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APPLICATION OF CONTEXTUAL TEACHING AND LEARNING (CTL) MODEL THROUGH THE USE OF AUDIO-VISUAL MEDIA TO ASSIST MATHEMATICS UNDERSTANDING IN FOURTH GRADE STUDENTS AT SDN 25 LUBUKLINGGAU

Eliya Permata Rizky[1], Agus Triyogo [2]
[1],[2]PGRI Silampari University
eliyapermata35@gmail.com

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Abstract: This study was motivated by the lack of meaningful learning experiences and low student enthusiasm in mathematics instruction, which led to low learning outcomes among fourth-grade students. The purpose of this study was to improve students' mathematical understanding through the application of the Contextual Teaching and Learning (CTL) model assisted by audiovisual media. This study employed classroom action research consisting of two cycles and involved 12 fourth-grade students at SDN 25 Lubuklinggau during the odd semester of the 2025/2026 academic year. Data were collected through mathematics achievement tests and classroom observations and analyzed descriptively. The results showed a significant improvement in students' learning outcomes. Classical mastery increased from 50% in Cycle I to 91% in Cycle II, exceeding the minimum mastery criterion of 85%. These findings indicate that the CTL model supported by audiovisual media effectively promotes active student participation and helps learners connect mathematical concepts with real-life contexts. In conclusion, the CTL model assisted by audiovisual media is effective in improving elementary students' mathematical understanding. This study implies that teachers are encouraged to implement contextual and multimedia-based learning strategies. Future research is recommended to examine the application of this model in different grade levels or subject areas.

Keywords: *Contextual Teaching and Learning, audiovisual media, mathematical understanding*, SDN 25 Lubuklinggau.

INTRODUCTION

Mathematics education at the elementary school level emphasizes providing direct and meaningful learning experiences to develop students' mathematical abilities optimally. Mathematical understanding is a fundamental skill that supports higher-order abilities such as

mathematical communication and critical thinking, which are essential for achieving learning objectives (Hikmah, 2017). At this level, students are expected not only to master basic concepts but also to build a strong foundation for logical and analytical thinking.

However, low mathematical understanding remains a common problem in elementary schools. This issue is closely related to the abstract nature of mathematics, which contrasts with the cognitive development stage of elementary school students who are still in the concrete operational stage (Ibda, 2015). Students at this stage tend to understand mathematical concepts more effectively when learning is connected to real-life situations and concrete experiences. Poor conceptual understanding can negatively affect students' academic performance and learning motivation (Masitoh & Prabawanto, 2016).

Based on preliminary observations at SDN 25 Lubuklinggau, fourth-grade students experienced difficulties in understanding mathematical concepts. Learning activities were still dominated by conventional teaching methods with limited use of instructional media, resulting in low student engagement and unsatisfactory learning outcomes. These conditions indicate the need for an instructional approach that actively involves students and helps them relate mathematical concepts to their daily lives. One potential solution is the Contextual Teaching and Learning (CTL) model, which emphasizes meaningful learning by connecting academic content with real-world contexts (Rahmi Wahyuni & Wahyuni, 2016). In addition, audiovisual media play an important role in supporting learning by combining visual and auditory elements to clarify abstract concepts and increase students' learning motivation (Saputra, 2024).

Previous studies have shown that the integration of the CTL model with audiovisual and interactive media can positively influence learning outcomes. CTL-based audiovisual media were found to significantly improve students' motivation and critical thinking skills (Sarwinda et al., 2020), while CTL assisted by audiovisual media positively affected students' learning achievement (Utami, 2020). In mathematics learning, animated video media integrated with CTL improved fourth-grade students' mathematics outcomes (Ilmu Pendidikan Ganesha, 2025), and CTL-audiovisual learning significantly enhanced fifth-grade students' understanding of mathematical concepts at SDN 34 Lubuklinggau (2024).

Furthermore, CTL combined with audiovisual media enhanced students' communication skills (Husnul Khatimah et al., 2024), and a systematic review confirmed that interactive multimedia integrated with CTL increases student engagement and conceptual understanding in elementary mathematics learning (Pratiwi et al., 2023).

