

Does the integration of think-pair-share and nearpod affect student participation and learning outcomes in senior high school?

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Abstract Learning models and media are critical factors in determining the success of classroom instruction. Various types of models and media can be utilized by teachers to enhance the quality of learning. Among them, the cooperative learning model Think-Pair-Share and the interactive media platform Nearpod integrate technology into collaborative learning. This study aims to examine the effect of integrating Think-Pair-Share and Nearpod on student participation and learning outcomes at the senior high school level. This research employed an experimental method with a cross-over design, in which all classes received different treatments in varied sequences and times. Participants were first-year senior high school students. Questionnaires and tests served as research instruments. The findings demonstrate that the integration of the Think-Pair-Share model with Nearpod significantly influenced student participation and learning outcomes. Furthermore, the combination of Think-Pair-Share (TPS) + Nearpod was found to be more effective in enhancing student participation and learning outcomes compared to the combinations of Think-Share (TS) + Nearpod and Share (S) + Nearpod.

Keywords: think pair share, nearpod, participation, learning outcomes, senior high school

1. Introduction

Education in the digital era offers significant opportunities to enhance the quality of learning, including at the senior high school level, where the adoption of technology has become increasingly prevalent. The use of technology in senior high schools not only facilitates students' access to information but also supports collaborative learning and personalizes the learning process (Cano, 2022). Digital technology positively impacts education by enabling teachers to design interactive and engaging instructional materials (Rajesh, 2023) and by creating deeper and more innovative learning experiences (Timotheou et al., 2023). Nevertheless, education in the digital age also presents various challenges, particularly for teachers. These challenges include the need for digital competencies (Kaminskiené et al., 2022), the influence of teachers' personal characteristics in adapting to digital learning environments (Timotheou et al., 2023), and the necessity to modify pedagogical approaches to integrate technology effectively into curricula (Palacios-Rodríguez et al., 2023).

Currently, Indonesia is implementing the Merdeka Curriculum, which emphasizes the integration of technology in learning, promotes student autonomy in developing according to their interests and potential, and focuses on student-centered learning (Sucipto et al., 2024). Classroom instruction is realized through activities and interactions between teachers and students. Effective teacher-student interaction requires two-way communication, prompting teachers to design learning processes that stimulate student responses and encourage active participation (Kamil et al., 2021). Participation is defined as students' engagement in the classroom, democratic decision-making processes, and interactions among students and between students and teachers (O'Brien et al., 2024). Participation is closely related to collaboration, as student interaction fosters knowledge exchange, the development of social skills, and problem-solving abilities (Nafisah et al., 2024). Consequently, student participation is a critical component of the teaching and learning process, essential for achieving learning objectives (Butar-butur & Appulembang, 2023). Research has shown that students who actively participate in learning activities tend to achieve higher academic performance (Ahmed et al., 2023), demonstrating that participation significantly influences students' academic success (Ismiyati & Salamah, 2020).

Learning outcomes are measurable statements encompassing the knowledge, skills, and attitudes that students should acquire upon completing a learning experience. Learning outcomes emphasize what students can demonstrate as a result of instruction (Holmes, 2019). Three major factors influence learning outcomes: (1) personal factors, including students' motivation and attitudes (Li et al., 2023); (2) social factors, such as family support, peer influence, and socioeconomic status (Davaatseren et al., 2024); and (3) institutional factors, including teachers' teaching skills, instructional methods, learning environments, and curriculum design (Wardat et al., 2023). This study specifically focuses on cognitive learning outcomes, given

that cognitive abilities are considered more critical indicators of academic success compared to affective or psychomotor aspects (Budiyanto & Kurniawan, 2017; Hasanah, 2022).

