



# The Effect of the Snowball Throwing Cooperative Learning Model Assisted by Audio-Visual Media on the Science and Social Studies (IPAS) Learning Outcomes

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## ABSTRACT

Science and Social Studies learning in elementary schools is expected to promote students' conceptual understanding, active participation, and collaborative learning. However, the learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal were still below the Minimum Learning Achievement Criteria, indicating that conventional teacher-centered instruction had not effectively engaged students. Although cooperative learning models and audio-visual media have been widely applied independently, studies investigating their combined implementation through the Snowball Throwing cooperative learning model remain limited. Therefore, this study aimed to determine the effect of the Snowball Throwing cooperative learning model assisted by audio-visual media on students' IPAS learning outcomes. This study employed a quantitative approach using a Pre-Experimental One-Group Pretest-Posttest Design. The participants consisted of 28 third-grade students selected through total sampling. Data were collected using achievement tests, questionnaires, and documentation. All research instruments were validated and tested for reliability before implementation. Data analysis included descriptive statistics, normality testing, Pearson Product Moment correlation, and the Paired Sample *t*-test using IBM SPSS Statistics Version 26. The results indicated that the mean pretest score increased from 48.46 to 78.04 on the posttest. Furthermore, the hypothesis test showed that  $|t| = 16.604$  was greater than the critical value of 2.052 with a significance level of 0.000 ( $< 0.05$ ). These findings demonstrate that the Snowball Throwing cooperative learning model assisted by audio-visual media significantly improves students' IPAS learning outcomes and provides an effective instructional strategy for enhancing academic achievement in elementary schools.

## Introduction

Education is a systematic process designed to develop learners' intellectual abilities, practical skills, attitudes, and character to enable them to participate effectively in society. In elementary education, learning should not only emphasize the acquisition of knowledge but also foster critical thinking, collaboration, communication, and problem-solving skills. These competencies are particularly important in Science and Social Studies (IPAS), which integrates scientific and social concepts to help students understand real-life phenomena

through meaningful learning experiences. Consequently, instructional practices should encourage active student participation and conceptual understanding rather than relying solely on teacher-centered instruction.

Cooperative learning has been widely recognized as an effective pedagogical approach for improving students' academic achievement and social interaction. Among various cooperative learning models, the Snowball Throwing model provides unique opportunities for students to construct knowledge through questioning, discussion, and collaborative problem-solving. Unlike conventional instruction, where students primarily receive information from the teacher, Snowball Throwing requires learners to formulate questions, exchange ideas with peers, and evaluate different responses. This process reflects the principles of constructivist learning theory, which argues that knowledge is actively constructed through social interaction and meaningful learning experiences rather than passively received (Vygotsky, 1978). Through peer questioning and collaborative reasoning, students become actively engaged in higher-order thinking processes, including analyzing, explaining, and evaluating scientific and social concepts. Such learning experiences are particularly appropriate for IPAS because many of its concepts require observation, interpretation, and application to authentic situations rather than simple memorization.

The effectiveness of Snowball Throwing becomes even greater when supported by appropriate instructional media. Audio-visual media are not merely motivational tools but also function as cognitive supports that facilitate conceptual understanding. According to Mayer's Cognitive Theory of Multimedia Learning (2009), students learn more effectively when information is presented simultaneously through visual and auditory channels because this enables them to organize, integrate, and retain knowledge more efficiently. In IPAS learning, many concepts—such as natural phenomena, environmental processes, and interactions between humans and nature—are abstract when explained verbally. Audio-visual media transform these abstract concepts into concrete representations through animations, videos, images, and sound, thereby reducing students' cognitive load and enabling deeper conceptual understanding. Consequently, students are not only more motivated but are also better able to connect new information with their existing knowledge structures.

The integration of the Snowball Throwing cooperative learning model with audio-visual media creates complementary learning processes that support meaningful learning. First, visualization through instructional videos provides students with accurate and contextual representations of scientific and social phenomena. Second, peer interaction during group discussions enables learners to exchange ideas, negotiate meaning, and clarify misconceptions through collaborative reasoning. Third, the questioning process encourages students to formulate problems, identify important concepts, and think critically about possible solutions before discussing them with classmates. Finally, collaborative reasoning enables students to justify their answers, compare different perspectives, and refine their conceptual understanding through constructive feedback. These interconnected learning processes are consistent with social constructivist theory, which emphasizes that knowledge develops through interaction, dialogue, and shared experiences.

