P A L A P A
Jurnal Studi Keislaman dan Ilmu Pendidikan

p-ISSN : 2338-2325
e-ISSN : 2540-9697

Terindeks: DOAJ, EBSCO, Dimensions, MIAR, Garuda, Google Scholar, etc

https://doi.org/10.36088/palapa.v14i2.6552

THE EFFECT OF THE THINK PAIR SHARE COOPERATIVE LEARNING MODEL ASSISTED BY TTS ON PARTICIPATION AND COGNITIVE LEARNING OUTCOMES

Neng Sholihat, Ratna Susanti, Berry Kurnia Vilmala, Hadi Purwanto, Defrizal Hamka, Agusminarti
Universitas Muhammadiyah Riau, Indonesia
nengsholihat@umri.ac.id

Abstract

Despite the potential of cooperative learning to improve science instruction, limited evidence exists regarding the use of Think–Pair–Share supported by crossword puzzles to enhance student participation and cognitive learning outcomes. This study evaluates the effects of this instructional model on both outcomes using a quantitative quasi-experimental approach with a pretest–posttest control-group design. Participants comprised 28 students in the experimental group and 22 in the control group, selected through purposive sampling. Data were collected using a student participation questionnaire and cognitive pretests and posttests and analyzed through an independent-samples t-test and normalized gain (N-Gain) analysis. The findings show that student participation in the experimental group reached 81.29%, classified as exceptional. The analysis also yielded a significance value of .018 (< .05), while the experimental group achieved a higher N-Gain score (0.67) than the control group (0.53). These results indicate that crossword puzzle-assisted Think–Pair–Share positively affects student participation and cognitive learning outcomes. The study contributes to science education by demonstrating the value of integrating cooperative learning with interactive instructional media and provides practical support for teachers seeking to implement more engaging and innovative classroom strategies.

Keywords: Cognitive Learning Outcomes; Crossword Puzzles; Science Education; Student Participation; Think–Pair–Share

Jurnal Palapa is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License

INTRODUCTION

Education is crucial for improving the quality of human resources, enabling them to remain in sync with progress in science and technology. In addition to enhancing knowledge, education also shapes students' skills, attitudes, and competencies (Kadek & Pratiwi, 2022). The quality of the learning experience shapes the effectiveness of education, fostering engagement and active participation among students, educators, and learning resources (Suryani et al., 2021). Science learning requires active and meaningful learning to encourage students to actively participate in developing their thinking skills, problem-solving skills, and scientific attitudes. This involvement is an essential element that facilitates the attainment of learning objectives (Sari et al., 2025).

Learning participation is a crucial indicator of learning success because it reflects students' physical and mental involvement in various activities, such as asking questions, answering questions, expressing opinions, discussing, and collaborating (Anggalia, 2024). High levels of learning participation indicate strong motivation and interest in learning, while low levels can hinder conceptual understanding and learning outcomes (Juanta et al., 2024). Various studies have shown that student participation in learning is still relatively low, resulting in poor learning outcomes (Rambe & Nukman, 2025). Similar issues were also found at XYZ Junior High School, based on interviews with science teachers, which showed that students tended to be passive, did not have the bravery to share their thoughts and were still passive in group dialogues. Moreover, the learning results, especially in physics, were also minimal. This scenario underscores the necessity of adopting learning models that can enhance student engagement while also advancing cognitive learning results.

To address these issues, one alternative is the implementation of a cooperative learning model. This model prioritizes collaboration between students in learning activities, which in turn can increase the level of learning participation (Verlia et al., 2025). A suitable cooperative model for implementation is Think-Pair-Share (TPS). In this approach, learners have the chance to engage in three phases of tasks: reflecting alone (think), conversing with a partner (pair), and presenting the outcomes of the conversation to the entire class (share). These phases enable every student to engage in learning actively and assist them in grasping concepts more thoroughly (Tungkir et al, 2025). The advantage of TPS compared to other cooperative models lies in providing adequate time for students to think before entering the

discussion stage, thereby increasing students' courage and confidence in expressing opinions (Sukadana, 2022).