Numerous educational institutions recognize that student participation benefits both schools and learners, often promoting it through student-centered learning approaches (Nafisah et al., 2024). A well-conducted teaching and learning process will naturally lead to improved learning outcomes (Rachmawati & Erwin, 2022). In their efforts to foster participation, teachers strive to design instructional strategies that stimulate students' enthusiasm and motivation to engage actively in learning activities (Kaliisa & Dolonen, 2023). Cooperative learning is regarded as a method that promotes teamwork and active student interaction (Iraola & Romero, 2024), encouraging students to collaborate and fostering greater enthusiasm for learning (Zhou & Colomer, 2024). Peer interactions and discussions enable students to build confidence in expressing their ideas, contributing to greater classroom participation (Mundelsee & Jurkowski, 2021). Cooperative learning is also viewed as a pedagogical model that achieves multiple educational outcomes, including cognitive, affective, and social development (Suryadi et al., 2024).

Cooperative learning is grounded in constructivist learning theory (Nurjannah et al., 2017), which posits that students better understand complex concepts through peer discussions. This aligns with constructivist principles emphasizing active, experience-based learning. The goal of constructivist theory is to actively engage students, promoting teamwork and motivation to enhance the learning experience (Leow & Neo, 2023). The theory underscores the responsibility of students for their own learning, positioning teachers as facilitators who plan, organize, guide, and support the learning process (Samaila et al., 2021). Research by Zaidah and Hidayatulloh (2024) confirmed that implementing cooperative learning models significantly improved students' academic performance compared to traditional lecture-based methods. This finding reinforces the idea that cooperative learning experiences enhance students' academic achievement (Nababan et al., 2023).

One type of cooperative learning model is Think-Pair-Share (TPS). The Think-Pair-Share strategy fosters student collaboration through active, student-centered learning (Li & Tu, 2024). In this model, students are encouraged to think independently to generate ideas (Think), discuss and exchange ideas with peers (Pair), and then share their discussion outcomes with the class (Share). TPS helps students who are accustomed to peer interaction enhance their contributions (Emerson et al., 2023). The structured stages of TPS build students' confidence to participate actively in classroom discussions. Mundelsee and Jurkowski (2021) argued that peer collaboration enables students to gain confidence in their ideas through peer feedback and the exchange of perspectives, creating a positive learning experience.

Nearpod is an interactive learning platform that combines audio, visual, and audiovisual elements. It allows students to access content via internet links or codes provided by educators. Nearpod offers educators interactive media to foster active learning environments. It provides numerous innovative and educational features that help students comprehend learning materials more effectively (Fuadiyah et al., 2024). By offering learning resources accessible via smartphones, tablets, and laptops, Nearpod enhances student interaction and participation. It also improves cognitive processes, problem-solving skills, learning routines, and transforms teachers' instructional roles, ultimately improving student learning outcomes (Mékota & Marada, 2020). Therefore, integrating the Think-Pair-Share model with the Nearpod platform is expected to significantly influence student participation and learning outcomes, particularly at the senior high school level (Figure 1).

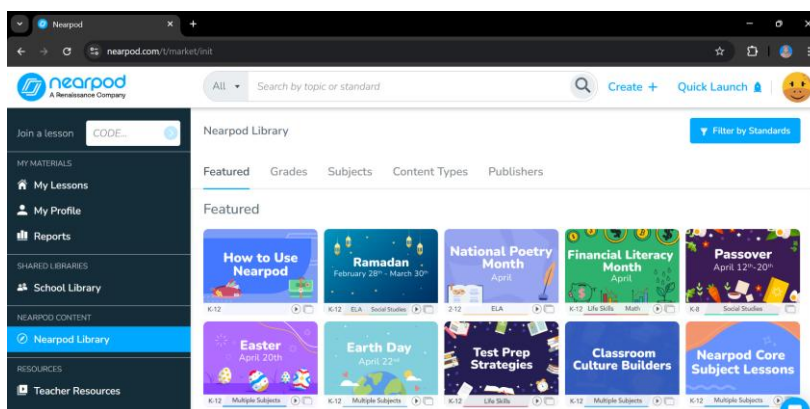


Figure 1 Nearpod library main view.