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Previous empirical studies consistently indicate that both the Snowball Throwing learning model and audio-visual media positively influence students' learning outcomes. Ulmi (2024) reported that the Snowball Throwing model significantly improved elementary students' participation and academic performance, while Musfirah et al. (2025) found that the model enhanced collaboration, critical thinking, and learning achievement through structured group discussions. Similarly, Kartasapoetra (2022) demonstrated that audio-visual media improved students' conceptual understanding by presenting learning materials in a more concrete and engaging manner. However, most previous studies investigated either the cooperative learning model or the instructional media independently. Consequently, there remains limited empirical evidence regarding how the integration of both instructional components simultaneously facilitates learning processes and improves students' achievement in elementary Science and Social Studies (IPAS).

Preliminary observations conducted in Grade III of SD Negeri 067242 Medan Sunggal revealed that IPAS instruction remained predominantly teacher-centered, with classroom activities relying mainly on lectures. As a result, students showed limited classroom participation, experienced difficulties in understanding scientific and social concepts, and demonstrated relatively low learning achievement. Daily assessment results indicated that 11 out of 28 students (39.29%) achieved only a "fairly developed" level of performance and required additional instructional support. These findings suggest that students need learning experiences that actively involve them in constructing knowledge while providing meaningful visual representations to facilitate conceptual understanding.

Although numerous studies have demonstrated the effectiveness of the Snowball Throwing cooperative learning model and audio-visual media separately, few have investigated the integration of these two instructional strategies in elementary IPAS learning, particularly among third-grade students. This limitation represents an important research gap because combining collaborative inquiry with multimedia visualization may produce stronger learning outcomes than implementing either strategy independently. The novelty of the present study lies not only in integrating the Snowball Throwing model with audio-visual media but also in examining the learning mechanisms through which this integration promotes students' conceptual understanding, collaborative reasoning, active participation, and academic achievement.

Based on this research gap, the present study addresses the following research question: Does the Snowball Throwing cooperative learning model assisted by audio-visual media significantly affect the IPAS learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal? Accordingly, this study aims to analyze the effect of the Snowball Throwing cooperative learning model assisted by audio-visual media on students' IPAS learning outcomes during the 2025/2026 academic year. The research hypothesizes that students taught using the Snowball Throwing cooperative learning model assisted by audio-visual media will achieve significantly higher IPAS learning outcomes after the intervention than before its implementation. The findings are expected to contribute to the growing body of knowledge concerning cooperative learning and multimedia-assisted instruction while providing practical guidance for elementary school teachers in designing interactive, student-centered, and conceptually meaningful IPAS learning experiences.

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## Research Methods

### Research Design

This study employed a quantitative approach using a Pre-Experimental Design with a One-Group Pretest–Posttest Design to examine the effect of the Snowball Throwing cooperative learning model assisted by audio-visual media on students' Science and Social Studies (IPAS) learning outcomes. In this design, a single experimental group was administered a pretest ( $O_1$ ) before receiving the instructional treatment (X) and a posttest ( $O_2$ ) after the treatment to determine changes in students' learning outcomes.

**Table 1.** One-Group Pretest–Posttest Design

| Pretest | Treatment | Posttest |
|---------|-----------|----------|
| $O_1$   | X         | $O_2$    |

Note:  $O_1$  = Pretest; X = Learning using the Snowball Throwing cooperative learning model assisted by audio-visual media;  $O_2$  = Posttest.

### Research Setting

The study was conducted at SD Negeri 067242 Medan Sunggal, Indonesia, during the second semester of the 2025/2026 academic year. The research was carried out from January to July 2026, covering the preparation and validation of research instruments, implementation of the learning intervention, data collection, data analysis, and preparation of the research report.

### Participants

The population comprised all students of SD Negeri 067242 Medan Sunggal in the 2025/2026 academic year. The sample consisted of 28 third-grade students, selected using the total sampling technique, in which all students in the target class were included because of the relatively small population size.

### Research Instruments

Data were collected using three research instruments: a learning achievement test, a questionnaire, and documentation. The learning achievement test consisted of 40 multiple-choice items administered as both the pretest and posttest to measure students' IPAS learning outcomes. A Likert-scale questionnaire was employed to identify students' responses to the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media. Documentation, including school records, students' achievement data, and classroom activity photographs, was used to support the research findings.

