

THE APPLICATION OF THE JARIMATIKA METHOD THROUGH SINGING MEDIA TO IMPROVE MATHEMATICS LEARNING OUTCOMES

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ARTICLE INFO	ABSTRACT
Article History : <i>Received : date of received article</i> <i>Accepted : date of accepted article</i>	<i>This study aims to describe and analyze the application of the Jarimatika method through singing media in improving teacher activities, student activities, and mathematics learning outcomes in multiplication operation material for grade II STUDENTS MIS DDI Hasanuddin Maros Regency. The research uses the Classroom Action Research (PTK) approach with the Kurt Lewin model which consists of four stages, namely planning, implementation of actions, observation, and reflection. The research was carried out in two cycles with 13 students consisting of five male students and eight female students. Data collection techniques include observation, tests, and documentation, while data analysis is carried out descriptively, quantitatively, and qualitatively. The results of the study show that the application of the Jarimatika method through singing media is able to improve the quality of the process and results of mathematics learning. Teacher activity increased from 72.1% in Cycle I to 86.1% in Cycle II. Student activity increased from 75% to 83%. Students' learning outcomes have also increased, as shown by the percentage of learning completeness from 46% in Cycle I to 77% in Cycle II. This improvement shows that the use of the Jarimatika method through singing media is able to create more active, fun, and developmental learning in accordance with the developmental characteristics of elementary school students so as to help students understand the concept of multiplication more easily. Based on the results of the study, it can be concluded that the application of the Jarimatika method through singing media is effective in increasing teacher activities, student activities, and mathematics learning outcomes of multiplication operation material in grade II STUDENTS MIS DDI Hasanuddin Maros Regency. This method can be used as an alternative to learning</i>
Keywords : Keywords 1; Scarlett. Keywords 2; Singing Media Keywords 3; Mathematics Learning Outcomes Keywords 4; multiplication operations Keywords 5; Classroom Action Research	

mathematics in elementary school, especially in the material on multiplication calculation operations.

1. INTRODUCTION

Education aims to develop the potential of students to become believers, knowledgeable, creative, independent, and responsible human beings as mandated in Law Number 20 of 2003 concerning the National Education System. Achieving these goals requires an active, meaningful, and consistent learning process in accordance with the characteristics of student development, especially at the elementary school level which is the foundation for mastering academic competencies.

Mathematics is a subject that plays an important role in developing students' logical, analytical, and numeracy thinking skills. According to (Yayuk, 2019) Mathematics learning in elementary school is directed so that students are able to understand concepts, use mathematical reasoning, solve problems, and communicate mathematical ideas. However, based on the results of initial observations in class II MIS DDI Hasanuddin, Maros Regency, students' ability in multiplication operation materials is still low because learning tends to use conventional approaches so that pre-cycle scores have not reached the Minimum Completeness Criteria (KKM). This condition shows the need for learning innovations that are more in line with the characteristics of student development.

Theoretically, the use of concrete learning methods is supported by Piaget's theory of cognitive development, Bruner's theory of representation, and Vygotsky's theory of constructivism, which asserts that elementary school students more easily understand concepts through concrete activities, direct experiences, and social interactions. One of the appropriate methods is Jarimatika, which is a calculation technique using fingers as a concrete medium that makes it easier for students to understand the concept of multiplication gradually (Wulandani, 2013). To make learning more interesting and increase learning motivation, the method is combined with singing media that can increase students' attention, participation, and memory (Rahman, 2022).

Various studies in the last ten years have shown the effectiveness of the Jarimatika method in improving numeracy skills and mathematics learning outcomes, including research (Sumirat & Trimurtini, 2016), (Utami, 2018), (Anwar & Kholil, 2020), (Kaltsum, 2024), and (Astuti et al., 2026). The results of the study prove that Jarimatika is effective in improving the numeracy skills, motivation, and learning outcomes of elementary school students.