2. Methodology

2.1. General Background

This study employed an experimental research method using a cross-over design. In a cross-over design, subjects may receive two or more treatments in a specified sequence (Turner, 2013). The participants consisted of two classes that received three different treatments in random orders across distinct time periods. This study involved three treatments: (1) the combination of Think-Pair-Share (TPS) + Nearpod; (2) Think-Share (TS) + Nearpod; and (3) Share (S) + Nearpod.

2.2. Research Design

The research was conducted at Al Azhar Islamic Senior High School 7 Sukoharjo from June to December 2024, employing a cross-over design. The design of the cross-over study is illustrated in Figure 2, adapted from Tjokprawiro (1981).

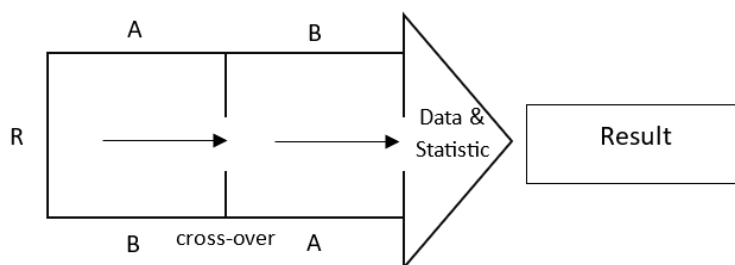


Figure 2 Research design.

2.3. Population and Sample

The population of this study consisted of all Grade X students at Al Azhar Islamic Senior High School 7 Sukoharjo in the academic year 2024/2025, totaling 95 students across four classes, as detailed in Table 1.

Table 1 Research population.

Class	Number of Students
X.E-1	21
X.E-2	32
X.E-3	22
X.E-4	20
Total	95

The research sample included students from classes X.E-3 (22 students, designated as Class A) and X.E-4 (20 students, designated as Class B). A random sampling technique was employed, granting every member of the population an equal opportunity to be selected, thereby ensuring the representativeness of the sample. All participants voluntarily agreed to participate in the study without coercion.

2.4. Research Procedure

In the cross-over design, different treatments were assigned to the two classes across three sessions. For example, during the first session, Class A received the TPS + Nearpod treatment, while Class B received the TS + Nearpod treatment. In subsequent sessions, the treatments were rotated. The research design is depicted in Figure 3.

	A	B
1	TPS + nearpod	TS + nearpod
2	TS + nearpod	S + nearpod
3	S + nearpod	TPS + nearpod

Figure 3 Research design.

Description:

- 1 = first meeting.
- 2 = second meeting.
- 3 = third meeting.
- A = class A.
- B = class B.
- TPS = Think-Pair-Share.
- TS = Think-Share.
- S = Share.



2.5. Instruments and Data Collection Techniques

Data were collected using two instruments: a questionnaire to assess student participation and a test to measure learning outcomes. The participation questionnaire was adapted from previous studies (Crosthwaite et al., 2015; Mundelsee & Jurkowski, 2021; Rocca, 2010), covering the indicators listed in Table 2.

Table 2 Learning Participation Instrument.

No	Indicators	Item
1)	Raising hands	I raised my hand because I was confident with my answer I raised my hand because I wanted to share my ideas I raised my hand because I felt confident that others would not laugh at me when I made a mistake I raised my hand because the question was easy
2)	Participating proactively	I am active in group activities During discussions, I participate in exchanging opinions During presentations, I dare to ask questions and comment
3)	Answering questions	I take the initiative to answer questions given by the teacher without being asked
4)	Asking questions	I dare to ask the teacher when I encounter difficulties
5)	Following the teacher's instructions	When the teacher gives instructions, I always follow them
6)	Completing assignments	I am determined to complete my class assignments thoroughly and on time
7)	Helping friends	I often help friends who are having difficulty learning
8)	Listening actively	I do not use my mobile phone during lessons I do not sleep during lessons I do not chat with friends during lessons
9)	Preparing necessary materials	Before lessons begin, I prepare my textbooks Before lessons begin, I prepare the assignments from the previous lesson I prepare the tools/materials needed in class
10)	Taking notes	I always take notes on the material or explanations from the teacher