### Data Collection Procedures

The data collection process consisted of five stages. First, students completed a pretest to determine their initial learning ability. Second, the instructional treatment was implemented using the Snowball Throwing cooperative learning model assisted by audio-visual media. Third, students completed a posttest to measure their learning outcomes after the intervention. Fourth, questionnaires were distributed to obtain students' responses to the learning process. Finally, supporting documentation was collected to complement the quantitative data.

### ***Instrument Validity and Reliability***

Before data collection, all research instruments were examined for validity and reliability. Item validity was assessed using the Pearson Product Moment correlation, while instrument reliability was evaluated using Cronbach's Alpha with the assistance of IBM SPSS Statistics Version 26. Only instruments that met the validity and reliability requirements were used in the study.

### ***Data Analysis***

The collected data were analyzed using both descriptive and inferential statistics. Descriptive statistics included the calculation of the mean, standard deviation, standard error, frequency distribution, and percentage to summarize students' learning outcomes. Inferential statistics comprised the Kolmogorov-Smirnov and Shapiro-Wilk normality tests, the Pearson Product Moment correlation to examine the relationship between the instructional model and learning outcomes, the coefficient of determination ( $R^2$ ) to determine the contribution of the instructional model, and the Paired Sample t-test to determine whether there was a statistically significant difference between students' pretest and posttest scores. The null hypothesis was rejected when the significance value was less than 0.05.

## **Findings**

### ***Pretest Results of Grade III Students***

Before the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media, a pretest was administered to the 28 third-grade students of SD Negeri 067242 Medan Sunggal to determine their initial achievement in Science and Social Studies (IPAS). The pretest consisted of 30 multiple-choice questions designed to assess students' prior knowledge before the instructional intervention.

The frequency distribution and descriptive statistics of the pretest scores are presented in Table 2.

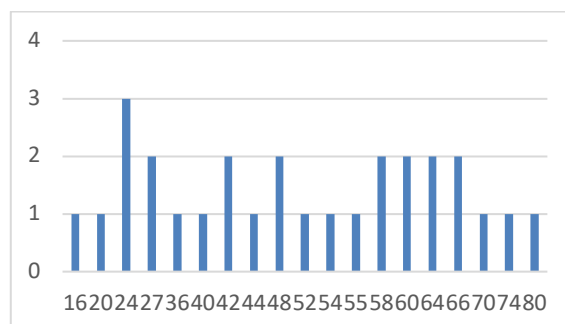
**Table 2.** Frequency Distribution of Pretest Scores

| Score (X) | Frequency (F) | FX  | $X - \bar{X}$ | $(X - \bar{X})^2$ | $F(X - \bar{X})^2$ |
|-----------|---------------|-----|---------------|-------------------|--------------------|
| 16        | 1             | 16  | -32.46        | 1,053.07          | 1,053.07           |
| 20        | 1             | 20  | -28.46        | 810.22            | 810.22             |
| 24        | 3             | 72  | -24.46        | 598.50            | 1,795.50           |
| 27        | 2             | 54  | -21.46        | 460.72            | 921.43             |
| 36        | 1             | 36  | -12.46        | 155.36            | 155.36             |
| 40        | 1             | 40  | -8.46         | 71.64             | 71.64              |
| 42        | 1             | 42  | -6.46         | 41.79             | 41.79              |
| 44        | 1             | 44  | -4.46         | 19.93             | 19.93              |
| 48        | 2             | 96  | -0.46         | 0.22              | 0.43               |
| 52        | 1             | 52  | 3.54          | 12.50             | 12.50              |
| 54        | 1             | 54  | 5.54          | 30.64             | 30.64              |
| 55        | 1             | 55  | 6.54          | 42.79             | 42.79              |
| 56        | 1             | 56  | 7.54          | 56.79             | 56.79              |
| 58        | 2             | 116 | 9.54          | 91.07             | 182.14             |
| 60        | 2             | 120 | 11.54         | 133.36            | 266.71             |
| 64        | 2             | 128 | 15.54         | 241.64            | 483.29             |

| Score (X) | Frequency (F) | FX    | $X - \bar{X}$ | $(X - \bar{X})^2$ | $F(X - \bar{X})^2$ |
|-----------|---------------|-------|---------------|-------------------|--------------------|
| 66        | 2             | 132   | 17.54         | 307.79            | 615.57             |
| 70        | 1             | 70    | 21.54         | 464.50            | 464.50             |
| 74        | 1             | 74    | 25.54         | 652.22            | 652.22             |
| 80        | 1             | 80    | 31.54         | 994.50            | 994.50             |
| Total     | 28            | 1,357 |               |                   | 8,671.02           |

