-experimental design is a research design that involves an experimental group and a control group. The main objective is to assess how the treatment (the method of playing mathematical puzzles) affects the dependent variable, in this context referring to skills in subtraction calculations.

Research Design

In the study, the research design used was the Nonequivalent Control Group Design, which is a quasi-experimental design that uses:

a. Treatment Group: received treatment in the form of applying the mathematical puzzle playing method.
b. Comparison group: did not receive treatment and continued to use conventional learning methods.

The design structure is in table 3.1:

Table 1. Design Structure

Group	Pretest	Variables	Posttest
Treatment	O_1	X	O_3
Comparator	O_2	Y	O_4

Explanation :

X = Math Puzzle.

Y = Conventional Learning.

$O_1$and O_2= Pretest Value.

$O_3$and O_4= Posttest Value.

This research design uses two variables, namely variable X (independent) which is the method of playing mathematical puzzles and variable Y (dependent) which is the ability to calculate subtraction. These two variables have indicators C1-C5 which are in accordance with Bloom's Taxonomy (1956) as follows:

a) Learning achievement indicators for variable (X):

Table 2. Indicators of Variable X

Code	Indicator C	Description
C1	Accuracy in arranging the puzzle according to the results.	The puzzle pieces are arranged with the correct subtraction answers.
C2	Understanding the concept of subtraction through puzzles.	Students find it easier to understand the concept of subtraction after playing puzzles.
C3	Physical activity in assembling puzzles.	Students demonstrate motor involvement when assembling puzzle pieces.
C4	Involvement in discussions while playing.	Students actively ask and answer questions to complete the puzzle.
C5	Enthusiasm/motivation when playing puzzles.	Students look enthusiastic, smiling, eager to try and focused while playing.

b) Learning achievement indicators variable (Y):

Table 3. Indicators of Variable Y

Code	Indicator C	Description
C1	Understand the concept of subtraction.	Students know that subtraction means "to take away," "to reduce," or "to less."
C2	Accuracy in solving subtraction problems.	The student's answer is correct according to the subtraction result.
C3	Speed of solving problems.	Students are able to complete questions in a relatively short time.
C4	Using the correct counting strategy.	Students use fingers, an abacus, or other assistive methods appropriately.
C5	Independence in solving problems.	Students work without the help of teachers or friends.

Whole and Part Taken

In this study, the population taken was all first-grade students of SDN 104202 Bandar Setia for the 2025/2026 academic year, consisting of two parallel classes, namely class 1-A and class 1-C, with a total of 44 students. The approach to determining respondents in this study used purposive sampling. The researcher selected two classes from class 1 with almost the same number of students and balanced abilities based on previous average scores.

In this study, the samples chosen were:

a. Class 1-C as a treatment class received treatment in the form of implementing a mathematical puzzle playing approach.
b. Class 1-A as a comparison class that received the application of the normal learning approach.

Each class consists of 22 students, so the total number of study respondents reached 44 students.

4. RESULTS AND DISCUSSION

This study was conducted at SDN 104202 Bandar Setia which is located on Jl. Terusan, Dusun V, Bandar Khalipah, Percut Sei Tuan District, Deli Serdang Regency.

Validity Test Findings

Initially, the questions were given to students, and the instrument had to undergo a preliminary trial to evaluate its validity and reliability. The instrument in the form of questions was used to collect data related to students' initial and final scores after the application of the puzzle media. The trial of the questions was conducted in class 1-B with 20 students as respondents by giving 20 subtraction questions in the form of essays combined with puzzle media. In this study, only questions that met the validity

requirements were used, while invalid questions were discarded. The instrument in the form of posttest questions was declared valid if the value was $r_{hitung} > r_{tabel}$. The data obtained obtained r_{tabel}= 0.444 (5%) or respondents (N) = 20 → see r_{tabel}. The following are the findings of the validity trial as seen in table 4.2:

Table 4. List of Names of Validity Test Students (1-B)

List of Class 1-B Student Names		
No	Student Name	Gender
1	Al Adli Firmansyah	Man
2	Alecya Putri	Woman
3	Alifa Naufalin	Woman
4	Alif Al-Hafidzi	Man
5	Chandra Buana Asry	Man
6	Dimas Adji Pramuja	Man
7	Edi Purnomo	Man
8	Fatih Alzikri Simbolon	Man
9	Ferry Ardiansyah Ramadani	Man
10	Hafidz Maulana Muhammad	Man
11	Haikal Arrazi	Man
12	Hania Syaqira	Woman
13	Hanin Dhiya Putri	Woman
14	Ifra Mikaila	Woman
15	Irza Rizky Ramadhansyah	Man
16	Kanaya Azzahra Lubis	Woman
17	Khaira Putri Laia	Woman
18	Khairil Ikhwan	Man
19	Khalif Raffasa	Man
20	Mhd. Ridwan	Man