Responses were rated on a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. The learning outcomes were assessed through multiple-choice tests administered before and after treatments (pre-test and post-test), each consisting of 20 items. Correct answers received 5 points; incorrect answers received 0 points. Participation scores and test scores for each treatment were analyzed to determine the effects of the interventions and to identify the most effective instructional model. The research questions formulated were:

Q1: Does the integration of Think-Pair-Share and Nearpod significantly affect students' participation and learning outcomes at the senior high school level?

Q2: Which combination of instructional models is most effective in enhancing participation and learning outcomes among senior high school students?

2.6. Data Analysis Techniques

This study employed three statistical tests: normality, homogeneity, and hypothesis testing. The normality test used the Shapiro-Wilk method at a significance level of 0.05, where data were considered normally distributed if the Sig. value exceeded 0.05. The homogeneity test was conducted using Levene's test with the same significance threshold; data were deemed homogeneous if the Sig. value was greater than 0.05. Hypothesis testing involved two methods: Multivariate Analysis of Variance (MANOVA) was used to assess the simultaneous effects of integrating the Think-Pair-Share model with Nearpod on student participation and learning outcomes, while one-way Analysis of Variance (ANOVA) and normalized gain (N-Gain) were applied to identify the most effective model-treatment combination. All analyses were performed using SPSS version 26, with the alternative hypothesis (H₁) accepted when the Sig. value was less than 0.05. The N-Gain score was derived from the subsequent formula:

$$N - gain (g) = \frac{post\ test\ points - pre\ test\ points}{maximum\ points - pre\ test\ points}$$

3. Results

The integration of the Think-Pair-Share learning model with Nearpod serves as an alternative instructional strategy in the digital era. This integration offers several benefits, particularly in enhancing student participation and learning outcomes. Students are actively engaged and able to interact with one another, thereby developing their communication skills through the stages of thinking, pairing, and sharing. The use of interactive learning resources creates a more engaging and stimulating



classroom environment. Additionally, this integration provides students with opportunities to exchange ideas, which fosters critical thinking skills and enriches their knowledge, ultimately contributing to improved academic performance. The new syntax resulting from the integration of Think-Pair-Share and Nearpod is presented in Table 3.

Table 3 Think Pair Share and nearpod integration.

Phase	Activity Steps	Activity
Think	Thinking	The teacher presents an issue and thereafter requests each student to contemplate their ideas or proposals for its resolution. This facilitates students' acclimatization to critical thinking and the generation of solutions to challenges.
Pair + nearpod	Pairing and assisting nearpod	Once all students have contemplated potential solutions to an issue, they are instructed to engage in discussion with their designated groups. The teacher subsequently allows all groups to deliberate and synchronize their ideas until they arrive at the correct solution to the problem. At this juncture, each group accesses the Nearpod platform to facilitate problem-solving.
Share	Sharing	At this juncture, students are requested to present the outcomes of their group talks for comparative analysis with other groups. Students are required to assume responsibility for the outcomes of the conversation to enhance their proficiency in articulating these results.

To optimize the learning process, the Think-Pair-Share model needs to be combined with instructional media to make it more engaging and easier to deliver to students. Nearpod is a platform that incorporates audio, visual, and audiovisual elements, offering a variety of features that facilitate the delivery of instructional content in an appealing manner. It provides interactive tools such as quizzes, polls, and discussion sessions that encourage active student participation. Educators can also assess, monitor, and evaluate student performance through this platform after instruction. The real-time feedback feature in Nearpod enables teachers to gauge students' understanding immediately, allowing them to adjust instruction according to students' needs. Prompt feedback also motivates students to engage more actively, as they feel heard and acknowledged. The use of Think-Pair-Share in conjunction with Nearpod is mutually reinforcing in enhancing student participation and learning outcomes, as it strengthens cognitive skills and broadens understanding of subject matter through collaborative work. This is consistent with findings from Suandi et al. (2024), which showed that classes implementing the Think-Pair-Share model alongside Nearpod achieved higher average scores than conventional classes. Students became more active and directly involved in problem-solving due to training in small-group collaboration. Furthermore, students were more interested in learning because of the engaging, interactive nature of the media used. To determine whether the integration of the Think-Pair-Share model and Nearpod significantly affects student participation and learning outcomes, a MANOVA test must be conducted. Prior to that, the data need to be tested for normality and reliability. In this study, the normality test was conducted using the Shapiro-Wilk method with a significance level (α) of 0.05. The results of the data analysis are presented in Table 4.