However, previous research generally still focuses on Jarimatika as a numeracy technique without integrating it with learning media that is able to increase student involvement. In addition, most studies only measure learning outcomes, while teacher activities and student activities during the learning process have not been studied simultaneously. Thus, there is still a research gap regarding the effectiveness of the integration of the Jarimatika method assisted by singing media in improving the quality of mathematics learning processes and outcomes in elementary schools.

Based on these conditions, this study offers novelty in the form of the application of the Jarimatika method assisted by singing media as a learning strategy to improve teacher activities, student activities, and mathematics learning outcomes of multiplication operation material in grade II MIS DDI Hasanuddin students of Maros Regency. This study aims to describe the application of this method and analyze the improvement of teacher activities, student activities, and mathematics learning outcomes through Classroom Action Research.

2. METHODS

This study uses a Classroom Action Research (*PTK*) approach with the Kurt Lewin model which aims to improve the quality of the learning process and improve teacher activities, student activities, and mathematics learning outcomes through the application of the Jarimatika method assisted by singing media. The Kurt Lewin model was chosen because it provides a systematic action

procedure through four stages, namely *planning*, action implementation, observation, and *reflection*, which are carried out repeatedly until improvements in the learning process and results are obtained.

The research was carried out in the even semester of the 2022/2023 Academic Year at MIS DDI Hasanuddin, Maros Regency. The subjects of the study were all class II students totaling 13 people, consisting of five male students and eight female students. The determination of the subjects used *the total sampling technique* because the number of students was relatively small and all of them had difficulties in understanding the material of multiplication operations based on the results of initial observations. The researcher plays the role of the implementer of learning actions, while the classroom teacher acts as a collaborator who helps observe the teacher's activities and students' activities and provides input at the reflection stage. The research was carried out in two cycles, each consisting of two learning meetings and one evaluation. If the success indicators have not been achieved in the first cycle, the action is corrected based on the results of reflection and continued in the next cycle.

The research objects include teacher activities, student activities, and mathematics learning outcomes in multiplication operation materials. Teacher activities were observed to determine the implementation of learning in accordance with the action plan, while student activities were observed to determine the level of participation, involvement, and activeness during the learning process. Learning outcomes were measured through tests given at the end of each cycle to determine the increase in mastery of the concept of multiplication after applying the Jarimatika method assisted by singing media.

The tools used in the research include teaching modules, Learning Implementation Plans (RPP), teacher activity observation sheets, student activity observation sheets, learning outcome test instruments, documentation guidelines, and cell phone cameras to document learning activities. The research materials are in the form of class II multiplication surgery material, the Jarimatika method as a concrete medium using fingers, and singing media in the form of learning songs that are arranged according to the steps of using Jarimatika.

The implementation of actions is carried out in two cycles, with each cycle consisting of the stages of planning, implementation of actions, observation, and reflection. At the planning stage, learning tools, research instruments, learning media, and scenarios for the application of the Jarimatika method assisted by singing media were prepared. The implementation stage is carried out through perception activities, delivery of learning objectives, demonstration of the use of Jarimatika, students' practice of using fingers, strengthening concepts through singing activities, and providing exercises and evaluation tests at the end of the cycle. During the implementation of the action, the collaborating teacher made observations on the implementation of learning, teacher activities, student activities, and various obstacles that arose. Furthermore, the results of observation and evaluation are analyzed at the reflection stage as a basis for refining actions in the next cycle. In the second cycle, improvements were made to the weaknesses found in the first cycle, especially in the demonstration of the use of Jarimatika, the provision of individual guidance, the intensity of training, and the use of singing media so that the learning process took place more effectively.