Many research studies have demonstrated that the think pair share technique significantly enhances student participation and learning results Ismania et al (2025), the implementation of TPS positively contributes to the level of student learning participation. Similarly, research conducted by Anwar et al (2025) also revealed that TPS can improve conceptual understanding and encourage active student participation throughout learning activities. Furthermore, Tungkir et al (2025) indicated that the application of TPS greatly influences students' cognitive learning results. Overall, these results suggest that TPS can foster a more engaging and student-focused learning atmosphere.

To enhance the efficiency of employing the think pair share cooperative learning approach, this approach can be combined with interactive learning materials, one of which is crossword puzzles (Zania & Supardi, 2025). crossword puzzles media can create a fun learning atmosphere, increase learning participation, and help students understand and remember concepts through challenging and interactive activities (Sudirman et al., 2024). Moreover, employing crossword puzzles promotes collaboration among students, fosters discussions, and enhances critical thinking in addressing the presented challenges. Based on the literature review findings and the empirical observations made in the field, there is still a lack of studies regarding the application of the think-pair-share cooperative learning model improved by crossword puzzles in relation to student learning involvement and cognitive performance, especially in Natural Science education for junior high school students. This study aims to explore the effects of the think pair share collaborative learning strategy, enhanced by crossword puzzles, on student involvement and cognitive learning outcomes. The results of this study seek to provide a different method for improving the quality of science education in educational settings.

METHODS

This research utilized a quantitative methodology alongside supplementary qualitative data and conducted descriptive and inferential statistical analyses to ssess the effects of the think pair share (TPS) collaborative learning approach, enhanced with crossword puzzles, on student involvement in learning and cognitive achievement. The research utilized a quasi-experimental pretest-posttest framework that included a test group

and a comparison group. Both groups underwent a pretest and a posttest, but the intervention, the TPS model augmented by crossword puzzles, was implemented only for the experimental group

The study took place at a middle school in Pekanbaru City during the second semester of the 2025/2026 academic year. The full sample included 50 students in eighth grade, separated into two groups: class VIII.1 serving as the control group and class VIII.2 serving as the experimental group. The sample was established through a saturated sampling technique, including the entire population in the research. Data were obtained through two main methods: testing and non-testing. The testing technique used multiple-choice questions to assess students' cognitive learning outcomes, administered before and after the learning process in both classes. Non-testing techniques included observation and questionnaire distribution to assess students' level of participation during the learning process, as well as documentation as supporting data.

Data analysis focused on processing student participation data and cognitive learning outcomes to identify differences in abilities before and after treatment. The analysis stages included normality and homogeneity tests as prerequisites, N-Gain computations to assess learning results using pretest and posttest scores, along with Independent Sample t-tests to evaluate the research hypotheses. Cognitive learning outcome data were analyzed descriptively with percentages to illustrate the degree of student engagement throughout the learning process. The N-Gain criteria mentioned pertain to Richard R. Hake, specifically :

Table 1. Normalized N-Gain Standards

Average Standards	Average C Standards
g > 0,70	High
0,30 ≤ g ≤ 0,70	Medium
g ≤ 0.3	Low

Sumber : Richard R. Hake dalam (Mahardika et al., 2024)

RESULTS

1. Student Learning Participation

Data regarding student learning participation was gathered through a survey featuring 20 statements linked to eight indicators of learning engagement: visual tasks, verbal tasks, auditory tasks, written tasks, emotional tasks, drawing tasks, physical tasks, and cognitive

tasks. The survey involved 28 students from the experimental group subsequent to the implementation of the think pair share collaborative learning framework enhanced by TTS. Table 2 displays the findings from the analysis of data concerning student engagement in learning.

Table 2. Results of the Student Participation Questionnaire

Participation Indicators	Description	Item Number		Questionnaire Score	Maximum Score	%Questionnaire Value
		+	-			
Visual activity	Students' attention to teacher explanations, media, and student worksheets	1	2	193	224	86,16%
oral activity	Students' activeness in asking, answering, and expressing opinions	4	3	184	224	82,14%
listening activity	Students' sincerity in listening to the teacher and their peers	5	6	184	224	82,14%
writing activity	Student involvement in writing answers and discussion results	8	7	164	224	73,21%
emotional activity	Student enthusiasm, interest, and self-confidence	9, 11	10, 12	371	448	82,81%
Drawing activity	Activities in creating drawings, diagrams, graphs, or illustrations	14	13	195	224	87,05%
Motor activity	Student physical activity in learning	16	15	176	224	78,57%
Mental activity	Ability to think, analyze, and solve problems	18 20	17, 19	354	448	79,02%
Amount		20		1821	2240	81,29%