Table 5. Findings of the Trial Test of the Validity Question Instrument

Number of Instruments	r_{hitung}	r_{tabel}	Explanation
1	0.479	0.444	Valid
2	0.451	0.444	Valid
3	0.594	0.444	Valid
4	0.587	0.444	Valid
5	0.604	0.444	Valid
6	0.479	0.444	Valid
7	0.604	0.444	Valid

8	0.630	0.444	Valid
9	0.682	0.444	Valid
10	0.556	0.444	Valid
11	0.737	0.444	Valid
12	0.502	0.444	Valid
13	0.556	0.444	Valid
14	0.472	0.444	Valid
15	0.580	0.444	Valid
16	0.613	0.444	Valid
17	0.509	0.444	Valid
18	0.695	0.444	Valid
19	0.501	0.444	Valid
20	0.544	0.444	Valid

Based on the findings in table 5. , 20 valid test items were obtained and all were suitable for distribution to respondents in control class 1-A and experimental class 1-C. To provide a clear picture of the results of the validity submission, the researcher attached the correlation value of each question along with the total item statistics in the appendix of the research report.

Reliability Test

To ensure the instrument's reliability and consistency as a reliable data collection tool, a reliability test was conducted. The reliability level was calculated using the Cronbach's Alpha formula.

Table 6. Interpretation of Reliability

Reliability Coefficient (r)	Validity Category
0.80 – 1.00	Very High
0.60 – 0.79	Top Category
0.40 – 0.59	Reasonable
0.20 – 0.39	Not enough
0.00 – 0.19	Very Low

Source : Arikunto, (2010:87)

Table 7. Reliability Test Findings

Reliability Statistics	
Cronbach's Alpha	N of Items
.890	20

Based on the reliability test calculations listed in Table 7. , it shows that the reliability coefficient obtained was 0.890. This finding proves that the questions tested met the reliability or consistency criteria, with a very high level of interpretation.

Description of Pretest and Posttest Results Data

The pretest for class 1-A was conducted at the first meeting, Wednesday, August 6, 2025, with a total of 22 students. The teacher began the learning activity by greeting and reciting a prayer before carrying out the lesson. The teacher provided information on the learning material to the students, specifically the mathematics subtraction subject that the researcher would be following.

In the initial activity, the researcher opened the session by introducing herself to the students, then provided a brief explanation of the subtraction lesson. Next, the researcher conducted a preliminary test to assess the students' arithmetic skills on the topic of subtraction learning. This preliminary test was conducted in two subject meetings and consisted of 20 questions that had gone through a validation process. The following are the results of the students' pretest scores:

Table 8. Initial Test Achievement in Comparison Class (1-A)

No.	Student Name	Mark
1	Arsyilla Sezza	70
2	Desti Ananda	50
3	Syarifah Syaqila	40
4	Hafiz Syahputra	60
5	Zaidan Rafan	65
6	Syarifah Syaqira	85
7	Muhammad Azril	70
8	Fayza Kulla Azmina	70
9	Bahrumsyah Damanik	50
10	Adra Pradipta	40
11	Fildzah Azkadina	45
12	Nuril Tifka	60
13	Reyvan Erlangga	70
14	Rasya Athaya Bilfaaz	80
15	Didit Triadi	90
16	Aditya Rifki	50
17	Zaidah Fauziah Lubis	50
18	Muhammad Arif	80
19	Alhadi Syahputra	55
20	Dhul Hanan	60
21	Muhammad Radit	70
22	Alfan Ramadhansyah	40
Description of Pretest Result Values		
Lowest Value		40
The highest score		90
Average		61.36

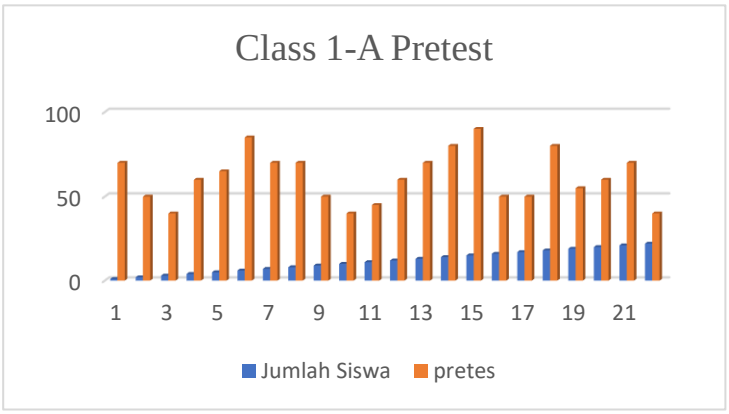

Figure 1. Diagram of Pretest Result Values for Class 1-A

Based on the pretest results in table 4.5 and diagram 4.1, followed by 22 students, the lowest score was recorded at 40, while the highest score reached 90. The average class score was 61.36, which means that in general, students' initial abilities were still in the moderate category, but had not yet reached the optimal value. When compared to the KKM of 70, there were only 9 students who reached or exceeded the minimum achievement criteria, while the other 13 students were still below the minimum completeness standard. This indicates that the majority of students still need further guidance in order to achieve the expected learning completeness.