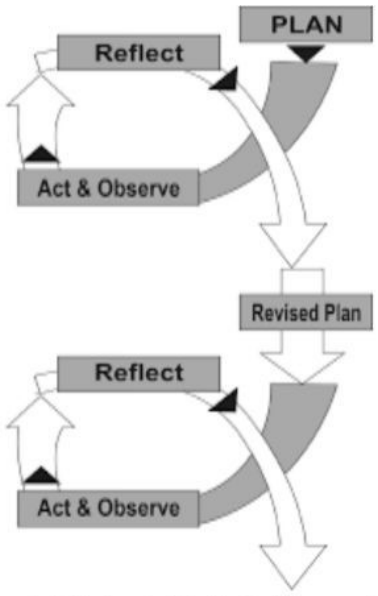
Despite these positive findings, several research gaps remain. Most previous studies focus on general learning outcomes or employ non-classroom action research designs. Moreover, there is a lack of PTK studies that specifically examine the effectiveness of the CTL model assisted by audiovisual media in improving mathematical understanding among fourth-grade students at SDN 25 Lubuklinggau. In addition, limited research has explored teacher implementation challenges in applying CTL-based audiovisual instruction in daily classroom practice.

Therefore, this study is significant as it addresses these gaps by implementing the CTL model assisted by audiovisual media through classroom action research. The findings are expected to provide practical contributions for teachers, schools, and future researchers in developing more effective and meaningful mathematics instruction. Based on this background, the research question of this study is: "Can the application of the Contextual Teaching and Learning (CTL) model assisted by audiovisual media improve the mathematics learning outcomes of fourth-grade students at SDN 25 Lubuklinggau?"

METODOLOGI

Research Design

The method used by the researcher in this study was Classroom Action Research. This research was conducted at SD Negeri 25 Lubuklinggau. The Classroom Action Research method used the spiral model proposed by C. Kemmis and Mc. Taggart, R. with a research procedure consisting of two cycles, each cycle consisting of three stages, namely planning, implementation of actions and observation, and finally reflection. The general steps of the research are illustrated in the following figure:



Gambar 1. PTK Model Spiral Oleh C. Kemmis dan Mc. Taggart

Based on the research model above, the research was conducted in two cycles. In the initial stage of cycle 1, the researcher made a plan, namely learning planning using the Contextual Teaching and Learning model and audiovisual media in mathematics learning in grade IV of SD Negeri 25 Lubuklinggau. In this stage, the researcher prepared all learning tools and learning assessment tools in the form of teacher and student observation sheets to be used for the next stage, namely the "Act & Observe" stage. The next stage was the "Act and Observe" stage. The "Act" stage is the learning action using the Contextual Teaching and Learning model assisted by audiovisual media in mathematics learning, including conducting learning evaluations. In this "Act" stage, learning was carried out in two meetings, namely the first meeting to implement learning in accordance with the existing learning implementation plan, then the second meeting to reinforce the previous learning and evaluate learning outcomes. In the "Observe" stage, the observer assesses the learning process by observing and evaluating the teacher's performance and student activities during the action process. After the "Act and Observe" stages are completed, the next stage is the "Reflect" stage. In this stage, the researcher reflects on the action activities that have been carried out to determine the level of success of both the learning process and outcomes, and uses this for improvement in cycle 2.

Stage 2 of the cycle consists of stages similar to those in cycle 1. Researchers carry out the “plan” stage, which is learning planning, followed by the “Act and Observe” stage, which is the action and observation of the performance of teachers and students. After the “Act and Observe” stage is complete, in the “Act” stage, learning is conducted in two meetings, as in cycle 1. The next stage is the “Reflect” stage, in which the researcher reflects on the actions that have been taken and then looks at improvements in learning outcomes, increases in student activity, and increases in teacher activity.

Research Preparation Stage:

In the preparation stage, researchers prepare everything needed to carry out the research, namely learning tools and data collection instruments. The learning tools consist of teaching materials in the form of Teaching Modules, Student Worksheets, and Cycle I and II Questions. The data collection instruments used are observation sheets and student learning outcome test questions. At this stage, it was determined that the class receiving the intervention would be Grade IV of SD Negeri 25 Lubuklinggau.