The descriptive analysis revealed that the students obtained a mean pretest score of 48.46, which was substantially below the school's Minimum Learning Achievement Criterion (70). This finding indicates that the majority of students had not yet achieved the expected level of mastery in IPAS prior to the instructional intervention. Furthermore, the standard deviation of 17.92 indicates considerable variation in students' initial abilities, suggesting differences in their prior knowledge and understanding of the subject matter. The standard error of 3.39 demonstrates that the sample mean provides a reliable estimate of the population mean.

Overall, the pretest results indicate that students' initial learning achievement was relatively low, emphasizing the need for an instructional approach capable of promoting active participation, enhancing conceptual understanding, and improving learning outcomes.



**Figure 1.** Distribution of Pretest Achievement Levels

As shown in Figure 1, 20 students (71.43%) were classified in the Needs Improvement category, 5 students (17.86%) were categorized as Fairly Developed, 2 students (7.14%) were classified as Developed, and only 1 student (3.57%) achieved the Highly Developed category. The predominance of students in the lower achievement categories confirms that most participants required instructional support before the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media. These findings provide a strong rationale for applying an interactive and student-centered instructional strategy to improve students' IPAS learning outcomes.

### **Posttest Results of Grade III Students**

After completing the pretest, the students participated in the learning process using the Snowball Throwing cooperative learning model assisted by audio-visual media on the topic of Landforms. Upon completion of the instructional intervention, a posttest was administered to evaluate students' final learning achievement and determine the improvement in their Science and Social Studies (IPAS) learning outcomes. The posttest consisted of the same 30 multiple-choice items used in the pretest.

The frequency distribution of the posttest scores is presented in Table 3.

**Table 3.** Frequency Distribution of Posttest Scores

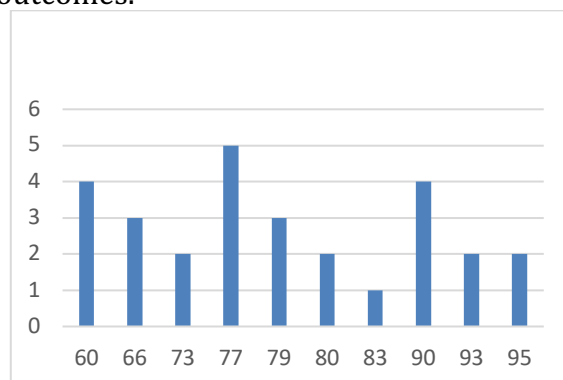
| Score (X) | Frequency (F) | FX  | $X - \bar{X}$ | $X^2$ | $FX^2$ |
|-----------|---------------|-----|---------------|-------|--------|
| 60        | 4             | 240 | -18.04        | 3,600 | 14,400 |
| 66        | 3             | 198 | -12.04        | 4,356 | 13,068 |
| 73        | 2             | 146 | -5.04         | 5,329 | 10,658 |

| Score (X) | Frequency (F) | FX    | $X - \bar{X}$ | $X^2$ | $FX^2$  |
|-----------|---------------|-------|---------------|-------|---------|
| 77        | 5             | 385   | -1.04         | 5,929 | 29,645  |
| 79        | 3             | 237   | 0.96          | 6,241 | 18,723  |
| 80        | 2             | 160   | 1.96          | 6,400 | 12,800  |
| 83        | 1             | 83    | 4.96          | 6,889 | 6,889   |
| 90        | 4             | 360   | 11.96         | 8,100 | 32,400  |
| 93        | 2             | 186   | 14.96         | 8,649 | 17,298  |
| 95        | 2             | 190   | 16.96         | 9,025 | 18,050  |
| Total     | 28            | 2,185 |               |       | 173,931 |

The descriptive statistical analysis showed that the mean posttest score was 78.04, exceeding the school's Minimum Learning Achievement Criterion (MLAC) of 70. Compared with the mean pretest score of 48.46, students' average achievement increased by 29.58 points, indicating a substantial improvement after the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media.