Table 2. Findings from the Student Participation Questionnaire indicate that the overall score for student involvement reached 1,821 out of a maximum score of 2,240

(81.29%), indicating that students' learning participation was in the very good category. The highest percentages were observed in the drawing activity (87.05%) and visual activity (86.16%) indicators, followed by emotional activity (82.81%) and both oral and listening activities (82.14% each). Meanwhile, mental activity (79.02%), motor activity (78.57%), and writing activity (73.21%) showed relatively lower percentages. These results demonstrate that the TTS-enhanced think pair share instructional model greatly increased student involvement, particularly during the observation and completion of crossword puzzles, as reflected in their enthusiasm and collaborative discussions while identifying the correct answers. The use of crossword puzzles also created a more engaging learning environment, which increased students' focus and participation. These results align with those presented by Ningsih et al. (2025) and Nurhalizah et al. (2025), who discovered that the Think Pair Share approach improves student involvement and active participation by offering chances for independent thought, conversation, and sharing of ideas.

2. Students' Cognitive Learning Outcomes

Normality checks were conducted on the pretest and posttest data for both the experimental and control groups to evaluate learning outcomes using statistical methods. This evaluation aimed to confirm that the data showed a normal distribution and were suitable for parametric analysis. Table 3 displays the results of the normality test.

Table 3. Outcomes of the Normality Assessment of Cognitive Learning Results

Group	Class	Shapiro-Wilk		
		statistic	df	Sig.
Pretest	Ekperimen	.962	28	.386
	Kontrol	.950	22	.310
Posttes	Ekperimen	.934	28	.079
	Kontrol	.928	22	.114

Table 3. The results of the Normality Test for Cognitive Learning Outcomes show that The significance values of the Shapiro–Wilk test for both pretest and posttest in the experimental and control groups exceeded 0.05. The results indicate that the study data exhibited a normal distribution. Given that the normality assumption was met, the analysis advanced with a homogeneity evaluation to assess the comparability of variances between the experimental and control groups. Assessing homogeneity is crucial for performing parametric statistical analyses. Table 4 shows the findings of the homogeneity test. Outcomes of the Uniformity Evaluation.

Table 4. Outcomes of Uniformity Assessment

Group	Based on	df1	df2	Sig.	Information
Pretest	Mean	1	48	.0,56	Homogen
	Median	1	48	.0,53	Homogen
Posttest	Mean	1	48	.0,53	Homogen
	Median	1	47.887	.0,54	Homogen

Table 4. Results from the Homogeneity Test show that the significance values obtained from the Levene test were greater than 0.05 for both the pretest and posttest data. These results indicate that the variations in the experimental and control groups were alike. Since the homogeneity assumption was maintained, the data met the requirements for parametric statistical analysis. Therefore, hypothesis testing was conducted using the Independent Samples t-test to analyze the effect of the Think Pair Share cooperative learning model enhanced by crossword puzzles (TTS) on students' cognitive learning outcomes. The findings of the Independent Samples t-test are shown in Table 5. Outcomes of the Independent Samples t-Test.

Table 5. Outcomes of the Independent Sample t-test

Test Statistics	T	Df	Significance		Mean Difference
			One-sided p	Two-sided p	
Equal variances assumed	-2.443	48	.009	.018	-3.367
Equal variances not assusmed	-2.363	38.137	.012	.023	-3.367

The results of the independent t-test presented in Table 5 indicate a two-tailed significance level of 0.018 (< 0.05), implying the rejection of the null hypothesis and the acceptance of the alternative hypothesis. This shows a significant difference in cognitive learning outcomes between the experimental and control groups. The application of the Think-Pair-Share (TPS) collaborative learning framework, augmented by crossword puzzle media, shows superior efficacy in improving students' cognitive learning outcomes compared to conventional teaching techniques.

Although the t-test shows a notable difference between the groups, this analysis does not yet reveal the extent to which learning outcomes have enhanced post-intervention. Consequently, an additional analysis utilizing N-Gain scores was performed to assess the level of enhancement in students' cognitive learning results following the application of the TPS model supplemented by crossword puzzles. Table 6 presented below shows the results of the N-Gain analysis.

