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STAD Learning Model and Learning Styles: Learning Outcomes of Fifth-Grade Students at Primary School

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ABSTRACT

Use of less diverse learning models and neglect of students' learning styles can lead to inferior social studies learning outcomes in elementary school children and a lack of classroom participation. This study examines how the Student Teams Achievement Division (STAD) learning model and learning styles affect fifth-grade social studies learning results in Primary School 2 Latihan Ambon. This experiment used a 2x3 factorial analysis and a posttest-only control group. All Primary School 2 Latihan Ambon pupils were studied, with 42 students divided into an experimental class (22 students) using the STAD model and a control class (20 students) using the TGT model, which stands for Teams Games Tournament, another cooperative learning model. A validated learning style questionnaire and learning outcome test were employed. Data was evaluated with a two-way ANOVA. The research findings showed that: (1) The STAD learning model had a significant effect on student learning outcomes (Sig. 0.000 < 0.05), with the average score of the experimental class (81.667) higher than the control class (63.267). (2) Learning styles have a significant influence on learning outcomes (Sig. 0.000 < 0.05), where students with visual learning styles achieved the highest score (84.400), followed by kinesthetic (69.800) and auditory (63.200). (3) There is a significant interaction between learning models and learning styles on student learning outcomes (Sig. 0.002 < 0.05). This study helps educators map student learning styles before choosing a model. These findings also support the STAD cooperative model's ability to boost primary school social studies material achievement.

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1. INTRODUCTION

Education is a planned effort to develop students' potential through an effective learning process, which, according to Novianti et al. (2020), involves interactions between educators and learning resources to produce positive behavioral changes. Within this context, social studies (IPS) education is a strategic instrument in elementary schools to shape democratic and responsible citizens (Ali et al., 2025; Okpomoh et al., 2025). In line with Hidayat's (2020) perspective, IPS integrates

various branches of social sciences to develop students' competencies in understanding societal dynamics. Therefore, quality learning not only meets comprehensive learning needs but also hones critical thinking skills, social skills, and environmental awareness.

The implementation of social studies in schools currently faces various significant challenges. Zahro et al. (2018) revealed that many students exhibit passivity, lack motivation, and have difficulty understanding abstract material due to monotonous learning approaches dominated by lecture methods. This is reinforced by Mujazi's (2020) opinion, which states that the use of methods that are not varied triggers boredom and low participation, which ultimately has a negative impact on student learning outcomes. A similar condition was found through initial observations at Primary School 2 Latihan, Ambon, especially in grade V, where the use of conventional methods has not been able to accommodate student learning needs, resulting in many not achieving the minimum completion criteria. Therefore, innovation in learning models is needed to overcome these obstacles while improving the quality of the process and overall student learning outcomes.

The Student Teams Achievement Division (STAD) cooperative learning model presents an alternative solution that emphasizes interaction between students to motivate each other to master the subject matter. According to Jesmita (2019), STAD focuses on teamwork and healthy competition between groups to achieve maximum achievement. The effectiveness of this model is also confirmed by Marheni et al. (2020), who stated that STAD has a significant impact on social attitudes and learning outcomes because it involves the formation of heterogeneous groups. Technically, the teacher delivers the material before students work in teams to ensure shared mastery, which then concludes with an individual quiz to encourage personal responsibility without the assistance of teammates (Arifin, 2022; Upa et al., 2025).

The implementation of the STAD model has been empirically proven to improve conceptual understanding and active participation of students at the elementary school level. Research by Anisensia et al. (2020) demonstrated significant improvements in learning outcomes thanks to the model's characteristics of emphasizing teamwork and positive interdependence. These findings are supported by Hazmiwati (2018), who also confirmed that the consistent implementation of STAD has a positive impact on student academic achievement. The success of this model is rooted in its ability to transform the classroom atmosphere into a more dynamic and inclusive one for all group members.

