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The Effect of the Talking Chips Cooperative Model Based on the Quiz Team Strategy on Interest and Learning Outcomes

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Abstract
The Talking Chips learning model is a cooperative approach that uses cards as a tool to regulate speaking turns. Meanwhile, the Quiz Team strategy aims to improve group cooperation through fun activities. This study aims to determine the effect of applying the Talking Chips model based on the Quiz Team strategy on students' interest and learning outcomes. The research was conducted with a quantitative approach using a quasi-experimental method and a post-test only control group design. The study was conducted at SMPN 26 Pontianak City in the even semester of the 2024/2025 academic year with a sample of two eighth grade classes with equal academic abilities. The experimental class received learning using the Talking Chips model based on the Quiz Team strategy, while the control class used conventional learning. The research instruments consisted of a learning interest questionnaire and a post-test learning outcome test.The results showed that the average learning outcome score of students in the experimental class (68.23) was higher than that of the control class (60.16), with a significant difference based on the Mann-Whitney test (Sig. 0.046). The Effect Size value of learning outcomes was 0.52, indicating that the learning model had a moderate effect on learning outcomes. In addition, in terms of learning interest, the experimental class obtained a “Very High” category with an average of 91.8%, while the control class was in the “Fair” category with an average of 69.4%. The t-test showed a significant difference (Sig. 0.000) with an Effect Size value of 2.02, which means that the learning model has a very large effect on learning interest. This study combines the Talking Chips model with the Quiz Team strategy as a cooperative learning approach that has been proven effective in increasing student interest and learning outcomes simultaneously.

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INTRODUCTION

Junior high school is a crucial stage in establishing the foundation of students' knowledge and skills. Amidst the demands of globalization and the development of science, science is a key pillar in preparing students to face future challenges. Efforts to improve the quality of education are ongoing, including through curriculum updates that empower students to grow into qualified and competent individuals. Learning success depends heavily on teachers' ability to create a learning environment that actively engages students (Harefa, 2023). This active involvement is believed to foster interest in learning, which in turn positively impacts student learning outcomes. A strong interest in learning encourages students to be more active in understanding the subject matter. This is supported by various previous studies (Mahfud, 2024) shows a positive relationship between learning interest and learning outcomes. The research Laratmase & Supardi (2022) and Magenda et al (2024) also found that interest significantly influences student learning outcomes. When students are interested in the material, they tend

to be more focused and able to understand the information in depth. Conversely, low interest can lead to boredom and difficulties in the learning process (Aprijal et al., 2020).

Based on the results of an interview with one of the science teachers at SMPN 26 Pontianak City, it was stated that during learning activities only 1-3 students were actively involved in class. Furthermore, cooperation during group discussions was also considered lacking, where some students were more active in expressing opinions during discussions, while passive students were less involved in expressing their opinions. One student revealed that they often felt worried about giving the wrong answer. This worry made them avoid expressing their opinions. The results of observations conducted by the researcher also showed a lack of student enthusiasm when the teacher delivered the material and during group discussions, so the classroom atmosphere tended to be boring. This indicates that learning activities seemed monotonous and uninteresting for some students. This condition certainly led to decreased interest, so efforts are needed to create a more interactive, enjoyable learning atmosphere and encourage all students to be actively involved in learning activities. One way to increase learning activity is by using a variety of learning models such as the talking chips cooperative model.

The talking chips type is a cooperative learning model with the help of cards as a requirement for answering questions. Students who raise a card first are required to answer questions from the teacher after studying the main material. This activity will continue until all questions are answered (Siregar, 2020). However, this doesn't guarantee that student contributions are relevant. Students may simply use their cards to say something irrelevant during a discussion without truly understanding the concepts being discussed. Therefore, a strategy is needed that can provide understanding and knowledge to students. Quiz team is an active learning strategy implemented in the classroom to make group work less boring and more enjoyable. Besides being enjoyable, this strategy can foster student engagement. This is because each group competes, creating a more lively learning environment. While Talking Chips fosters student participation, Quiz Team provides a competitive edge that can boost learning enthusiasm. Various studies have supported the effectiveness of the Talking Chips model in improving learning outcomes.

Research conducted by Harefa (2023) showed that Talking Chips significantly improved student learning outcomes. Dewi (2019) also found improved learning outcomes in each learning cycle after implementing this model. Similar research by Alawi (2019) demonstrated that this method is effective in creating an active and immersive learning environment. Meanwhile, research on the Quiz Team strategy has also shown encouraging results. Afrida (2020) reported an increase in student learning interest after implementing Quiz Team. Research by Jawaher (2023) even showed that this strategy not only increased interest but also positively impacted learning outcomes. Febriyanti et al. (2023) also stated that Quiz Team significantly increased students' average grades from cycle I to cycle II. Similar research by Alawi (2019) demonstrated that this method is effective in creating an active and immersive learning environment. Meanwhile, research on the Quiz Team strategy has also shown encouraging results. Afrida (2020) reported an increase in student learning interest after implementing Quiz Team. Research by Jawaher (2023) even showed that this strategy not only increased interest but also positively impacted learning outcomes. Febriyanti et al (2023) also stated that Quiz Team significantly increased students' average grades from cycle I to cycle II.