3. RESULTS AND DISCUSSION

This class action research was carried out in two cycles, each consisting of the stages of planning, implementing actions, observation, and reflection. The learning action was carried out through the application of the Jarimatika method assisted by singing media on multiplication operation material in class II MIS DDI Hasanuddin, Maros Regency. The success of the action was evaluated based on three main indicators, namely teacher activities, student activities, and mathematics learning outcomes.

a. Initial Conditions (Pre-Action)

Before the action was carried out, the researcher observed the mathematics learning process in class II MIS DDI Hasanuddin, Maros Regency. The results of the observation show that

learning is still dominated by lecture methods and practice questions so that students tend to be passive. Teachers explain more material in front of the class, while students only listen, take notes, and do the exercises given. This condition causes most students to have difficulty understanding the concept of multiplication, especially when solving problems that require understanding concepts, not just memorization.

In addition, learning has not utilized media or methods that are in accordance with the characteristics of low-grade students. The material of multiplication operations is presented in an abstract manner so that students have difficulty connecting the concept of multiplication with concrete experiences. As a result, learning motivation is relatively low and only a small percentage of students actively ask and answer teachers' questions during the learning process.

The results of the initial test showed that the students' ability in the multiplication operation material was still below the Minimum Completeness Criteria (KKM). Of the 13 students, only 4 students (30.7%) have achieved learning completion, while 9 students (69.2%) have not achieved KKM. These findings show the need for improvement actions through the application of more innovative learning methods and in accordance with the characteristics of students.

The data in Table 1 shows that most of the students have not reached learning completeness, so learning actions are needed that are able to improve understanding of the concept of multiplication through a more concrete and enjoyable learning experience.

Table 1. Pre-Action Learning Outcomes

	Quantity
Number of students	13
Conclusion	4
Incomplete	9
Completion percentage	30,7%
The percentage has not been completed	69,2%

b. Results of Cycle I Implementation

The implementation of actions in Cycle I began with the preparation of learning tools which included teaching modules, observation sheets, test instruments, and learning media in the form of songs combined with the Jarimatika method. Learning is carried out according to the stages of Class Action Research, namely planning, implementation of actions, observation, and reflection.

At the implementation stage, the teacher introduced the concept of multiplication through the use of fingers as a counting medium. The teacher then guides students to practice the steps of Jarimatika gradually, then strengthens them through singing activities so that students can more easily remember the multiplication procedure. Most of the students showed better enthusiasm than in the previous learning. However, there are still some students who need intensive guidance because they are not used to using the Jarimatika method.



(a)



(b)

Figure 1. Learning documentation using the Jarimatika method: (a) the teacher demonstrates the use of Jarimatika; (b) students practice Jarimatika through singing activities.

Based on the results of observations, teacher activities in Cycle I obtained a percentage of 72.1% with a good category. Teachers have carried out most of the learning steps according to plan, although there are still some aspects that need to be improved, such as providing reinforcement, time management, and individual guidance to students who are experiencing difficulties. The results of the observation showed that the students' activities reached 75%. The students began to show the courage to use Jarimatika in front of the class and participated in the singing activity with enthusiasm. However, some students still lack confidence when working on questions independently, so they need direction from the teacher.

The increase in learning activities in Cycle I has an impact on student learning outcomes. Of the 13 students, 6 students (46%) have achieved learning completion, while 7 students (54%) have still not reached KKM. Although the completeness of learning has increased compared to the initial condition, the results have not met the established research success indicators. The results of the reflection show that teachers need to clarify the demonstration of the use of Jarimatika, increase the intensity of the exercise, provide more individualized guidance, and optimize the use of singing media so that all students can actively participate in learning.

Table 2. Learning Outcomes of Cycle I

Description	Quantity
Number of students	13
Conclusion	6
Incomplete	7
Completion percentage	46%
The percentage has not been completed	54%

c. Results of Cycle II Implementation

Learning improvements in Cycle II were carried out based on the results of reflection in Cycle I. Teachers provided demonstrations of the use of Jarimatika more systematically, increased the number of gradual exercises, provided opportunities for students to practice the use of Jarimatika in pairs, and integrated singing media more intensively during the learning process. These improvements have a positive impact on the quality of learning. The classroom atmosphere

became more conducive, students seemed more confident in using Jarimatika, and student involvement during learning increased significantly.