Then, the pretest research continued on the second day, Thursday, August 7, 2025. The research was conducted in class 1-C, an experimental class with a total of 22 students. The teacher began the lesson by greeting all students. Then, the researcher delivered the mathematics material, specifically on the topic of subtraction, which would be studied together with the researcher. The researcher also conducted a pre-test to measure students' numeracy skills before learning began on the subtraction lesson content. This pre-test was conducted during two subject meetings with 20 validated questions. The following is the pre-test score of class 1-C students.

Table 9. Initial Value Data for Treatment Class (1-C)

No.	Student Name	Mark
1	Abizam Alghifari	35
2	Asifa Indriyani	40
3	Fikri Azriel Hanif	40
4	Hafiz Gilang Febriyan	45
5	Haisya Hanum Hananian	50
6	Beautiful Tri Shezan	55
7	Kayara Zahra	60
8	Mikhayla Putri Az-zahra	65
9	Muhammad Abil Generous	55
10	Muhammad Alfariski	50
11	Muhammad Aulia Rahman	60
12	Muhammad Daffa	45
13	Nabila Umairah Pelawi	65
14	Paramitha Alfathunnisa	55
15	Rahmad Maulana	50
16	Raisya Sofia Nuraini	45
17	Sakhiya Raisa Utama	70
18	Syafira Arsy	60
19	Princess Yolanda	50
20	Uwais Alqarni	55
21	Zahwa Kalila	85
22	Febrianda	60
Pretest Score Description		
Lowest Value		35
The highest score		85
Average		54.32

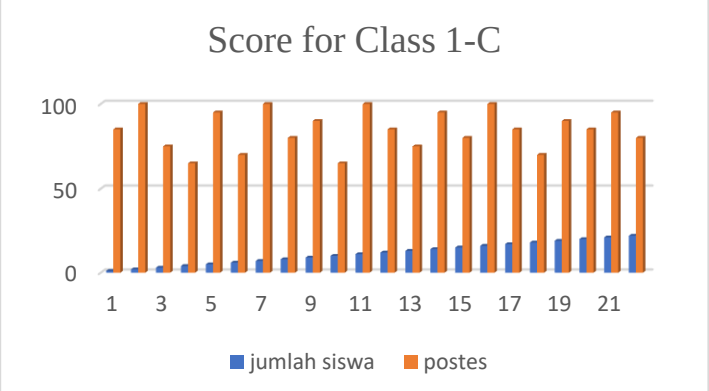

Figure 2. Diagram of Pretest Values for Class 1-C

Based on the pretest results in table 9. and diagram 2., followed by 22 students in the treatment class, the lowest score was recorded at 35, while the highest score reached 85. This indicates a fairly wide range in initial ability achievement between students. The average class score of 54.32 means that in general, students' initial abilities are still at a low level and have not shown optimal achievement. When compared to the KKM of 70, only 2 students reached or exceeded the KKM, while 20 other students did not meet the KKM. This condition indicates that most students still need assistance and strengthening of understanding in order to achieve the expected learning completeness.

To address these issues, researchers plan to implement puzzle-based learning as a more engaging and enjoyable learning strategy. Through puzzle-based learning, it is hoped that students will be more motivated, engaged, and understand the material more easily, thereby improving learning outcomes and achieving the targeted mastery.

Description of Learning Implementation with the Puzzle Playing Method

In the third learning session, held on Friday, October 22, 2025, the researcher conducted a lesson in the experimental class, namely class 1-C, with mathematics material on subtraction of numbers 1-10. The learning instrument used was a student worksheet containing a puzzle image. The learning process was adjusted based on the previously prepared Learning Implementation Plan (RPP).

At the end of the learning activity, each student received a math puzzle consisting of individual puzzle pieces. This learning tool was provided to assess the extent to which students understood the mathematics taught during the activity.

Figure 3. Implementation of learning activities using the puzzle method

Description of Learning Outcome Data (Posttest)

After administering pretest questions and treatment to the experimental class through the use of puzzle media and conventional models to the control class, the next or final stage was administering posttest questions to re-measure the students' level of numeracy ability. The following data shows the results of the final test scores in the comparison class (1-A) and the treatment class (1-C).