The standard deviation (SD = 25.38) indicates that students' posttest scores remained relatively diverse, suggesting differences in individual learning achievement despite the overall improvement. Meanwhile, the standard error (SE = 4.80) demonstrates that the sample mean provides a reliable estimate of the students' final learning performance.

Overall, the posttest findings indicate that the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media positively improved students' IPAS learning outcomes.



**Figure 2.** illustrates the distribution of students' posttest scores.

Based on the posttest results, the highest score achieved was 95, while the lowest score was 60. A total of 22 students (78.57%) scored at or above the Minimum Learning Achievement Criterion, whereas 6 students (21.43%) scored below the criterion. Compared with the pretest results, the number of students achieving learning mastery increased considerably. These findings indicate that the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media effectively enhanced students' understanding of IPAS concepts, promoted active participation during the learning process, and provided a more engaging and meaningful learning experience.

#### Questionnaire Results of Grade III Students

After completing all learning activities, the researcher administered a questionnaire to the 28 third-grade students of SD Negeri 067242 Medan Sunggal. The questionnaire was designed to examine students' responses to the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media during Science and Social Studies (IPAS) instruction. It was distributed after the students had completed both the learning activities and the posttest, ensuring that their responses reflected their overall learning experiences following the instructional intervention.

The frequency distribution of the questionnaire scores is presented in Table 4.

**Table 4.** Frequency Distribution of Questionnaire Scores

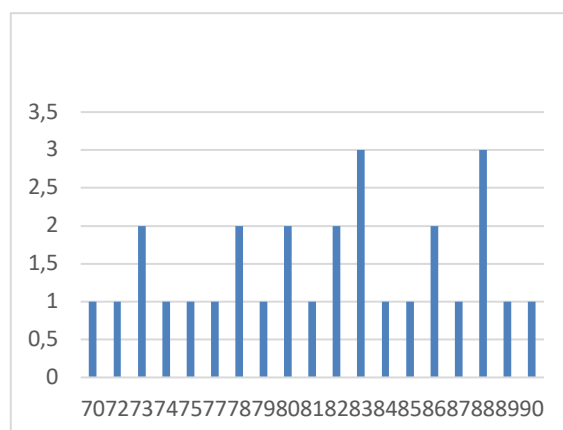
| Score (X) | Frequency (F) | FX    | $X - \bar{X}$ | $(X - \bar{X})^2$ | $F(X - \bar{X})^2$ |
|-----------|---------------|-------|---------------|-------------------|--------------------|
| 66        | 1             | 66    | -18.64        | 347.45            | 347.45             |
| 72        | 1             | 72    | -12.64        | 159.77            | 159.77             |
| 75        | 2             | 150   | -9.64         | 92.93             | 185.86             |
| 78        | 1             | 78    | -6.64         | 44.09             | 44.09              |
| 79        | 3             | 237   | -5.64         | 31.81             | 95.43              |
| 80        | 1             | 80    | -4.64         | 21.53             | 21.53              |
| 84        | 1             | 84    | -0.64         | 0.41              | 0.41               |
| 85        | 4             | 340   | 0.36          | 0.13              | 0.51               |
| 87        | 1             | 87    | 2.36          | 5.57              | 5.57               |
| 88        | 4             | 352   | 3.36          | 11.29             | 45.14              |
| 89        | 2             | 178   | 4.36          | 19.01             | 38.02              |
| 90        | 1             | 90    | 5.36          | 28.73             | 28.73              |
| 93        | 3             | 279   | 8.36          | 69.89             | 209.67             |
| 94        | 1             | 94    | 9.36          | 87.61             | 87.61              |
| 95        | 1             | 95    | 10.36         | 107.33            | 107.33             |
| 96        | 1             | 96    | 11.36         | 129.05            | 129.05             |
| Total     | 28            | 2,378 |               | 1,156.60          | 1,506.17           |

The descriptive statistical analysis of the questionnaire responses yielded a mean score of 84.93, indicating that students' perceptions of the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media were in the good category. This finding suggests that most students responded positively to the instructional approach used during the learning process.

The standard deviation ( $SD = 7.47$ ) indicates relatively low variability in students' responses, suggesting that their perceptions of the instructional model were generally consistent. Furthermore, the standard error ( $SE = 1.41$ ) indicates that the sample mean provides a reliable estimate of the overall responses of the participants.