The results of observations showed that teacher activity increased to 86.1% with the very good category. Teachers are able to carry out all stages of learning according to the plan, provide appropriate reinforcement, manage the classroom more effectively, and guide students more intensively during the learning process.

Student activities have also increased to 83%. Students are more active in asking questions, answering teachers' questions, practicing the use of Jarimatika, participating in singing activities, and completing exercises independently. The interaction between students also looked better than in Cycle I.

Improving the quality of the learning process affects student learning outcomes. Of the 13 students, 10 students (77%) managed to achieve learning completion, while 3 students (23%) still did not achieve KKM. This percentage has met the established research success indicators, namely classical learning completeness of at least 75%.

Table 3. Cycle II Learning Outcomes

Description	Quantity
Number of students	13
Conclusion	10
Incomplete	3
Completion percentage	77%
The percentage has not been completed	23%

Overall, the application of the Jarimatika method through singing media showed an increase in all research indicators. The data in Table 4 shows that all indicators have improved after learning improvements in Cycle II. Teacher activity increased by 14.0%, student activity increased by 8%, while learning completeness increased by 31%. These results show that the application of the Jarimatika method through singing media is able to improve the quality of the learning process as well as mathematics learning outcomes in multiplication operation material in class II MIS DDI Hasanuddin, Maros Regency.

Table 4. Recapitulation of Improved Research Results

Indicator	Cycle I	Cycle II	Improvement
Teacher Activities	72,1%	86,1%	+14,0%
Student Activities	75%	83%	+8%
Learning Completeness	46%	77%	+31%

This study aims to determine the effectiveness of the application of the Jarimatika method through singing media in improving teacher activities, student activities, and mathematics learning outcomes of multiplication operation material in grade II MIS DDI Hasanuddin students Maros Regency. Based on the results of the research carried out through two cycles of Class Action Research, it was found that all indicators of success have increased. This increase is not only shown by the increase in the percentage of completeness of learning outcomes, but also by the improvement in the quality of the learning process which is reflected in teacher activities and student activities. These findings show that learning that combines the Jarimatika method with

singing media is able to create a more concrete, active, and enjoyable learning experience for elementary school students.

The results of observations showed that teacher activity increased from 72.1% in Cycle I to 86.1% in Cycle II. This increase indicates that teachers are increasingly able to carry out learning in accordance with the action scenarios that have been designed. In the first cycle, teachers still experience several obstacles, such as time management, reinforcement, and individual guidance for students who experience difficulties. The results of reflection at the end of the first cycle then become the basis for improving learning in the second cycle so that the implementation of learning takes place more systematically and effectively.

The increase in teacher activity shows that the reflection process in Classroom Action Research serves as a mechanism of continuous improvement. Teachers not only carry out learning, but also evaluate the shortcomings that arise during the learning process and then correct them in the next action. This condition is in line with the characteristics of Classroom Action Research put forward by Kemmis and McTaggart, which is research that is carried out cyclically through the stages of planning, action, observation, and reflection to improve the quality of learning practices.

From a pedagogical perspective, the increase in teacher activity also shows an increase in teachers' competence in managing student-centered learning. Teachers no longer play the role of the only source of information, but become facilitators who guide students in building understanding of concepts through concrete learning experiences. The change in the role of the teacher is in accordance with Vygotsky's theory of constructivism which places the teacher as a *scaffolding* giver, which is assistance that is given gradually until students are able to complete tasks independently. In this study, the assistance was realized through demonstrations of the use of Jarimatika, the provision of gradual training, and reinforcement through singing media.