Implementation Stage of the Learning Process:

In this study, the learning process applied the Contextual Teaching and Learning (CTL) model, which was carried out in two cycles, with each cycle consisting of three meetings, two meetings discussing the material and one meeting conducting a daily test. The learning stages applying the CTL model began with the teacher preparing students for learning, taking attendance, and then asking questions related to the material to elicit students' prior knowledge. The teacher then connected the answers to the material to be learned. Contextual Teaching and Learning (CTL) model, the first stage, Invitation, began with the teacher preparing the students for learning, taking attendance, and then asking questions related to the material to elicit the students' prior knowledge. Then, the teacher connected the students' answers to the material to be studied after entering the exploration stage, where the teacher formed the students into 6 groups consisting of 5-6 people in each group. Each group worked on the same topic according to the material to be discussed. After the group discussion was completed, the explanation and solution stage began, where several group representatives presented the results of their discussion in front of the class and the other

students responded to the discussion results of the group that presented, while the teacher guided and facilitated the students.

Next step, the teacher gives a written test to students in the form of an essay. After the students have completed the written test, the teacher guides the students to summarize the lesson and relate the conclusions to the context of daily life, as well as guiding students to apply what they have learned in their daily lives.

Research Subject

This study was conducted at SD Negeri 25 Lubuklinggau in the 2025/2026 academic year. The subjects used in this study were fourth-grade students at SD Negeri 25 Lubuklinggau. There were 12 students consisting of seven women and five men in the class.

Data Collecting

The data collection tools used in this study were in the form of tests and non-tests. The tests were in the form of multiple choice and essay questions, and the non-tests were in the form of observation sheets on teacher performance and student activity observation sheets. Data collection using test techniques was used to assess student learning outcomes during the action learning process. The completion of student learning outcomes in each cycle must meet the research success indicators. If the success indicators are not met, improvements will be made in 223 Agus Irwandy, Application of the CTL model assisted by audiovisual media to improve integrated thematic learning outcomes in elementary schools the next cycle, until the learning outcomes meet the research success indicators. To see the success rate of this research, learning outcomes must increase and classical mastery in each subject must be ≥85%.

Student activity observation sheets were conducted to reflect on the action activities in Cycle 1 and were used for improvements in Cycle 2. The success of student activities also has criteria, namely very good, good, less good, and very less good.

Data were collected through pretest and posttest assessments conducted before and after the treatment. Additionally, observations were carried out during the learning process to support the quantitative data and provide an overview of the learning activities (Pratiwi, 2018).

Data Analysis

Data analysis of student activities based on the results of observation sheets during the learning process is useful for observing all activities carried out by students during the learning process and is calculated using the formula $NR = \frac{JS}{SM} \times 100\%$ (in Syahrilfuddin et al., 2011).

Description:

NR: Average percentage of activity (student)

JS: Total activity score achieved

S: Maximum score achievable from the activity (student)

Table 1 Intervals for Student Activity Categories

Percentage Interval	Category
81 - 100	Very Good
61 - 80	Good
51 – 60	Fair
≤ 50	Poor

(dalam Syahrifuddin dkk, 2011)

To find the student's learning outcome, it can be calculated using the following equation: $S = \frac{R}{N} = 100$ (in Ngalim Purwanto, 2006)

Explanation:

S = Score obtained

R = Total score from items or questions answered correctly

N = Maximum score for the test

The increase in learning outcomes obtained from the processed observation results was analyzed using the following percentage formula $P = \frac{Postrste-Baserate}{Basrate} \times 100\%$ (in Zainal Aqib et al., 2011)

P = Description:

P = Percentage Increase

Post rate = Average score after the intervention

Base rate = Average score before the intervention

RESEARCH RESULT

The research results indicate that the implementation of the Contextual Teaching and Learning (CTL) model supported by audiovisual media significantly enhances the mathematical understanding of fourth-grade students at SDN 25 Lubuklinggau, involving 12 students. The average posttest scores increased compared to the pretest scores, demonstrating the effectiveness of this learning model in better assisting students to comprehend mathematical material. These findings align with evidence showing that the use of the CTL model, aided by audiovisual media, can considerably improve students' ability to understand mathematical concepts.