Overall, the questionnaire results demonstrate that students positively perceived the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media. The instructional model created a more active, engaging, and interactive learning environment that encouraged greater student participation throughout the learning process. In addition, the use of audio-visual media helped students understand IPAS concepts more concretely, while the Snowball Throwing activities promoted questioning, discussion, collaboration, and confidence in expressing ideas. These findings suggest that the instructional model is an appropriate alternative for improving student engagement and participation in elementary school IPAS learning.





**Figure 3.** Histogram of the Questionnaire Score Distribution

As illustrated in Figure 3, most questionnaire scores were concentrated within the 85–93 score range. This distribution indicates that the majority of students expressed favorable perceptions of the Snowball Throwing cooperative learning model assisted by audio-visual media. The concentration of scores in the higher range further suggests that the instructional model was well accepted by the students and successfully created an active, engaging, and motivating learning environment.

### **Prerequisite Analysis**

#### **Normality Test**

A normality test was conducted to determine whether the research data met the assumption of normal distribution prior to performing parametric statistical analyses. The Kolmogorov–Smirnov and Shapiro–Wilk tests were performed using IBM SPSS Statistics Version 26. Since the sample size was fewer than 50 participants ( $N = 28$ ), the Shapiro–Wilk test was used as the primary basis for determining data normality.

The results of the normality test are presented in Table 5.

**Table 5.** Results of the Normality Test

| Variable          | Kolmogorov–Smirnov Sig. | Shapiro–Wilk Sig. | Interpretation |
|-------------------|-------------------------|-------------------|----------------|
| Learning Outcomes | 0.156                   | 0.142             | Normal         |
| Questionnaire     | 0.200                   | 0.439             | Normal         |

As shown in Table 5, the Shapiro–Wilk significance value for the learning outcomes variable was 0.142, while the questionnaire variable obtained a significance value of 0.439. Both values exceeded the significance level of 0.05, indicating that the data were normally distributed. Therefore, the assumption of normality was satisfied, allowing the data to be further analyzed using parametric statistical procedures, including the Pearson Product Moment correlation and the Paired Sample  $t$ -test.

#### **Pearson Product Moment Correlation**

The Pearson Product Moment correlation analysis was performed to determine the relationship between the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media and students' IPAS learning outcomes.

The correlation analysis is presented in Table 6.

**Table 6.** Results of the Pearson Product Moment Correlation Test

| Variables                                   | Pearson Correlation ( $r$ ) | Sig. (2-tailed) | N  |
|---------------------------------------------|-----------------------------|-----------------|----|
| Snowball Throwing Model – Learning Outcomes | 0.824                       | 0.000           | 28 |

The analysis yielded a Pearson correlation coefficient ( $r$ ) of 0.824 with a significance value of 0.000, indicating a statistically significant relationship between the instructional model and students' learning outcomes ( $p < 0.05$ ). Based on Sugiyono's (2016) classification, a correlation coefficient ranging from 0.80 to 1.00 is categorized as very strong, suggesting

that the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media was strongly and positively associated with improvements in students' learning outcomes.

**Table 7.** Interpretation of the Correlation Coefficient

| Correlation Coefficient | Interpretation |
|-------------------------|----------------|
| 0.00–0.199              | Very Low       |
| 0.20–0.399              | Low            |
| 0.40–0.599              | Moderate       |
| 0.60–0.799              | Strong         |
| 0.80–1.000              | Very Strong    |

Based on this classification, the obtained correlation coefficient ( $r = 0.824$ ) falls within the very strong category, indicating a substantial positive relationship between the instructional model and students' IPAS learning outcomes.

### **Hypothesis Testing**

Following confirmation that the data were normally distributed, the research hypothesis was tested using the Paired Sample *t*-test to determine whether the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media significantly affected the IPAS learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal.

The hypotheses were formulated as follows:

- $H_0$ : The Snowball Throwing cooperative learning model assisted by audio-visual media has no significant effect on students' IPAS learning outcomes.
- $H_1$ : The Snowball Throwing cooperative learning model assisted by audio-visual media has a significant effect on students' IPAS learning outcomes.

The results of the Paired Sample *t*-test are presented in Table 8.