In addition, the increase in teacher activity shows that the use of the Jarimatika method not only requires mastery of numeracy techniques, but also pedagogical skills in managing the classroom. Teachers need to ensure that each learner understands the steps to use Jarimatika, gets the opportunity to practice, and receives appropriate feedback. Thus, the success of the Jarimatika method is not only determined by the method itself, but also by the quality of the implementation carried out by the teacher.

Student activity increased from 75% in Cycle I to 83% in Cycle II. This improvement shows that learning has become more interactive and able to actively involve students in every stage of learning. In the second cycle, students were more enthusiastic about participating in Jarimatika demonstrations, more confident in practicing the use of fingers, more actively asking questions, answering questions, and participating in singing activities that were integrated with mathematics learning.

This finding can be explained through Piaget's theory of cognitive development which states that elementary school-age students are at a concrete operational stage. At this stage, it is easier for students to understand concepts through activities involving concrete objects rather than through abstract explanations. The use of fingers in the Jarimatika method provides a manipulative experience that is in accordance with the characteristics of students' development so that they can more easily build an understanding of the concept of multiplication.

The results of this study also support Bruner's theory of the stages of enactive, iconic, and symbolic learning. In the application of the Jarimatika method, students first learn through direct actions using the finger (enactive stage), then understand the visual pattern of finger use (iconic stage), before finally being able to complete multiplication operations using mathematical symbols (symbolic stage). Thus, the learning process takes place in stages according to the development of students' thinking skills.

Singing media combined with the Jarimatika method also contributes to increasing student activities. The songs used during learning help create a more enjoyable learning atmosphere so

that students do not feel pressured when learning multiplication material. The repetition of concepts through songs strengthens memory and increases students' attention during learning. These findings are in line with the theory of learning motivation which states that a pleasant learning atmosphere will increase student involvement in the learning process. Motivated learners tend to be more active, more confident, and more diligent in completing study assignments.

The results showed that learning completeness increased from 46% in Cycle I to 77% in Cycle II. The increase of 31 percentage points shows that the application of the Jarimatika method through singing media has a positive impact on the mastery of the concept of multiplication. The increase in learning outcomes is a logical consequence of improving the quality of the learning process, both in terms of teacher activities and student activities.

The results of the study showed that the application of the Jarimatika method assisted by singing media was able to increase teacher activities, student activities, and mathematics learning outcomes in multiplication operation materials. The increase can be seen from teacher activity which increased from 72.1% in Cycle I to 86.1% in Cycle II, student activity from 75% to 83%, and learning completeness from 46% to 77%. These findings show that the integration of concrete counting methods with fun media can improve the quality of the learning process while improving learning outcomes. The improvements made in each cycle through reflection also show that Classroom Action Research provides space for teachers to evaluate and refine learning strategies in an ongoing manner so that learning becomes more effective.

The increase in teacher activity indicates that teachers are increasingly able to implement student-centered learning through the provision of demonstrations, gradual guidance (*scaffolding*), as well as reinforcement during the learning process. This condition is in line with the theory of social constructivism which places teachers as facilitators who help students build knowledge through meaningful interaction and learning experiences. In addition, the use of concrete media in the form of fingers makes it easier for teachers to present the concept of multiplication more systematically so that students get learning assistance that is in accordance with their developmental stages. These findings support the results of the study (Wafiroh & A'yun, 2023) which shows that Jarimatika helps teachers create more active and easy to understand mathematics learning by students, and is strengthened by (Rahayu & Utami, 2022) who reported that the integration of Jarimatika with creative songs was able to increase students' motivation and learning engagement.

The increase in student activity shows that the use of Jarimatika assisted by singing media has succeeded in creating more interactive learning. Students not only listen to the teacher's explanation, but are directly involved through motor activities using fingers, singing, discussing, and practicing problem solving. This activity is in accordance with Piaget's theory of cognitive development which states that elementary school-age students are at a concrete operational stage so that it is easier to understand concepts through the manipulation of real objects. These findings are also in line with Bruner's theory of representation, which is that learning takes place from the enactive to the symbolic stage through direct experience. Research (Fitri et al., 2026) and (Armadila et al., 2026) shows that the use of songs in numeracy learning increases students' attention, retention, and participation, while the use of concrete media strengthens the understanding of mathematical concepts (Anggraeni & Astriani, 2026); (Nabila & Aprilidianto, 2026).