Table 6. Findings from the Independent Sample t-test

Test Statistics	t	Df	Significance		Mean Difference
			One-sided p	Two-sided p	
Equal variances assumed	-2.443	48	.009	.018	-3.367
Equal variances not assusmed	-2.363	38.137	.012	.023	-3.367

3. The Relationship between Participation and Students' Cognitive Learning Outcomes

After all required tests were finalized, A correlation analysis was conducted to evaluate the relationship between learning engagement and cognitive learning outcomes in students. This study aimed to evaluate the degree of closeness in the connection between the two variables. The complete outcomes of the correlation test are shown in Table 7 below.

Table 4.7 Correlation Test Results

		Student Participation	Student Cognitive Learning Outcomes
Student Participation	Pearson Correlation	1	.364
	Sig. (2-tailed)		.057
	N	28	28
Student Participation	Pearson Correlation	.364	1
	Sig. (2-tailed)	.057	
	N	28	28

Table 7. Findings from the correlation test show that the Pearson correlation coefficient connecting students' engagement in learning with cognitive learning outcomes was 0.364, together with a significance level (Sig. 2-tailed) of 0.057. According to the correlation coefficient interpretation criteria proposed by Jabnabillah & Margina (2022), this value indicates a low positive correlation. These findings suggest that higher levels of learning participation tend to be associated with higher cognitive learning outcomes. However, since the p-value exceeded 0.05, the association was deemed not statistically significant.

DISCUSSION

Student involvement in learning, which achieved a remarkable level, suggests that using the cooperative learning method of think pair share with crossword puzzles (TTS)

fosters a more engaging learning environment. The think stage allows students to engage in independent thought, the pair stage fosters conversation with a partner, and the share stage offers a chance to present discussion outcomes to the class. These activities make students more engaged during the learning process. The highest percentage for the drawing activity indicator indicates that students are enthusiastic when completing the TTS and working on the illustrations contained in the Student Worksheet (LKPD). Conversely, the writing activity indicator achieved the lowest percentage because the learning process emphasizes thinking, discussion, and expressing opinions rather than writing. This finding aligns through studies conducted by Ningsih et al (2025), Nurhalizah et al (2025), Anggalia (2024), Endang et al (2023), Nainggola et al (2024), The significant level of student engagement in learning suggests that utilizing the Think Pair Share collaborative learning approach with crossword puzzles (TTS) creates a more engaging educational atmosphere.

The Independent Sample t-test results indicated a notable difference in cognitive learning outcomes between the experimental group and the control group. These results indicate that the Think Pair Share approach aided by TTS proves to be more effective than conventional learning methods in improving student performance. The phases of learning allow students to develop knowledge through thinking, discussing, and sharing information, which enhances their comprehension of the concepts learned. The N-Gain analysis findings, categorized as moderate to high, also affirm that this learning model can enhance concept mastery across all cognitive ability levels. This finding is consistent with research Khoirudin & Supriyanah (2021), Puji & Fatmala (2023), and Putri et al., (2025), which indicated that the Think Pair Share approach can enhance educational results as it offers chances for students to engage in active and collaborative learning.

However, the relationship between learning participation and cognitive learning outcomes showed a correlation coefficient of 0.364, which is low and insignificant. This indicates that learning outcomes are influenced not only by learning participation but also by other factors such as initial ability, motivation, study habits, and learning support outside of school. Based on interviews with teachers, some students in the control class participated in extra tutoring, thus receiving reinforcement outside of the classroom. This scenario is thought to be one of the reasons for the minor variation in learning results between the two groups, in spite of the experimental group employing the TTS-assisted Think Pair Share method.

This study shows that the TTS-assisted Think Pair Share collaborative learning technique can act as an alternative science teaching method to improve student involvement and cognitive learning outcomes. Nonetheless, this research has constraints, such as a limited sample size and the educational implementation covering just a handful of sessions, and the evaluation of learning engagement conducted exclusively within the experimental group. As a result, the results need to be tested on a broader range.