**Table 8.** Results of the Paired Sample *t*-Test

| Paired Differences | Mean      | Std. Deviation | Std. Error Mean | <i>t</i> | df | Sig. (2-tailed) |
|--------------------|-----------|----------------|-----------------|----------|----|-----------------|
| Pretest – Posttest | -30.53571 | 9.73151        | 1.83908         | -16.604  | 27 | 0.000           |

As shown in Table 8, the paired sample *t*-test produced a *t*-value of -16.604 with a significance value of 0.000. The negative sign indicates that the posttest mean was higher than the pretest mean, reflecting an improvement in students' learning outcomes after the instructional intervention. For hypothesis testing, the absolute value of the test statistic ( $|t| = 16.604$ ) was compared with the critical value ( $t = 2.052$ ,  $df = 27$ ,  $\alpha = 0.05$ ). Since  $|t| > t_{\text{table}}$  and  $p < 0.05$ , the null hypothesis ( $H_0$ ) was rejected and the alternative hypothesis ( $H_1$ ) was accepted.

These findings demonstrate that the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media had a positive and statistically significant effect on the IPAS learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal. The significant difference between the pretest and posttest scores confirms that the instructional model effectively improved students' academic achievement. Therefore, this learning model can be considered an effective alternative instructional strategy for enhancing Science and Social Studies learning outcomes in elementary schools.

### **Discussion**

This study was conducted at SD Negeri 067242 Medan Sunggal and involved 28 third-grade students as the research participants. The purpose of the study was to examine the effect of the Snowball Throwing cooperative learning model assisted by audio-visual media on students' Science and Social Studies (IPAS) learning outcomes. The research data were

collected using a learning achievement test and a student response questionnaire. Prior to implementation, all research instruments were subjected to validity and reliability testing to ensure their suitability for data collection.

The validity analysis indicated that 30 out of 40 multiple-choice test items were valid, while 10 items were excluded. Similarly, 30 out of 40 questionnaire statements met the validity criteria and were retained for data collection. Reliability testing using Cronbach's Alpha produced coefficients of 0.866 for the achievement test and 0.934 for the questionnaire, indicating very high reliability. These findings confirm that the research instruments were both valid and reliable, supporting Sugiyono's (2023) assertion that research instruments must accurately measure the intended constructs and produce consistent results. Consequently, the data obtained in this study can be considered reliable for drawing research conclusions.

The descriptive analysis revealed that the mean pretest score was 48.46, which was below the school's Minimum Learning Achievement Criterion (70). This result indicates that students' initial understanding of the IPAS material was relatively low before the instructional intervention. The low pretest performance suggests that conventional teacher-centered instruction had not adequately facilitated students' conceptual understanding.

Following the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media, the mean posttest score increased to 78.04, exceeding the minimum learning criterion. In addition to the increase in the average score, the proportion of students achieving learning mastery also improved substantially. These findings demonstrate that the instructional intervention contributed positively to students' academic achievement.

The improvement in learning outcomes is consistent with Slavin's (2015) theory of cooperative learning, which emphasizes that learning in small collaborative groups enables students to support one another in understanding instructional materials. Through discussion, peer interaction, and collaborative problem-solving, students actively construct knowledge rather than relying solely on teacher explanations. Therefore, the significant increase in posttest scores indicates that the cooperative learning environment effectively enhanced students' conceptual understanding of IPAS.

Furthermore, Ulmi (2024) reported that the Snowball Throwing learning model increases student engagement by encouraging learners to ask and answer questions through interactive "snowball" activities. Such activities create an enjoyable learning atmosphere that enhances students' motivation and participation. The present findings support this view, suggesting that combining the Snowball Throwing model with audio-visual media provides an effective instructional strategy for improving learning outcomes.

The questionnaire results further support these findings. The mean questionnaire score of 84.93 indicates that students responded positively to the implementation of the instructional model. During classroom observations, students actively participated in asking questions, expressing opinions, discussing ideas, and collaborating within their groups. These behaviors demonstrate that the instructional model successfully promoted active learning and student engagement.

The positive student responses may also be explained by the integration of audio-visual media, which helped transform abstract IPAS concepts into more concrete and meaningful learning experiences through images, animations, and instructional videos. This finding supports Kartasapoetra (2022), who argued that audio-visual media effectively combines visual and auditory stimuli to improve students' attention, motivation, and conceptual understanding. The simultaneous use of visual and auditory channels enables

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students to process information more effectively and creates a more engaging learning environment.