Furthermore, learning success is also greatly influenced by everyone's learning style in absorbing and processing information. Setiawan and Alimah (2019) emphasize the importance of educators understanding these learning styles to design effective strategies, which, according to Rambe and Yami (2019), are divided into visual, auditory, and kinesthetic types. Optimizing material absorption occurs when there is a match between the learning model used and the characteristics of the students' learning styles. As Azis et al. (2020) add, students who learn using methods that align with

their learning style preferences tend to demonstrate significantly better learning outcomes than those who use methods that are incompatible.

The interaction between learning models and students' learning styles is a crucial factor in improving learning outcomes, as emphasized by Lisnawati et al. (2022), who stated that the effectiveness of a model depends heavily on its suitability to individual learning preferences. Research by Sudana and Wesnawa (2017) shows that the STAD cooperative learning model is effective in accommodating various learning style characteristics, where visual learners tend to be optimally engaged with graphic media, while kinesthetic learners require direct physical activity. Kusumawardani et al. (2018) also emphasized that a deep understanding of the interaction between learning models and student characteristics significantly assists teachers in designing more meaningful and effective instructional processes in the classroom.

Based on this urgency, this study was conducted to provide an empirical overview of the effectiveness of the STAD model, considering the diversity of learning styles in the context of social studies learning in elementary schools. Specifically, this study aims to: (1) analyze the influence of the STAD model on the social studies learning outcomes of fifth-grade students at Primary School 2 Latihan Ambon; (2) identify the influence of learning styles on these learning outcomes; and (3) determine the interaction between the STAD model and learning styles on student learning outcomes. The results of this study are expected to provide theoretical contributions to the development of adaptive learning models as well as practical contributions for teachers in implementing more comprehensive social studies learning strategies.

2. METHOD

This study employed a quantitative approach with an experimental approach to test the predetermined variables. The research design used was a posttest only control group design integrated into a 2x3 factorial ANOVA analysis framework. This design allowed researchers to systematically observe the final results of the treatment given to the research subject groups. The structure of this study involved two independent variables: the learning model consisting of the STAD and TGT types, and learning styles encompassing visual, auditory, and kinesthetic categories. Meanwhile, the dependent variable, the focus of measurement in this study, was students' Social Studies (IPS) learning outcomes. The use of factorial analysis allowed researchers to examine not only the independent effects of each variable but also the interactions between them.

The study population included all students at Primary School 2 Latihan Ambon, with random sampling. Based on this procedure, two classes were selected as research subjects: Class V1 as the experimental class, consisting of 22 students using the STAD model, and Class V2 as the control class, consisting of 20 students using the TGT model. Thus, the total sample involved in this study was 42 students.

The data collection instruments in this study consisted of systematically designed non-test and test instruments. The non-test instrument was a learning style questionnaire containing 30 multiple-choice questions to identify students' learning

style tendencies, including visual, auditory, and kinesthetic. Meanwhile, the test instrument consisted of 25 multiple-choice questions to objectively measure student learning outcomes.

To ensure data quality, all instruments underwent statistical testing before being used in the study. Instrument validity was tested using the Pearson Product Moment correlation test, while internal consistency, or reliability, was measured using the Cronbach's Alpha test. This step ensured that the measurement tools used had adequate accuracy and reliability in collecting data from respondents.

The research procedure was carried out in four main stages: beginning with the administration of a prior knowledge test and a learning style questionnaire, followed by the implementation of the STAD model in the experimental class and the TGT model in the control class, and concluding with the administration of a posttest. Data analysis was carried out through prerequisite tests including the Chi-Square normality test and Levene's homogeneity test, which was then continued with hypothesis testing using Two-Way ANOVA assisted by SPSS 25.0 for Windows software.

3. RESULTS AND DISCUSSION
Results

Description of Research Results

The research data collected through observation techniques was then processed as the primary material for the research data analysis. Since the data for variables X and Y were still in the form of raw scores, they were converted into standard scores or numbers to meet statistical testing requirements. The detailed results of the research data analysis are presented below.

Validity Test

Validity test results using the Pearson Product Moment technique with 2-tailed significance were conducted on a research instrument consisting of 25 test items. This analysis focused on obtaining correlation values between individual test item scores and the total score, which were then systematically compared with the r_{table} value at a predetermined significance level. This procedure is crucial to ensure that each instrument measures the research parameters with high accuracy.