CONCLUSION

The findings of the study indicate that the think-pair-share collaborative learning method, enhanced with crossword puzzles, positively impacts the learning engagement and cognitive achievement of seventh-grade students at SMP Talenta Juara Pekanbaru. The experimental class saw student participation at 81.29%, classified as very good, showing that the think-pair-share approach, coupled with crossword puzzles, significantly boosts student engagement during the learning experience. The results of the Independent Sample t-test indicated a significance level of 0.018 (<0.05), emphasizing a noteworthy difference in cognitive learning outcomes between the experimental and control groups.

The think-pair-share collaborative learning strategy, supported by crossword puzzles, acts as a different educational method to improve student involvement and cognitive learning outcomes, particularly in science. Teachers are encouraged to implement learning models that involve students actively and use interesting learning materials to improve the interaction and enjoyment of the educational experience. Furthermore, further research could be conducted with a wider participant pool and examine other factors that influence learning outcomes, such as the motivation to learn, the interest in learning, or students' critical thinking skills.

REFERENCES

Agusminarti, & Hudi, I. (2020). Developing Android-based team games tournament (TGT) type cooperative learning for students' academic achievement in biology. *Jurnal PAJAR (Pendidikan dan Pengajaran), 4*(6), 1277–1286.

Alkahfy, R., Asriati, N., & Wahyuni, F. S. (2026). Penerapan Model Think Pair Share untuk Meningkatkan Keaktifan Siswa di SMA Negeri 3 Kayan Hilir. *Jurnal Education and Development, 14*(1), 296–301. https://journal.ipts.ac.id/index.php/ED/article/view/7708

Anwar, K., Prasetya, D. D., & Setiawan, A. Y. (2025). Penerapan Model Pembelajaran Kooperatif Tipe Think-Pair-Share untuk Meningkatkan Pemahaman Konsep dan Partisipasi Aktif Siswa Kelas X-4 SMAN 7 Malang pada Materi Sistem Komputer. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(2), 1323–1335. https://journal.unpas.ac.id/index.php/pendas/article/view/24835

Endang, E. S., Siswandari, Suharno, & Jumintono. (2023). Think Pair Share (TPS) learning methods to improve student learning activities. *Jurnal Pedagogi dan Pembelajaran, 6*(2), 308–318. https://doi.org/10.23887/jp2.v6i2.59134

Ismania, D., Pohan, C. N., Adrias, & Suciana, F. (2025). Kajian Pustaka: Pengaruh Model Pembelajaran Think Pair Share terhadap Motivasi Belajar Siswa Sekolah Dasar pada Matapelajaran IPA. *Jurnal Media Ilmu, 4*(1), 76–88. https://doi.org/10.31869/jmi.v4i1.6569

Juanta, P., Nababan, J. J., Manalu, N. E. S. M., Laila, I., & Damanik, B. (2024). Analisis Pengaruh Motivasi Belajar Siswa terhadap Hasil Pembelajaran. *Scientica: Jurnal Ilmiah Sains dan Teknologi, 2*(8), 347–353. https://jurnal.kolibi.org/index.php/scientica/article/view/2256

Khoirudin, & Supriyanah. (2021). Pengaruh Model Pembelajaran Think Pair Share (TPS) terhadap Hasil Belajar Ekonomi pada Siswa Kelas X di SMA Kutabumi I Tangerang Banten. *Jurnal Inovasi dan Kreativitas (JIKa), 1*(2), 77–85. https://doi.org/10.30656/jika.v1i2.3883

Mahardika, S. P., Hidayati, S. N., & Aulia, E. V. (2024). Efektivitas Discovery Learning Berorientasi Video Microlearning dalam Meningkatkan Keterampilan Berpikir Kritis Siswa. *Nusantara: Jurnal Pendidikan Indonesia, 4*(4), 909–918. https://doi.org/10.14421/njpi.2024.v4i4-1

Nainggolan, B. A., Harefa, S., Saragih, O., Simbolon, R., & Waruwu, T. (2024). Pengaruh Model Pembelajaran Think Pair Share terhadap Keaktifan Belajar Pendidikan Agama Kristen dan Budi Pekerti Siswa Kelas XI SMA Swasta HKBP Doloksanggul Tahun Pembelajaran 2024/2025. *Tri Tunggal: Jurnal Pendidikan Kristen dan Katolik, 2*(4), 139–152. https://doi.org/10.61132/tritunggal.v2i4.703