To maximize the learning process, it is necessary to combine the Think-Pair-Share model with an engaging instructional medium. Nearpod, an interactive platform combining audio, visual, and audiovisual features, assists educators in delivering material effectively. Features such as quizzes, polls, and collaborative boards foster active participation. Additionally, Nearpod enables real-time feedback, allowing teachers to assess students' understanding and adjust instruction as needed. This immediate feedback loop motivates students to remain engaged and fosters a supportive learning environment.

Thus, integrating Think-Pair-Share and Nearpod strengthens cognitive skills and deepens material comprehension, aligning with previous findings (Suandi et al., 2024). Before conducting hypothesis testing using MANOVA, the data were first subjected to normality and homogeneity tests. The Shapiro-Wilk test was used to assess the normality of the data. Results are summarized in Table 4.

Table 4 Data normality test.

Instrument	Learning model	Statistic	df	Sig. Shapiro-Wilk	Conclusion
Learning Participation	TPS + nearpod	0,974	42	0,449	Normal
	TS + nearpod	0,961	42	0,157	Normal
	S + nearpod	0,981	42	0,690	Normal
Learning Outcomes	TPS + nearpod	0,950	42	0,065	Normal
	TS + nearpod	0,947	42	0,052	Normal
	S + nearpod	0,967	42	0,267	Normal

Table 4 indicated that the questionnaire data on participation in the TPS + Nearpod treatment model was $0.449 > 0.05$. The questionnaire data for the TS + Nearpod treatment model was $0.157 > 0.05$, whereas for the S + Nearpod treatment model, it was $0.690 > 0.05$. This demonstrated that the questionnaire data regarding participation in the three treatment models follows a normal distribution. The findings of the normality test for the learning outcome data in the TPS + Nearpod treatment model were $0.065 > 0.05$. The learning outcome data for the TS + Nearpod treatment was $0.052 > 0.05$, whereas the learning outcome data for the S + Nearpod treatment was $0.267 > 0.05$. The normality test results indicated that the learning outcomes



in the three treatment models were normally distributed. In this study, the homogeneity test employed Levene's method with a significance threshold of 5% or 0.05. The outcomes of the homogeneity test are displayed in Table 5.

Table 5 Data homogeneity test.

Instrument	df	Sig. Levene's	5%	Conclusion
Learning Participation	126	0,228	0,05	Homogeneous
Learning Outcomes	126	0,002	0,05	Not Homogeneous

According to Table 5 regarding the homogeneity test results, the Sig. value for the learning participation data was 0.228 > 0.05; hence, it could be inferred that the study data was homogeneous. The test results on the learning outcome data yielded a significance value of 0.002 < 0.05, indicating that the research data was heterogeneous. The results of the homogeneity test determine the subsequent test to be chosen. If the significance value was > 0.05 and the data was homogeneous, the Bonferroni test was employed. If the significance value was < 0.05 and the data lacks homogeneity, the Games-Howell test was employed. The initial hypothesis test in this study was the MANOVA test, as illustrated in Table 6.

Table 6 Multivariate Analysis of Variance Test (Manova).