Table 10. Posttest results for the control class (1-A)

No	Name	Mark
1.	Arsyilla Sezza	75
2.	Desti Ananda	70
3.	Syarifah Syaqila	65
4.	Hafiz Syahputra	80
5.	Zaidan Rafan	70
6.	Syarifah Syaqira	90
7.	Muhammad Azril	80
8.	Fayza Kulla Azmina	80
9.	Bahrumsyah Damanik	85
10.	Adra Pradipta	70
11.	Fildzah Azkadina	75
12.	Nuril Tifka	80
13.	Reyvan Erlangga	90
14.	Rasya Athaya Bilfaaz	100
15.	Didit Triadi	95
16.	Aditya Rifki	70
17.	Zaidah Fauziah Lubis	70
18.	Muhammad Arif	100
19.	Alhadi Syahputra	70
20.	Dhul Hanan	75
21.	Muhammad Radit	85
22.	Alfan Ramadhansyah	60
Posttest Value Description		
Lowest Score		60
Highest Score		100
Average Score		78.86

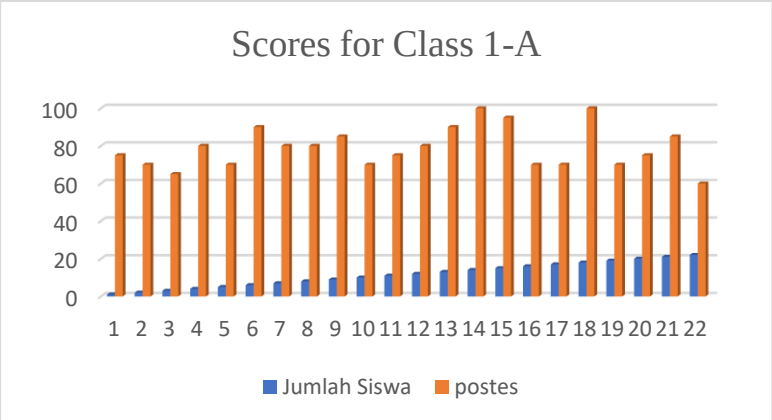

Figure 4. Diagram of Posttest Values for Control Class (1-A)

According to the posttest results of class 1-A (control class) seen in table 4.7 and figure 4. which were followed by 22 students, where the lowest score reached 60, on the contrary, the highest score reached 100. This shows an increase in student learning achievement when compared to the pretest. The average class achievement was 78.86 which means that in general the students' abilities are classified as good and exceed the KKM value. When compared to the KKM of 70, 20 students were found to have exceeded the KKM, while there were 2 students who had not reached the KKM. This achievement shows that after the implementation of learning, almost all students achieved the targeted learning mastery.

Table 11. Posttest Results for Class 1-C (experimental)

No.	Student Name	Mark
1.	Abizam Alghifari	85
2.	Asifa Indriyani	100
3.	Fikri Azriel Hanif	75
4.	Hafiz Gilang Febriyan	65
5.	Haisya Hanum Hananian	95
6.	Beautiful Tri Shezan	70
7.	Kayara Zahra	100
8.	Mikhayla Putri Az-zahra	80
9.	Muhammad Abil Generous	90
10.	Muhammad Alfariski	65
11.	Muhammad Aulia Rahman	100
12	Muhammad Daffa	85
13.	Nabila Umairah Pelawi	75
14.	Paramitha Alfathunnisa	95
15.	Rahmad Maulana	80
16.	Raisya Sofia Nuraini	100
17.	Shakiya Raisa Utama	85
18.	Syafira Arsy	70
19.	Princess Yolanda	90
20.	Uwais Alqarni	85
21.	Zahwa Kalila	95
22.	Febrianda	80
Posttest Result Value Description		
Lowest Score		65
Highest Score		100
Average Score		84.77

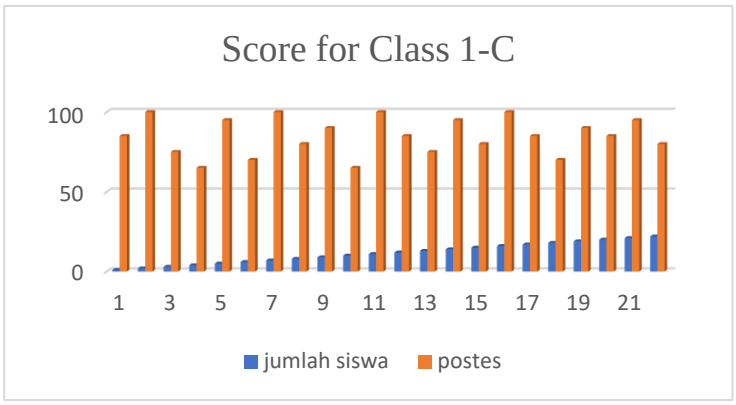

Figure 5. Posttest Value Diagram for Experimental Class (1-C)

Based on the posttest results in table 11, followed by 22 students, the minimum achievement was 65 and the maximum achievement was 100. The average achievement of the experimental class was 84.77 which showed progress in student learning achievement compared to the pretest results (average pretest = 54.32). When compared to the KKM of 70, 20 students were found to have exceeded the KKM, but 2 students had not reached the KKM. This achievement shows that the majority of students have achieved learning completion after implementing the puzzle playing method.