Tabel 1. Outcomes Table

No	Siklus	Treatment	Average Value	Incomplete		Complete		Amount	
				F	Persen (%)	F	Persen (%)	F	Persen (%)
1	Siklus 1	Pre-test	45,00	6	50,00%	6	50,00%	12	Pre-test
		Post-test	65,83	6	50,00%	6	50,00%	12	Post-test
2	Siklus 2	Post-test	82,50	1	8,33%	11	91,67%	12	Post-test

Based on the data presented in the table, students' mathematics learning outcomes showed a clear and progressive improvement across the two research cycles through the implementation of the Contextual Teaching and Learning (CTL) model assisted by audio visual media. In Cycle I, the pre-test results indicated that students' initial mathematical understanding was relatively low. The average score achieved was 45.00, with only 6 out of 12 students (50.00%) reaching the completeness criterion, while the remaining 6 students (50.00%) were categorized as incomplete. These results reflect students' limited prior understanding of the material before the learning intervention was applied. After the learning activities in Cycle I, a post-test was administered to measure the immediate impact of the treatment. The results showed an increase in the average score to 65.83. However, despite this improvement in the mean score, the number of students who achieved completeness remained the same, with 6 students (50.00%) categorized as complete and 6 students

(50.00%) still incomplete. This indicates that although students' overall performance improved, the learning outcomes had not yet met the expected classical mastery criterion.

In Cycle II, further improvements were observed following revisions and refinements made based on the reflection results from Cycle I. The post-test results in Cycle II demonstrated a substantial increase in students' learning outcomes. The average score rose significantly to 82.50, indicating a strong improvement in students' mathematical understanding. In terms of learning completeness, 11 students (91.67%) achieved the completeness criterion, while only 1 student (8.33%) remained incomplete. This result exceeded the classical mastery standard and reflects the effectiveness of the CTL model assisted by audiovisual media when implemented more optimally. Overall, the data indicate that continuous improvements in instructional strategies across cycles contributed to higher student achievement, increased learning completeness, and a more effective mathematics learning process.

Based on the results of the classroom action research, it can be concluded that the application of the Contextual Teaching and Learning (CTL) model assisted by audiovisual media effectively improved the mathematics learning outcomes of fourth-grade students at SDN 25 Lubuklinggau. The data showed a consistent increase in students' average scores and learning completeness across the research cycles. In Cycle I, although there was an improvement in the average score from the pre-test to the post-test, the level of learning completeness had not yet reached the expected classical mastery criterion. After reflecting on the weaknesses in Cycle I and making improvements in learning implementation, the results in Cycle II showed a significant increase in both average scores and the percentage of students achieving completeness, exceeding the minimum classical mastery standard.

Discussion

Based on the results of a pre-experimental study conducted on 12 fourth-grade students at SD Negeri 25 Lubuklinggau, the application of the Contextual Teaching and Learning (CTL) model through audio-visual media showed a significant improvement in mathematics learning outcomes. The average post-test score reached 82.50 with a mastery rate of 91.67%, where 11 out of 12 students had met the Learning Objective Achievement Criteria (KKTP).

This finding is in line with previous studies showing that the CTL model is effective in improving students' understanding of mathematical concepts. According to Fauziyah

(2024), the CTL approach, which integrates real-world contexts into the learning process, can increase student engagement and understanding. In addition, Mahbengi (2025) emphasizes that the use of audio-visual media in the CTL model helps students understand mathematical material more deeply and meaningfully.

The increase in average scores and the high percentage of mastery indicate that the CTL model with audio-visual media creates a more active, contextual, and engaging learning environment for students. This supports student-centered learning, emphasizing active engagement and the relevance of the material to students' daily experiences.

Thus, the application of the CTL model assisted by audio-visual media can be used as an effective strategy to improve mathematics learning outcomes in elementary school students, especially in grade IV of SD Negeri 25 Lubuklinggau.

CONCLUSION

Based on the results of the classroom action research, it can be concluded that the application of the Contextual Teaching and Learning (CTL) model assisted by audiovisual media effectively improved the mathematics learning outcomes of fourth-grade students at SDN 25 Lubuklinggau. The data showed a consistent increase in students' average scores and learning completeness across the research cycles. In Cycle I, although there was an improvement in the average score from the pre-test to the post-test, the level of learning completeness had not yet reached the expected classical mastery criterion. After reflecting on the weaknesses in Cycle I and making improvements in learning implementation, the results in Cycle II showed a significant increase in both average scores and the percentage of students achieving completeness, exceeding the minimum classical mastery standard.

These findings indicate that the CTL model, when supported by audiovisual media, helps students better understand mathematical concepts by connecting learning materials to real-life contexts and presenting them in a more engaging and meaningful way. The learning process became more active, interactive, and student-centered, which positively influenced students' motivation and comprehension. Therefore, the CTL model assisted by audiovisual media can be recommended as an effective alternative instructional strategy to improve mathematics understanding and learning outcomes in elementary school settings.

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