Multivariate Tests				
Effect		Value	F	Sig.
Learning Model	Pillai's Trace	0,279	9,952	0,000
	Wilks' Lambda	0,721	10,816	0,000
	Hotelling's Trace	0,386	11,678	0,000
	Roy's Largest Root	0,386	23,738	0,000

According to Table 6, the MANOVA test results for the Think-Pair-Share learning model indicated a significance value of 0.000 < 0.05. The MANOVA test results indicated that the significance value is below 0.05, leading to the rejection of H₀ and acceptance of H_a, which signified a substantial impact of the integration of the Think-Pair-Share learning model and Nearpod on student participation and learning outcomes in senior high schools concurrently. Subsequent post-hoc analyses were performed to evaluate the effects of each treatment group in accordance with the previously executed homogeneity test. The participation variable data exhibited homogeneity, permitting the application of the Bonferroni test; however, the learning outcomes variable data displayed heterogeneity, requiring the utilisation of the Games-Howell test. Table 7 displays the post-hoc testing.

Table 7 Further testing (Post-Hoc).

Dependent Variable		(I) Learning Model	(J) Learning Model	Mean Difference (I-J)	Std. Error	Sig.
Learning Participation	Bonferroni	TPS + nearpod	TS + nearpod	4.21*	1.492	.017
			S + nearpod	6.71*	1.492	.000
		TS + nearpod	TPS + nearpod	-4.21*	1.492	.017
			S + nearpod	2.50	1.492	.289
		S + nearpod	TPS + nearpod	-6.71*	1.492	.000
			TS + nearpod	-2.50	1.492	.289
	Games-Howell	TPS + nearpod	TS + nearpod	4.21*	1.436	.012
			S + nearpod	6.71*	1.589	.000
		TS + nearpod	TPS + nearpod	-4.21*	1.436	.012
			S + nearpod	2.50	1.446	.201
		S + nearpod	TPS + nearpod	-6.71*	1.589	.000
			TS + nearpod	-2.50	1.446	.201
Learning Outcomes	Bonferroni	TPS + nearpod	TS + nearpod	7.02*	2.371	.011
			S + nearpod	11.67*	2.371	.000
		TS + nearpod	TPS + nearpod	-7.02*	2.371	.011
			S + nearpod	4.64	2.371	.157
		S + nearpod	TPS + nearpod	-11.67*	2.371	.000
			TS + nearpod	-4.64	2.371	.157
	Games-Howell	TPS + nearpod	TS + nearpod	7.02*	2.015	.002
			S + nearpod	11.67*	2.348	.000
		TS + nearpod	TPS + nearpod	-7.02*	2.015	.002
			S + nearpod	4.64	2.700	.204
		S + nearpod	TPS + nearpod	-11.67*	2.348	.000
			TS + nearpod	-4.64	2.700	.204



The results of the further comparison of the effects of each treatment group could be concluded by looking at the significance values. If the Sig. Value was < 0.05; it signified that there was a significant effect, and vice versa if the Sig. Value was > 0.05, which meant that there was no significant effect. Based on Table 7, it can be concluded that:

- a) There is a significant effect of the TPS + nearpod and TS + nearpod models based on learning participation.
- b) There is a significant effect of the TPS + nearpod and S + nearpod models based on learning participation.
- c) There is no significant effect of the TS + nearpod and S + nearpod models based on learning participation.
- d) There is a significant effect of the TPS + nearpod and TS + nearpod models based on learning outcomes.
- e) There is a significant effect of the TPS + nearpod and S + nearpod models based on learning outcomes.
- f) There is no significant effect of the TS + nearpod and S + nearpod models based on learning outcomes.

The second hypothesis test on the learning participation variable used a one-way ANOVA test to determine the most influential combination of learning models on learning participation. The results of the one-way ANOVA test and Tukey's post hoc test are presented in Tables 8 and 9.

Table 8 One-Way ANOVA Test on Learning Participation Variables.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	967.286	2	483.643	10.343	.000
Within Groups	5751.571	123	46.761		
Total	6718.857	125			

Table 9 Tukey test.