Descriptive Analysis

Descriptive analysis aims to present information collected through pretests and posttests on the treatment and comparison groups. This data analysis includes:

a. Average value (mean)
b. Maximum and minimum values
c. Standard Deviation
d. Variance

The aim is to determine the distribution and trends of the data before conducting hypothesis testing.

Table 12. Descriptive Analysis Testing in Class 1-A (Comparison Group)

Descriptive Analysis						
	Respondents	Lowest	Highest	Average	S Standard deviation	Variant s
Initial Test	22	40	90	61.36	14,895	221,861
Final Test	22	60	100	78.86	11,012	121,266
Valid N (listwise)	22					

Referring to table 12., the findings from the descriptive analysis show that in the comparison group (1-A) the initial test score had the lowest score of 40, the highest score of 90, with an average score of 61.36, a standard deviation of 14.895, and a variance of 221.861. The final test results in the comparison group (1-A) showed the lowest score of 60, the highest score of 100, with an average score of 78.86, a standard deviation of 11.012, and a variance of 121.266. This finding indicates an increase in the average score between

the initial and final tests in the comparison group, even though learning was implemented using conventional learning. This increase in the average score was also followed by a decrease in the standard deviation and variance, indicating that the distribution of student scores in the posttest was more even compared to the pretest. The following are the results of the statistical calculations for the treatment group.

Table 13. Descriptive Analysis Testing in Class 1-C (Treatment Group)

Descriptive Analysis						
	Respondents	Lowest	Highest	Average	Standard Deviation	Variant s
Initial Test	22	35	85	54.32	11,265	126,894
Final Test	22	65	100	84.77	11,493	132,089
Valid N (listwise)	22					

Table 13. shows that the final test score in the treatment group (1-C) had the lowest score of 35, the highest score was 85, with an average score of 54.32, a standard deviation of 11.265, and a variance of 126.894. Meanwhile, in the final test, students got the lowest score of 65, the highest score was 100, with an average score of 84.77, a standard deviation of 11.493, and a variance of 132.089.

These findings demonstrate a significant increase in the average student learning scores from the initial to the final test after implementing the puzzle-based learning approach. This average increase also demonstrates the approach's effectiveness in strengthening students' understanding of the material.

Prerequisite Analysis Test

a) Normality Test

The normality test aims to assess whether the collected data follows a normal distribution or not. In this study, the normality test was carried out using the Shapiro-Wilk approach in relation to the sample used did not reach 50. In addition, the Liliefors normality test was conducted using *SPSS Version 25 software* on a Windows system with a significance level of 0.05. The criteria used include the following:

If the significance level (sig.) is more than 0.05, the data is proven to have a normal distribution.

If the significance level (sig.) is less than 0.05, the data is said to not follow a normal distribution.

The findings from the normality test on the comparison group and the treatment group are presented as follows:

Table 14. Findings of Normality Test in Comparison Group (1-A)

Normality Testing						
	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	.141	22	.200 *	.948	22	.286
Posts	.153	22	.196	.941	22	.205
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

The findings of the Shapiro-Wilk normality test presented in table 14. obtained a significance score of 0.286 for the initial test and a significance value of 0.205 for the final test. Based on both significance scores exceeding the $\alpha = 0.05$ level, it is proven that the scores obtained from the initial and final tests in the comparison group (1-A) are normally distributed. This finding indicates that student learning achievement in the control class is suitable for use in parametric statistical analysis, such as the t-test, because one of the basic assumptions, namely normal distribution, has been met. Thus, further analysis can be carried out appropriately to determine the differences in learning achievement between the pretest and posttest as well as for comparison with the treatment group.

Table 15. Findings of Normality Test in Treatment Group (1-C)

Normality Analysis						
	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	.125	22	.200 *	.955	22	.393
Posts	.131	22	.200 *	.931	22	.131
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Based on the findings of the Shapiro-Wilk normality test as seen in table 15., the pretest significance level was 0.393 while the posttest significance level was 0.131. A significance level with a score exceeding 0.05 proves that the achievement of the initial and final tests in the treatment group (1-C) follows a normal distribution.