The correlation coefficient ($r_{calculated}$) obtained from each test item serves as the primary indicator in determining the validity status of the instrument. A test item is considered valid if the resulting correlation value is greater than the r_{table} value, thus allowing it to be used reliably in the process of collecting learning outcome data. The following are the details of the validity test results for each test item, presented in the form of measurement data:

Table 1. Correlation Analysis and r Values

No	Correlation Value	r-table Value	Description
1	0.599	0.400-0.599	Moderate
2	0.464	0.000-1.999	Very Low
3	0.552	0.400-0.599	Moderate

No	Correlation Value	r-table Value	Description
4	0.464	0.000-1.999	Very Low
5	0.630	0.400-0.599	Moderate
6	0.386	0.400-0.599	Low
7	0.476	0.400-0.599	Moderate
8	0.476	0.000-1.999	Very Low
9	0.840	0.800-1.000	Very Strong
10	0.921	0.800-1.000	Very Strong
11	0.406	0.000-1.999	Very Low
12	0.339	0.200-0.399	Low
13	0.898	0.800-1.000	Very Strong
14	0.620	0.600-0.799	High
15	0.921	0.800-1.000	Very Strong
16	0.921	0.000-1.999	Very Low
17	0.630	0.600-0.799	High
18	0.825	0.000-1.999	Very Low
19	0.825	0.800-1.000	Very Strong
20	0.921	0.000-1.999	Very Low
21	0.898	0.800-1.000	Very Strong
22	0.921	0.800-1.000	Very Strong
23	0.700	0.600-0.799	High
24	0.816	0.800-1.000	Very Strong
25	0.570	0.400-0.599	Moderate

The data results in Table 1 show that the validity level for each instrument score is distributed into very high, high, medium, and low categories. The results of statistical analysis using SPSS software on 25 posttest questions show that there are 15 questions that are declared valid with the very strong, high, and medium categories, while the other 10 questions are declared invalid because they are in the low and very low categories. Thus, the instrument used to measure learning outcomes in this study is the 15 questions whose validity has been tested.

Reliability Test

The reliability test in this study was conducted using Cronbach's Alpha technique with the help of SPSS software to measure the internal consistency of the instrument items. Determination of the reliability of each item or variable constituent factor is based on the analysis of the resulting coefficient values, where the instrument is declared reliable if it has a correlation value or Cronbach's Alpha coefficient greater than or equal to 0.40. Through this threshold, the instrument used can be ensured to have sufficient stability to capture research data consistently.

Table 2. Reliability Test Results

Cronbach's Alpha	N of Items	Coefficient r Interval	Category
.647	25	$0.40 < r_{11} \leq 0.70$	Reliability: Moderate

Table 2 above, 25 test items were used for the reliability test. The results of the reliability analysis of the test items showed that the Cronbach's Alpha value was .647. To determine whether the test items were declared reliable or not, the Cronbach's Alpha value was compared with the coefficient interval value. From the comparison between the Cronbach's Alpha value and the coefficient r interval value, it can be stated that the posttest items fall into the reliability category with a moderate level.

Prerequisite Analysis Tests

Normality Test

The normality test was conducted to determine whether the research data was normally distributed or not using the Chi-Square method, where the decision-making criteria were based on a significant value that must be greater than 5% (0.05). The results of the analysis using SPSS 25.0 software showed that the Asymp. Sig. (2-tailed) value for both the experimental and control classes was 1,000, which means both exceeded the 0.05 threshold. Based on these test criteria, it can be concluded that the data distribution from both sample groups came from a normally distributed population, so the data met the requirements and was suitable for use in further research analysis.

Homogeneity Test

The homogeneity test was conducted to ensure equality of variance between research groups using the Levene test, where the data analyzed were sourced from students' pretest scores. Based on the testing criteria, the data were declared homogeneous if the significance value (P) was greater than 0.05. The results of the analysis assisted by SPSS 25.0 software showed a significant value of 0.672, which means $P = 0.672 > 0.05$, so it can be concluded that the variance in the experimental group and the control group was the same or homogeneous. By fulfilling this homogeneity prerequisite, the data analysis can proceed to the hypothesis testing stage using the two-way ANOVA technique.