These findings are also consistent with Piaget's constructivist theory, which proposes that knowledge is actively constructed through meaningful learning experiences. In the Snowball Throwing learning model, students actively build their understanding by asking questions, exchanging ideas, discussing concepts, and solving problems collaboratively. Consequently, the positive responses obtained in this study indicate that the instructional model successfully created a student-centered learning environment that fostered active participation and meaningful learning experiences.

The inferential statistical analysis further strengthens these findings. The Paired Sample *t*-test produced a *t*-value of 16.604 with a significance value of 0.000 ( $p < 0.05$ ), indicating a statistically significant difference between students' pretest and posttest scores. Therefore, the null hypothesis was rejected, confirming that the implementation of the Snowball Throwing cooperative learning model assisted by audio-visual media had a significant positive effect on students' IPAS learning outcomes.

Similarly, the Pearson correlation coefficient ( $r = 0.824$ ) indicates a very strong positive relationship between the implementation of the instructional model and students' learning outcomes. According to Sugiyono (2023), a significance value below 0.05 indicates that the independent variable has a statistically significant effect on the dependent variable. Therefore, the present findings provide empirical evidence that the instructional model substantially contributed to improving students' academic achievement.

The results of this study also corroborate Slavin's (2015) cooperative learning theory, which suggests that collaborative learning enhances academic achievement because group members share responsibility for one another's success. Through peer interaction, students develop higher-order thinking skills, communication skills, collaboration, and problem-solving abilities. In addition, the present findings are consistent with the study conducted by Musfirah et al. (2025), which reported that the Snowball Throwing learning model effectively improves students' learning motivation, classroom participation, and academic performance. The consistency between the current findings and previous research reinforces the effectiveness of the Snowball Throwing model for elementary school instruction.

From a practical perspective, this study provides important implications for classroom instruction. The integration of the Snowball Throwing cooperative learning model with audio-visual media not only improves students' academic achievement but also enhances collaboration, communication, confidence in expressing ideas, questioning skills, and learning motivation. Audio-visual media facilitate students' understanding of abstract IPAS concepts, while the Snowball Throwing activities create an interactive, enjoyable, and student-centered learning environment.

Overall, the findings demonstrate that the Snowball Throwing cooperative learning model assisted by audio-visual media has a positive and statistically significant effect on the Science and Social Studies (IPAS) learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal. These findings strengthen the theoretical foundations of cooperative learning by confirming that active student participation, collaborative interaction, and meaningful learning experiences contribute significantly to improving conceptual understanding, social skills, and academic achievement. Furthermore, this study extends previous research by demonstrating that integrating the Snowball Throwing model with audio-visual media provides an effective instructional approach for enhancing IPAS learning outcomes in elementary school settings.

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## Conclusion

This study investigated the effect of the Snowball Throwing cooperative learning model assisted by audio-visual media on the Science and Social Studies (IPAS) learning outcomes of third-grade students at SD Negeri 067242 Medan Sunggal during the 2025/2026 academic year. The findings indicate that the instructional model was successfully implemented and received positive responses from students, as reflected in the questionnaire mean score of 84.93, which falls within the good category. Throughout the learning process, students demonstrated high levels of enthusiasm, actively participated in questioning and discussion activities, collaborated effectively within groups, and engaged optimally with the support of audio-visual media.

The implementation of the instructional model also resulted in a substantial improvement in students' learning outcomes. The mean score increased from 48.46 on the pretest to 78.04 on the posttest, indicating that most students achieved the school's Minimum Learning Achievement Criterion (MLAC). These findings demonstrate that the integration of the Snowball Throwing cooperative learning model with audio-visual media effectively enhanced students' understanding of the Landforms topic in IPAS.

Furthermore, the hypothesis testing confirmed that the instructional model had a positive and statistically significant effect on students' learning outcomes. The Paired Sample *t*-test produced a calculated value of  $|t| = 16.604$ , which exceeded the critical value of 2.052, with a significance level of 0.000 ( $p < 0.05$ ). Therefore, the alternative hypothesis was accepted, confirming that the Snowball Throwing cooperative learning model assisted by audio-visual media significantly improved the IPAS learning outcomes of third-grade students.

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