Thus, student learning achievement in the experimental class met the assumption of normality, allowing for further analysis using parametric statistical tests. These results demonstrate that the implementation of the puzzle-based learning activity method in the experimental class allows for accurate evaluation through inferential statistical analysis to assess its effectiveness in improving student learning achievement.

b) Homogeneity Analysis

Homogeneity analysis was conducted to assess whether the variances of the two groups (the treatment group and the comparison group) were homogeneous. This test was performed using Levene's test. Data are considered homogeneous when the significance score (sig.) exceeds 0.05. Below are the findings of Levene's test for the comparison group and the treatment group:

Table 16. Findings of the Comparison Group Homogeneity Test (1-A)

Test of Homogeneity of Variances					
		Levene Statistics	df1	df2	Sig.
Control Group	Based on Mean	2,751	1	42	.105
	Based on Median	2,391	1	42	.130
	Based on Median and with adjusted df	2,391	1	39,805	.130
	Based on trimmed mean	2,669	1	42	.110

Based on table 16., the Levene's "Based on Mean" test shows a statistical value of 2.751 with a significance level of 0.05. With a significance level exceeding 0.05, it is proven that the variance of information on student learning achievement in the comparison group is homogeneous. This finding indicates that the distribution of student scores is relatively uniform, so the homogeneity requirement has been met so that the data is ready for further research through the application of parametric statistical tests such as the t-test to compare learning achievement before and after conventional learning.

Table 17. Homogeneity Test in Treatment Group (1-C)

Test of Homogeneity of Variances					
		Levene Statistics	df1	df2	Sig.
Experimental Group	Based on Mean	.189	1	42	.666
	Based on Median	.192	1	42	.663
	Based on Median and with adjusted df	.192	1	41,320	.663
	Based on trimmed mean	.152	1	42	.698

The findings in table 17. of Levene's "Based on Mean" test obtained a statistical score of 0.189 with a significance value of 0.666. With a significance level of more than 0.05, it is explained that the distribution of information on student learning outcomes in the treatment group is homogeneous.

These findings indicate that the distribution of student scores in the treatment group was relatively uniform. Because the homogeneity assumption has been met, student learning outcome data can be further reviewed through parametric analysis, such as a t-

test, to determine the impact of using the puzzle-based learning method on improving learning achievement.

Hypothesis Analysis

a) Paired Sample Testing

The aim is to assess the comparison between the initial test scores and the final test scores in one class, both control and experimental classes.

Decision making steps:

a. If Sig. (2-tailed) is less than 0.05, it indicates a significant difference between the initial and final conditions of the variable, indicating an impact of the treatment on each variable.
b. If Sig. (2-tailed) exceeds 0.05, it means that there is no significant difference between the initial and final conditions, indicating that the treatment has no effect on each variable.

The findings of the paired sample test analysis are shown in table 4.13:

Table 18. Paired Sample Test Findings in Comparison Group (1-A)

Paired Sample Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-17,500	8,416	1,794	-21,232	-13,768	-9,753	21	.000

Based on the paired sample test shown in table 18., it produces a Sig. (2-tailed) score = 0.000. Where this finding is lower than the significance score of 0.05 (0.000 is less than 0.05), thus indicating that the difference in the initial and final test scores is proven to be statistically significant. In other words, it can be said that a strong basis has been found to state that the learning provided has an influence on the ability to calculate mathematical subtraction in the control class (1-A) so that H_0it is rejected and H_1accepted through intervention, namely that there is a difference in the mathematical subtraction learning calculation skills of students in class 1 of SDN 104202 Bandar Setia Village who are taught with the usual learning approach.

Table 19. Findings of Paired Sample Test of Treatment Groups (1-C)

Paired Sample Testing									
		Paired Differences					t	df	Sig. (2-ailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest – Posttest	-30,455	15,423	3,288	-37,293	-23,616	-9,262	21	.000

The findings of paired sample testing in the treatment group (1-C) are shown in table 19. showing a Sig. (2-tailed) score = 0.000 lower with a significance level of 0.05 (0.000 less than 0.05). Thus, it can be stated that the comparison of the initial and final test scores reveals a statistically significant difference in students. In other words, the application of learning in the treatment group has been proven to have a significant impact on the mathematical learning subtraction calculation skills of students in grade 1 of SDN 104202 Bandar Setia Village. Thus, it $H_0$is rejected and H_1accepted. The intervention is There is an Effect of the Mathematical Puzzle Playing Method on Subtraction Calculation Skills in Students in Grade 1 of SDN 104202 Bandar Setia Village.

2. Two Independent Samples t-Test

The t-test was used to examine the differences in the final test findings in the treatment group which was implemented using a puzzle game approach and the control group which used a regular learning approach.

Basis for decision making:

a. If the probability score (Sig.) exceeds 0.05, it means there is a significant difference, meaning that the method of playing mathematical puzzles has an influence on students' subtraction calculation abilities.
b. If the score (Sig.) is less than 0.05 based on this, it can be stated that there is no significant difference, meaning that the approach applied does not have a real effect.

The hypothetical decision making is:

Comparison Group Hypothesis:

H_0= No differences were found in subtraction calculation skills in class 1 students at SDN 104202 Bandar Setia who received learning using the usual approach.

H_1= There is a difference in the subtraction calculation skills of class 1 students at SDN 104202 Bandar Setia who follow learning with the usual approach.