Ningsih, I. S., Iffendi, M., & Prima, A. (2025). Penggunaan Model Pembelajaran Kooperatif Learning Jenis Think Pair Share dalam Meningkatkan Hasil Belajar Siswa pada Pembelajaran Bahasa Arab di Pesantren Paqusatta. *Hidayah: Cendekia Pendidikan Islam dan Hukum Syariah, 2*(3), 26–41. https://doi.org/10.61132/hidayah.v2i3.1255

Nurhalizah, R. R., Solihat, A. N., & Kurniawan. (2025). Penerapan Model Cooperative Learning Tipe Think Pair Share Berbantuan Media Teka-Teki Silang untuk Meningkatkan Hasil Belajar Siswa. *Journal Sains Student Research, 3*(6), 323–332. https://www.ejurnal.kampusakademik.co.id/index.php/jssr/article/view/6278

Pratiwi, N. K. R. (2022). Pengembangan Bahan Ajar IPA Berbasis Multirepresentasi terhadap Pemahaman Konsep Siswa SMP: Sebuah Tinjauan Studi. *Jurnal Pendidikan MIPA, 12*(2), 359–366. https://doi.org/10.37630/jpm.v12i2.614

Rahmawati, P., & Fatmala, G. A. (2023). Penerapan Model Pembelajaran Kooperatif Tipe Think Pair Share untuk Meningkatkan Hasil Belajar IPA Siswa SMP. *Variabel, 6*(1), 49–54. https://doi.org/10.26737/var.v6i1.4209

Rambe, S. A. S., & Nukman, M. (2025). Analisis Faktor-Faktor Penyebab Rendahnya Motivasi Belajar Siswa pada Mata Pelajaran IPAS. *Murhum: Jurnal Pendidikan Anak Usia Dini, 6*(1), 877–886. https://doi.org/10.37985/murhum.v6i1.1334

S, V. A., Sholihat, N., & Vilmala, B. K. (2025). Pengaruh Time Token Learning Literasi Sains terhadap Keterampilan Komunikasi dan Hasil Belajar Kognitif Peserta Didik SMPN XYZ. *Konstanta: Jurnal Matematika dan Ilmu Pengetahuan Alam, 3*(3), 76–90. https://doi.org/10.59581/konstanta.v3i3.5502

Sari, U. A., Nadiroha, W., Adrias, & Syam, S. S. (2025). Analisis Faktor Rendahnya Motivasi Belajar Siswa dalam Mata Pelajaran IPA di Sekolah Dasar. *Natural Science Education Research, 8*(1), 111–116. https://journal.trunojoyo.ac.id/nser/article/view/29635/0

Sukadana, I. N. (2022). Model Pembelajaran Kooperatif Tipe Think Pair Share (TPS) untuk Meningkatkan Hasil Belajar IPA Siswa SMP. *Jurnal Penelitian dan Pengembangan Pendidikan, 6*(1), 50–55. https://doi.org/10.23887/jppp.v6i1.44596

Suryani, E., Nurfathurrahmah, N., Azmin, N., & Andang, A. (2021). Pengembangan Lembar Kerja Siswa (LKS) Model Pembelajaran Kooperatif Tipe TPS (Think Phair Share) pada Materi Sel Kelas XI. *Jurnal Pendidikan Ilmu Pengetahuan Alam (JP-IPA), 2*(1), 28–36. https://doi.org/10.56842/jp-ipa.v2i01.58

Tungkir, T. M. B., Silaban, P. J., Lumban Gaol, R., Juliana, & Sari, D. W. (2025). Pengaruh Model Pembelajaran Kooperatif Tipe Think Pair Share (TPS) terhadap Hasil Belajar Siswa dalam Pembelajaran IPAS Kelas V SD Negeri 091374 Naga Saribu. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 10*(2), 710–723. https://journal.unpas.ac.id/index.php/pendas/article/view/26911

Zania, F., & Supardi, U. S. (2025). Efektivitas Media Pembelajaran Teka-Teki Silang (TTS) terhadap Hasil Belajar IPA di Kelas IX A MTS Ghoyatul Jihad. *RIGGS: Journal of Artificial Intelligence and Digital Business, 4*(2), 4750–4754. https://doi.org/10.31004/riggs.v4i2.1323