The increase in learning outcomes from 46% to 77% showed that the combination of Jarimatika and singing media not only increased learning activity, but also strengthened students' conceptual understanding of multiplication operations. Jarimatika helps students understand multiplication as a repetitive addition through concrete representations, while singing media reinforces the process of repetition so that information is easier to remember. These results support the research (Damayanti et al., 2024) which concluded that the use of Jarimatika consistently improved numeracy skills and elementary school mathematics learning outcomes.

The difference between this research and the previous research lies in the integration of the Jarimatika method with singing media as a learning strategy that is able to combine visual, kinesthetic, and auditory aspects in one learning process. The integration provides a more meaningful learning experience, increases motivation, and strengthens students' numeracy skills. Thus, the Jarimatika method assisted by singing media can be used as an innovative alternative to mathematics learning and in accordance with the characteristics of elementary school students, especially in calculation operations materials that require a concrete understanding of concepts.

4. CONCLUSIONS AND SUGGESTIONS

Based on the results of the Classroom Action Research carried out in two cycles, it can be concluded that the application of the Jarimatika method through singing media has proven to be effective in improving the quality of the learning process and mathematics learning outcomes in the multiplication operation material of class II STUDENTS MIS DDI Hasanuddin Maros Regency. The application of the Jarimatika method through singing media is able to increase teachers' activities in carrying out learning.

Improvements made based on the results of reflection in each cycle encourage teachers to carry out learning in a more systematic, interactive, and student-centered manner. Teachers are increasingly skilled in managing classes, providing demonstrations of the use of the Jarimatika method, utilizing singing media as a learning reinforcement, guiding students individually and in groups, and creating an active and fun learning atmosphere.

The application of the Jarimatika method through singing media has also been proven to increase students' activities during the learning process. The use of fingers as a concrete medium combined with singing activities is able to attract attention, increase motivation, and encourage students to actively participate in each stage of learning. Students become more enthusiastic about participating in learning, more courageous to ask and answer questions, more confident in practicing Jarimatika techniques, and able to work together with friends in completing the assignments given.

The application of the Jarimatika method through singing media has a positive impact on students' mathematics learning outcomes in multiplication operation materials. Improving the quality of the learning process has implications for increasing students' ability to understand the concept of multiplication and solve problems more precisely. These results show that the Jarimatika method through singing media is effectively used as an alternative learning to improve the ability to count multiplication in elementary school students.

Overall, the results of the study prove that the integration of the Jarimatika method with singing media not only improves the cognitive aspects of students through improving learning outcomes, but also improves the quality of the learning process as shown by the increase in teacher activities and student activities. These findings strengthen the theory that mathematics learning at the elementary school level will be more effective if it is presented through a concrete, contextual, interactive, and developmental learning experience that is in accordance with the characteristics of student development.

This research provides the implication that elementary school and madrasah ibtidaiyah teachers need to develop innovative mathematics learning by utilizing methods and media that are in accordance with the characteristics of students. The Jarimatika method through singing media can be used as one of the learning alternatives that are easy to apply, economical, and able to create an active, creative, effective, and fun learning atmosphere so as to contribute to improving the quality of mathematics learning in elementary schools.

Although this study showed positive results, the study was still limited to one class with a relatively small number of students and only focused on multiplication operation material. Therefore, further research is recommended to test the effectiveness of the Jarimatika method through singing media in other mathematical materials, involving a larger number of subjects,

using more diverse research designs, and combining it with digital learning media in order to obtain broader empirical evidence regarding the effectiveness of the method in improving students' numeracy skills.

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