Hypothesis Testing

This section presents the results of hypothesis testing compiled based on tabulation of respondent test result data, which were then analyzed statistically using the Two-Way Analysis of Variance (ANOVA) technique. This test was conducted to evaluate the influence of factor levels on variable A (learning model) and variable B (learning style), as well as to identify any interactions between the two variables on learning outcomes. The decision-making criteria were based on the significance value generated by the SPSS program with a significance level (alpha) of 0.05; where H_0 is accepted if the significance value is > 0.05 and H_0 is rejected if the significance

value is < 0.05 . The details of the results of the two-way analysis of variance are presented comprehensively in Table 3 below.

Table 3. Two-Way Analysis of Variance

Source of Variance	F-ratio	Sig.
Learning Model	63.746	.000
Learning Style	29.546	.000
Interaction of Learning Model and Learning Style	3.444	.002

Hypothesis testing analysis was conducted using posttest scores from the experimental and control classes to test the effect of the learning model variable (Variable A). Statistically, the null hypothesis (H_0) states that there is no effect of the learning model, while the alternative hypothesis (H_1) states the opposite. Based on the results of the two-way ANOVA calculation assisted by SPSS, significance value of 0.000 was obtained, which means it is much smaller than the specified significance level ($\alpha = 0.05$). In accordance with the testing criteria where H_0 is rejected and H_1 is accepted if the Sig. value < 0.05 , it can be concluded that there is a significant influence of the use of learning models on student learning outcomes.

Description of Learning Model Results

The presentation of the results of the implementation of this learning model focuses on the comparison of the average (mean) values between the experimental class that implemented the TGT learning model and the control class that used the STAD learning model. All test results were recorded and calculated systematically based on each model implemented to determine the significance of the differences in the effectiveness of both in improving student learning outcomes. Based on the results of data analysis using SPSS for Windows 25.0 software, the details of the comparison of the achievements of the two learning models are further described in Table 4 below.

Table 4. Analysis of Learning Model Implementation

Learning Model	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
TGT	81.667	1.630	78.303	85.030
STAD	63.267	1.630	59.903	66.630

The analysis results in Table 4 show a significant difference in achievement between the two learning models tested, where the TGT model recorded an average value (mean score) of 81.667, while the conventional model obtained an average value of 63.267. The comparison of these average scores empirically shows that there is a real difference in effectiveness between the application of the TGT learning model and the STAD learning model in influencing student learning outcomes.

The analysis of the influence of learning styles on student learning outcomes was conducted by testing statistical hypotheses through a comparison of significance values at the α level = 0.05. Based on the calculation results using SPSS, a

significance value of 0.000 was obtained, which is statistically smaller than the threshold of 0.05 ($P = 0.000 < 0.05$). In accordance with the testing criteria, these results establish the rejection of H_0 and acceptance of H_1 , so it can be concluded that learning styles have a significant influence on improving student learning outcomes. The results of this descriptive analysis confirm that paying attention to the diversity of learning styles in the instructional process makes a real contribution to more optimal academic achievement.

Description of Learning Style Results

This description of student learning style results discusses the mean score averages from each learning style, namely auditory learning style, visual learning style, and kinesthetic learning style. The test results will be recorded and calculated based on each applied learning style. The analysis results from the three learning styles will determine whether there is a difference in learning styles as well as to support the acceptance of hypothesis 2 above. Based on the analysis results using SPSS for Windows 25.0, it can be further elaborated in the following Table 5.

Table 5. Learning Style Analysis

Learning Style	Mean
Auditory	63.200
Visual	84.400
Kinesthetic	69.800

The data in Table 5 shows a significant difference in learning outcomes between the three learning styles, with a mean score of 63.200 for auditory learning styles, 84.400 for visual learning styles, and 69.800 for kinesthetic learning styles. This significant difference in scores empirically supports the acceptance of the alternative hypothesis (H_1) in the second test, which confirms that students' diverse learning preferences contribute differently to their learning outcomes.