Tukey HSD ^a			
Learning Model	N	Subset for alpha = 0.05	
		1	2
S + Nearpod	42	70.36	
TS + Nearpod	42	72.86	
TPS + Nearpod	42		77.07
Sig.		.219	1.000

According to Table 8, the significance of the one-way ANOVA test was indicated by the Sig. The value was 0.000 < 0.05, indicating a significant difference in the means among the three treatment models. The Tukey test findings in Table 9 indicated that the TPS + Nearpod treatment model achieved the highest participation, with a value of 77.07. Concurrently, the second hypothesis test for the learning outcome variable employed the Kruskal-Wallis test and normalised gain (N-Gain). The Kruskal-Wallis test was a non-parametric alternative to the ANOVA test employed due to the heterogeneity of the learning outcome data. Both parametric and non-parametric methodologies is employed concurrently in a study if the classical assumption tests are not entirely satisfied (Daly-Grafstein & Gustafson, 2023). Tables 10 and 11 below reflect the findings of the Kruskal-Wallis test and the average learning outcomes of students by treatment groups.

Table 10 Kruskal-Wallis Test.

Learning outcomes	
Kruskal-Wallis H	20.561
df	2
Asymp. Sig.	.000

Table 11 Ranking of learning outcomes based on treatment.

Ranks			
	Learning model	N	Mean Rank
Learning outcomes	TPS + nearpod	42	82.90
	TS + nearpod	42	59.89
	S + nearpod	42	47.70
	Total	126	

According to Table 10, the results of the Kruskal-Wallis test indicated that the Asymp. Signature. The value was 0.000 < 0.05, indicating a significant difference in the averages of the TPS + Nearpod, TS + Nearpod, and S + Nearpod learning models. The TPS + Nearpod therapy yielded the greatest average value, as indicated in Table 11, with a value of 82.90. The second hypothesis test on learning outcomes additionally employed the Normalised Gain (N-Gain) assessment. The outcomes of the Normalised Gain (N-Gain) assessment and associated criteria are displayed in Tables 12 and 13.

The N-Gain test findings in Table 13 indicated that the TPS + Nearpod model treatment achieved the highest N-Gain value of 59.16%, categorising it as moderately effective. The TS + Nearpod and S + Nearpod models had N-Gain values of 32.30% and 18.73%, respectively, categorising them as unsuccessful. The findings of the second hypothesis test indicated the rejection



of H_0 and the acceptance of H_a , signifying that the integration of the Think-Pair-Share and Nearpod learning models effectively enhanced student's participation and academic performance in senior high schools.

Table 12 Interpretation of N-Gain effectiveness.

Percentage	Interpretation
< 40	Not Effective
40 - 55	Less Effective
56 - 75	Quite Effective
> 76	Effective

Source: (Hake, 2002).

Table 13 N-Gain Test Results.

Learning Model	Pre-test Average	Post-test Average	N-Gain Score (%)	Conclusion
TPS + nearpod	63,81	85,95	59,16	Quite Effective
TS + nearpod	65,60	78,93	32,30	Not Effective
S + nearpod	63,10	74,29	18,73	Not Effective

4. Discussion

The findings of this study indicate that the Think-Pair-Share (TPS) cooperative learning model can be effectively integrated with Nearpod as a digital instructional tool, as technology-enhanced learning offers numerous positive outcomes. This aligns with previous research suggesting that integrating technology into learning fosters greater student engagement, encourages collaboration, and enhances motivation, thereby improving the overall learning experience (Leow & Neo, 2023). Nearpod offers a wide range of features that assist teachers in delivering content in engaging ways. Interactive features such as game-based quizzes enhance student participation and create a more interactive and enjoyable learning environment (Metaria et al., 2024). When cooperative learning is integrated with interactive elements like videos, images, games, and quizzes in Nearpod, it captures students' attention and fosters an enjoyable classroom atmosphere that promotes active participation. As a platform with many innovative and educational features, Nearpod helps students better understand the learning materials (Fuadiyah et al., 2024). One of its key strengths lies in its ability to encourage students to engage more actively in the teaching and learning process. Feri and Zulherman (2021) also found that Nearpod's diverse features support student involvement in classroom learning.