Treatment Group Hypothesis

H_0= There was no influence of the mathematical puzzle playing approach on the subtraction calculation skills of class 1 students at SDN 104202 Bandar Setia.

H_1= It was found that there was an influence of the mathematical puzzle playing approach on the subtraction calculation skills of class 1 students at SDN 104202 Bandar Setia.

The findings of the t-test of two independent samples in the comparison group and the treatment group are as follows:

Table 20. Findings of the Two-Sample Independent T-Test for the Comparison Group (1-A)

Test of Two Independent Samples										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Control Group	Equal variances assumed	2,751	.105	-4,431	42	.000	-17,500	3,949	-25,470	-9,530
	Equal variances not assumed			-4,431	38,676	.000	-17,500	3,949	-25,490	-9,510

In table 20., there is a sig (significance) score of 0.105, which states that the score exceeds the significance limit for decision-making in two-sample independent testing or (0.105 exceeds 0.05). It can be stated that the null hypothesis is rejected and the alternative hypothesis is accepted. This means that the interpretation of the results is that there is a difference in subtraction arithmetic skills in grade 1 students of SDN 104202 Bandar Setia who are taught using a conventional learning approach.

Table 21. Findings of the Two Independent Sample Test of Treatment Groups (1-C)

Independent Samples Test								
	Levene's Test for Equality of Variances		t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error	95% Confidence Interval of the Difference

								Difference	Lower	Upper
Experimental Group	Equal variances assumed	.189	.666	-8,876	42	.000	-30,455	3,431	-37,379	-23,530
	Equal variances not assumed			-8,876	41,983	.000	-30,455	3,431	-37,379	-23,530

In table 21., there is a sig (significance) value of 0.666, which means that this value is more than the significance level based on the independent t-test decision making (Sig. score = 0.666 exceeds 0.05). Therefore, H_0 it is rejected while H_1 accepted. Thus, this states that the method of playing mathematical puzzles has a real impact on the findings of subtraction arithmetic skills in students in grade 1 of SDN 104202 Bandar Setia.

Explanation of Findings

This study aims to obtain information on the extent to which the application of a mathematical puzzle approach influences the mastery of subtraction skills in first-grade elementary school students. Learning achievement can be identified by differences in behavior. Although not all behavioral changes reflect learning outcomes, learning activities are generally accompanied by such changes. Behavioral changes as a result of learning can also influence learning outcomes and are often reflected in improved thinking skills. According to Oemar Hamalik (2008:137), learning achievement is based on a holistic behavioral pattern. Learning achievement is a change in student behavior that encompasses cognitive, affective, and psychomotor aspects under certain conditions as a result of repeated experiences.

learning often involves abstract concepts, such as numbers, symbols, and arithmetic operations. Therefore, researchers want to test, examine, and assess the impact of using puzzles in classroom learning. Learning media can help concreteize concepts, making them easier for students to understand. According to Hamalik (2008:137), the use of learning tools helps deliver material in a more concrete way, avoiding relying solely on verbal explanations, thus making it easier for students to understand.

Optimally designed learning media can assist students and support the achievement of learning objectives. Each medium has its own characteristics, advantages, and disadvantages. Therefore, careful planning is required in the selection and use of instructional media. Learning media aspects include hardware and the material or message conveyed by the designed media. Therefore, using puzzle games allows teachers to deliver material accurately and in accordance with the learning structure, so that it is hoped that learning targets will be achieved by students and will improve compared to before using this media.

In the initial stage, the researcher conducted a pre-test at the first meeting in the treatment group and the comparison group. Based on the pre-test achievement, it was proven that there were still students who had not met the Minimum Completion Criteria (KKM), consisting of 13 students in the comparison group and 20 students in the treatment group. This finding proves that the numeracy skills of students in both groups still need additional guidance and appropriate learning treatments to achieve the expected standards. In the experimental group, the researcher used puzzle games as a learning tool. It is hoped that by using the puzzle game tool, student achievement will increase and meet the KKM set by the school.

Impact of the Implementation of the Puzzle Playing Approach Related to Subtraction Counting Skills in Students in Grade 1 Mathematics Lessons at SDN 104202 Bandar Setia.

Based on the research, it can be seen that the use of a mathematical puzzle game approach has a significant influence on the numeracy skills of grade 1 students at SDN 104202 Bandar Setia. This finding supports the study conducted by Rahmat (2024), proving that the application of teaching aids in the form of number puzzles provides benefits for developing students' basic mastery skills. The study, the findings of the hypothesis test indicate that the use of number puzzle teaching materials has a positive impact on students' numeracy skills. Furthermore, a study by Siregar (2024) also supports these findings, by showing that the use of rubric puzzle teaching aids can develop addition and subtraction arithmetic skills in the treatment group. The achievement of this study proves that the use of rubric puzzle playing facilities in the experimental group contributes to the progress of addition and subtraction arithmetic skills significantly.