Furthermore, the interaction analysis between learning models and learning styles showed significant results based on statistical testing using SPSS. By setting the significance level at $\alpha = 0.05$, the obtained Sig. value was 0.000. Therefore, it was decided to reject H_0 and accept H_1 because the P value = $0.000 < 0.05$. These findings convincingly prove that there is a significant interaction effect between the use of learning models (especially TGT) and students' learning styles on improving learning outcomes, which indicates that the effectiveness of a particular learning model is highly dependent on its suitability to the characteristics of students' learning styles.

Description of Interaction Results between Learning Model and Learning Style

The test results will be recorded and calculated based on each applied learning model and learning style. The analysis results from the interaction between learning model and learning style will determine whether there is a difference in the interaction between the TGT cooperative learning model and learning style as well as to support

the acceptance of hypothesis 3 above. Based on the analysis results using SPSS for Windows 25.0, it can be further elaborated in the following Table 6.

Table 6. Analysis Results of Learning Model × Learning Style

Learning Model	Learning Style	Mean
TGT	Auditory	72.600
	Visual	89.800
	Kinesthetic	82.600
STAD	Auditory	53.800
	Visual	79.000
	Kinesthetic	57.000

The data in Table 6 shows that the distribution of average learning outcomes in the control class implementing the Student Teams Achievement Division (STAD) model shows significant variation according to student learning style. Students with a visual learning style scored the highest at 79.000, followed by students with a kinesthetic learning style at 57.000, and those with an auditory learning style at 53.800. These data indicate that even with the STAD model implemented, differences in information absorption characteristics still impact student academic achievement.

In the experimental class implementing the Jigsaw learning model (a development of TGT in this context), a similar trend was found, but with significantly higher scores across all categories. Students with a visual learning style demonstrated exceptional performance with an average score of 89.800, followed by students with a kinesthetic learning style at 82.600, and those with an auditory learning style at 72.600. These results confirm that the more active cooperative learning model can optimally enhance the potential of students in each learning style compared to the control class.

A comparative analysis between the two classes showed that the average scores of students in the experimental class (both visual, auditory, and kinesthetic) consistently exceeded the average scores of students in the control class. This significant margin of difference provides a strong empirical basis for accepting the alternative hypothesis (H_1) in the third test. Thus, it can be concluded that there is a significant interaction effect between learning models and learning styles in influencing student learning outcomes, where certain learning models are proven to be more effective in accommodating the diversity of learning styles in the classroom.

Discussion

Effect of Learning Model on Learning Outcomes

The results of this study indicate that the cooperative learning model has a significant impact on student learning outcomes, a finding consistent with a study by Aningsih et al. (2023), which recorded an 18% increase in success rates and a 9-point increase in average scores through the implementation of STAD. This effectiveness is further supported by research by Evianti et al. (2023), which demonstrated that the use of the STAD model, aided by audiovisual media, can optimally improve thematic

learning outcomes in fifth-grade elementary school students. Theoretically, this success is rooted in the principle of constructivism, where students construct knowledge through social interaction. As demonstrated by Ghufon et al. (2023), STAD-based learning tools can enhance students' critical thinking skills.

The superiority of the STAD model in improving cognitive abilities is also supported by the use of interactive media, as found by Riny and Safrul (2022). According to Yurisma et al. (2022), this model is highly effective because it encourages active participation in group discussions and hones collaborative critical thinking skills. In addition, Asmedy (2021) added that the success of the STAD model cannot be separated from the group rewards system which is able to motivate students to work together intensively to achieve common learning goals.

13 Effect of Learning Style on Learning Outcomes

The results of this study confirm that learning styles have a significant influence on student learning outcomes, with the visual learner group recording the highest average score (84.400), followed by the kinesthetic learner group (69.800) and the auditory learner group (63.200). This finding aligns with a study by Muslim et al. (2022), which also found a dominant learning outcome among students with a visual learning style compared to other learning styles, with a strong significance level. This indicates that visual representations contribute significantly to material comprehension, which, according to Aswanto et al. (2024), is due to the ability of visual learners to integrate information through tables, graphs, and illustrations frequently used in the instructional process.