The implementation of the Think-Pair-Share model provides students with opportunities to learn collaboratively, discuss, and exchange ideas in order to understand lesson content. The model consists of three main stages: Think, Pair, and Share. In the Think stage, students are given time to reflect individually on a given problem. During the Pair stage, they collaborate in pairs or small groups to discuss and share ideas about the topic or problem assigned by the teacher. Finally, in the Share stage, groups present the outcomes of their discussions. Such collaborative learning promotes student engagement, maintains focus, and encourages involvement in the instructional process (Catania et al., 2022). Research by Wong (2022) also highlights that the Think-Pair-Share model leads to higher levels of student engagement, characterized by increased motivation, interest, and individual attentiveness. This engagement facilitates deeper understanding of the content and supports the development of critical thinking skills. Students are actively involved in their learning process, contributing to improved learning outcomes. When learning activities are well-executed, they tend to yield better academic results (Rachmawati & Erwin, 2022). Active learning through Think-Pair-Share has been shown to significantly enhance student achievement (Gioiosa & Kinkela, 2022).

The integration of the cooperative Think-Pair-Share model with the interactive Nearpod platform offers multiple benefits in increasing student participation and academic performance. The structured stages of thinking, pairing, and sharing allow students to engage actively and interact with peers, enhancing communication skills. The interactive learning resources provided through Nearpod contribute to a more engaging and dynamic learning environment. The study found that despite different sequences of treatment in Class A and Class B, both groups concluded that the combination of TPS and Nearpod yielded higher levels of participation and learning outcomes compared to combinations of TS + Nearpod or S + Nearpod. This combination is considered effective in boosting students' confidence to participate in classroom activities. According to Alsmadi et al. (2023) and Mundelsee & Jurkowski (2021), this model combination allows learners more time to think, prepare to speak, and share ideas with peers before presenting their discussion outcomes. It also supports deeper understanding of the material, thus improving academic performance through active learning (Gioiosa & Kinkela, 2022; Rachmawati & Erwin, 2022). Moreover, the integration enables students to exchange ideas, fostering critical thinking skills and enriching their knowledge and understanding, which positively impacts learning outcomes. These findings reinforce previous research affirming that the Think-Pair-Share cooperative learning model effectively enhances both student participation (Crosthwaite et al., 2015; Guenther & Abbott, 2024; Mundelsee & Jurkowski, 2021) and academic achievement (Astra et al., 2021; Citrawathi et al., 2020; Gioiosa & Kinkela, 2022).

5. Conclusions

This study concludes, first, that the integration of the Think-Pair-Share (TPS) model and Nearpod has a significant impact on students' participation and learning outcomes at the senior high school level. Second, the combination of the TPS model with Nearpod proves to be more effective in enhancing student engagement and academic performance compared to the combinations of TS + Nearpod and S + Nearpod. This finding is supported by the results of an experimental study employing a cross-over design. The novelty of this research lies in its specific focus on combining the Think-Pair-Share model with the Nearpod platform. While previous studies have explored the use of either TPS or Nearpod independently, few have investigated the integrated application of both strategies to improve student participation and learning outcomes. Additionally, this study employs a cross-over research design, which remains relatively uncommon, particularly in educational research. The study recommends further exploration and development of the integration of the Think-Pair-Share model and Nearpod at other educational levels, such as elementary, junior high school, and tertiary education, to obtain a more comprehensive understanding. Future research could also adopt alternative methodologies and research designs, such as quasi-experimental designs, to further examine the effectiveness of this instructional approach.

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Ethical considerations

We confirm that we have obtained all consent required by the applicable law to publish any personal details or images of patients, research subjects, or other individuals used. We agree to provide Multidisciplinary Science Journal with copies of the consent or evidence that such consent has been obtained if requested.

Conflict of Interest

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