Based on the influence of the use of puzzle playing facilities on student learning achievement, it was analyzed through a t-test (Independent Sample Test). From the test, a significance score of 0.666 was obtained which exceeded the significance limit for decision making (0.666 exceeds 0.05). Based on this, the null hypothesis was rejected and the alternative hypothesis was accepted, this finding proves that the mathematical puzzle playing approach has a significant influence on the subtraction calculation skills of grade 1 students at SDN 104202 Bandar Setia. Based on the results of the data processing, it was stated that the implementation of learning facilities that focused on mathematical puzzles supported the improvement of students' subtraction calculation skills in mathematics lessons in grade 1 of SDN 104202 Bandar Setia.

Implementation of the Mathematical Puzzle Playing Approach Through Subtraction Teaching and Learning Activities for Students in Grade 1 of Elementary School.

Learning subtraction using a mathematical puzzle playing approach can be done by applying the following steps:

a) Preparation Stage:

a. Researchers prepared mathematical puzzles that were appropriate to the subtraction material.
b. Researchers designed a learning scenario that involved puzzle playing activities.
c. Researchers prepare worksheets and evaluation instruments.

b) Implementation Stage:

a. The researcher explains the learning objectives and rules of playing math puzzles.
b. Researchers demonstrate how to use math puzzles for subtraction operations.
c. Students are given math puzzle game worksheets independently.
d. Students complete a worksheet containing subtraction problems found in the pictures

c) of each piece of the math puzzle.

d) Teachers provide guidance and facilities during the learning process.

Evaluation Stage:

a. Researchers and students discuss the results of solving subtraction problems.
b. Students present strategies for solving subtraction problems with math puzzles.
c. Researchers provide feedback and reinforcement on the strategies used by students.
d. Researchers conducted an evaluation to measure students' understanding of the concept of subtraction.

The purpose of implementing a mathematical puzzle approach in subtraction learning in first grade is to enable students to master subtraction learning in a realistic manner and provide a fun experience through play activities. By using puzzles, students can learn to visually connect subtraction problems with the correct answers, making it easier for them to master basic arithmetic skills. This method aims to examine the influence and progress of learning motivation, train concentration, and develop logical thinking skills, so that subtraction learning does not feel boring but rather more interesting and meaningful for students.

Student Responses to Subtraction Learning Activities Through a Mathematical Puzzle Playing Approach

In the use of puzzle media, students responded very well to subtraction learning in mathematics. Because seen from cognitive responses, students were faster in solving problems because they understood the procedure and not just memorizing, calculation errors were reduced because students could check their answers independently, students could directly see the process of "subtracting" by "moving" and "sticking" the appropriate puzzle pieces. Game activities created a relaxed, fun, and non-threatening learning atmosphere, the challenge of playing puzzles fostered curiosity and satisfaction when

successful. According to Brunner (1960) concrete-based learning (enactive) strengthens the understanding of basic mathematical concepts before entering the symbolic use stage. According to Hamalik (2008) learning aids that are interesting for students can increase learning motivation and create a pleasant learning experience.

5. CONCLUSION AND SUGGESTIONS

Conclusion

Based on the findings of the study, several conclusions can be established as follows: The use of the mathematical puzzle playing method has a significant effect on the mastery of subtraction calculation skills of grade 1 students of SDN 104202 Bandar Setia. This fact is proven based on the difference in the middle score of the final test between the treatment group (84.77) and the comparison group (78.86) through the achievement of paired sample tests proving significance or Sig. (2-tailed) = 0.000 (0.000 <0.05) thus, H_0rejected and H_1accepted. Based on the implementation of the puzzle playing approach, it is carried out through the activity of arranging puzzle pieces containing subtraction questions, then students discuss the answers with the teacher so that learning becomes more active, concrete and in accordance with the level of students' thinking abilities. Students show a positive response, seen from their enthusiasm, active involvement, and high motivation in solving subtraction problems. Thus, the mathematical puzzle playing method is worthy of being used as an alternative learning approach that is effective, fun and able to develop understanding and subtraction calculation skills of lower grade elementary school students.

Suggestion

Based on the findings of the study, the authors provide the following directions:

a. For teachers, it is hoped that the use of a play approach in learning, such as playing math puzzles, can be used as an alternative media to improve students' counting skills and understanding of the subtraction learning process that is appropriate to the learning content.
b. For schools, in order to further encourage motivation and availability in presenting teaching materials, this makes it easier for teachers to choose the right tools to be applied in each lesson so that class teachers can be productive in thinking and not just focus on monotonous learning.
c. For students, it's expected that they will be more actively involved in learning. Active student engagement during learning will help them master the material taught by the teacher, thereby improving their math skills and learning outcomes.
d. For further authors, it is hoped that further studies can continue and expand the findings of this study, thereby increasing understanding and knowledge in related fields.

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