The importance of synchronizing teaching strategies with student learning preferences is also emphasized by Supit et al. (2023), who stated that such alignment can substantially improve learning outcomes. In line with Zahran's (2019) view, educators need to continuously develop teaching styles to create a challenging and engaging learning environment to foster student creativity. On the other hand, Parwati (2024) explains that each student tends to achieve optimal scores in their dominant learning style, so kinesthetic students still require a more interactive approach and direct physical activity to achieve results on par with their peers.

12 Interaction between Learning Model and Learning Style on Learning Outcomes

The results of this study indicate a significant interaction between learning models and learning styles on student learning outcomes (Sig. 0.002 < 0.05), indicating that the effectiveness of a model is highly dependent on individual learning style characteristics. This finding aligns with a study by Lisnawati et al. (2020) which found a similar interaction effect on elementary school students' social studies learning outcomes. The data showed that students with visual learning styles achieved the highest scores in both classes, as cooperative models such as STAD and TGT frequently utilize visual media in material delivery and group discussions. Similarly, Ervilia and Fauzi (2024) emphasized that cooperative learning combined with

differentiated learning can optimally accommodate visual, kinesthetic, and reading-writing learning styles.

Mandopa et al. (2025) also emphasized the importance of considering diverse learning styles in designing cooperative learning so that all students can be actively involved and achieve maximum learning outcomes. The practical implications of these findings require teachers to recognize student learning preferences and adapt learning models appropriately. Furthermore, Dewi et al.'s (2025) research on the Jigsaw model using concrete media confirmed that the interaction between learning models and student characteristics can create meaningful learning and improve conceptual understanding. Overall, this study provides an empirical contribution regarding the crucial synergy between learning models and learning styles in improving students' academic achievement in social studies.

Theoretically, this research strengthens the application of Constructivist Learning Theory and Attribution Theory in the context of elementary education. These findings provide new empirical evidence regarding a significant interaction between cooperative learning models (TGT and STAD) and diverse student learning styles (visual, auditory, and kinesthetic). This research enriches the pedagogical literature by demonstrating that the effectiveness of a learning model is not universal, but rather moderated by students' sensory preferences in absorbing information. Furthermore, these results support the theory of differentiated learning, which states that optimal cognitive achievement can be achieved when the instructional environment aligns with students' individual characteristics.

Practically, this research makes a strategic contribution by providing a reference for educators in modifying cooperative learning models to better accommodate diverse visual, auditory, and kinesthetic learning styles. It also serves as a foundation for schools in developing inclusive curricula and facilitating the provision of varied learning media. Furthermore, these findings serve as an academic reference for future researchers exploring other interaction variables, such as achievement motivation or self-efficacy, to deepen their understanding of the complex factors influencing optimal learning outcomes in Social Studies.

4. CONCLUSION

This study concluded that the implementation of the Student Teams Achievement Division (STAD) cooperative learning model had a more significant impact on fifth-grade students' social studies learning outcomes compared to the Teams Games Tournament (TGT) model, as demonstrated by the experimental class's average score of 81.667, exceeding the control class's score of 63.267. Furthermore, a significant effect of learning style diversity was found, with the visual group achieving the highest performance (84.400), as well as a significant interaction (Sig. 0.002 < 0.05) between learning model and learning style, confirming that the effectiveness of the STAD model will achieve optimal results when implemented by considering the specific learning modality characteristics of each student.

As a strategic follow-up, educators are advised to map student learning styles at the beginning of the semester to align the use of the STAD model with visual media and balanced kinesthetic activities. Schools should facilitate the development of teacher competencies in designing innovative cooperative learning based on student characteristics. For further researchers, it is recommended to expand the scope of the research by involving other moderator variables such as achievement motivation or learning independence in a wider population, to test the consistency and effectiveness of the learning model in improving the quality of social studies education at the elementary school level.

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