Based on the background description, the problem that is the focus of this research is whether the application of the Talking Chips type cooperative learning model based on the Quiz Team strategy has an effect on students' learning interest, and whether the application of this model also has an effect on the science learning outcomes of class VIII students at SMPN 26 Pontianak City.

METHOD

This study used a quantitative approach through a Quasi-Experimental Design model with a Posttest-Only Control Group design. The quantitative approach was used because this study focused on measuring the effect of treatment on certain variables objectively and measurably. The Quasi-Experimental design was chosen because researchers could not fully control all external variables, but still be able to compare results between the experimental and control groups (Hastjarjo, 2019).

In this design, two classes were given treatment and a posttest at the end of the session, then their learning interests and outcomes were compared. The following design was used in this study (Nasution, 2019).

Tabel 1. Posttest Only Control Group Design

Class	Treatment	Posttest
Experimental	X	O_1
Control	-	O_2

Description:

X : Implementation of the Talking Chips cooperative model based on the quiz team strategy in the experimental class.

O_1 : Posttest of the implementation of the Talking Chips cooperative model based on the quiz team strategy in the experimental class

O_2 : Posttest of the implementation of the conventional model in the control class

The data collection techniques were carried out through questionnaires, post-tests, and interviews to obtain data regarding learning interests, learning outcomes, and student responses to the learning model applied.

The questionnaire is a list of questions related to students' learning interests in the model implemented by the researcher. The questionnaire is used to measure respondents' perceptions of their learning interests, which will be measured through four indicators: interest, enjoyment, attention, and student participation/involvement. Respondents will then be asked to choose one answer that best reflects their feelings during the learning activities. The data processing of the student learning interest questionnaire uses percentages with the following formula (Rahmajati & Dewi, 2024).

$$Pm = (m.100) : M$$

Description:

Pm : Percentage of student interest in learning

m : Total student interest in learning score

M : Maximum interest in learning score

The data obtained will be classified according to the following table 2 (Rahmajati & Dewi, 2024).

Table 2. Learning Interest Percentage Criteria

Interval (%)	Criteria
80% - 100%	Very High
70% - 79%	Tall
60% - 69%	Enough
50% - 59%	Low
0% - 49%	Very Low

After the questionnaire, a post-test was also used in this study. A post-test is a method used to collect data in the form of student scores by providing a number of multiple-choice questions

for students to complete. The results are then analyzed quantitatively to determine their level of achievement or understanding. The formula for finding the average score can be used (Fatikasari et al., 2020) as follows.

$$M = \frac{\Sigma X}{N}$$

Description: M : Average score
ΣX : Total scores of all students
N : Number of students who look the test

The next stage is the interview. An interview is a conversation between two or more people in which one party asks questions and the other provides answers. The primary goal is to gather information, opinions, and data from the interviewees, for example, regarding learning conditions, perceptions of the learning model being implemented, and obstacles encountered during the learning process (Shofwani & Rochmah, 2021).

The data analysis in this study was carried out quantitatively through a statistical approach to test the research hypothesis, with the help of IBM SPSS software version 24. Before conducting the hypothesis test, prerequisite tests were first carried out which included normality tests and homogeneity tests to ensure that the data met the parametric statistical assumptions (Baihaqi & Zulkarnaen, 2024). The normality test is a statistical procedure used to determine whether the data in a sample comes from a normally distributed population (Pangkerego & Sojow, 2021). In this study, the normality test was conducted using the Kolmogorov–Smirnov test (for $n > 50$) or the Shapiro–Wilk test (for $n \leq 50$) using SPSS version 24 software. The criteria for the normality test are as follows (Oktavia et al., 2019).

a. If the value (Sig.) < 0.05, then the data is not normally distributed.
b. If the value (Sig.) > 0.05, then the data is normally distributed.

Homogeneity testing is important to ensure that the data groups being compared have equal variance or diversity, especially before forming hypotheses (Pangkerego & Sojow, 2021) . The criteria for homogeneity testing are as follows (Oktavia et al., 2019).

a. If the value (Sig.) is <0.05, the data is not homogeneous.
b. If the value (Sig.) is >0.05, the data is homogeneous.

If the data is normally distributed and homogeneous, an Independent Sample T-Test is conducted to determine differences in interest and learning outcomes between the experimental and control classes. However, if the data is not normally distributed, the non-parametric Mann-Whitney test is used as an alternative to the t-test. The criteria for both the t-test and the Mann-Whitney test are as follows (Oktavia et al., 2019).

a. If sig < 0,05 H_1 is accepted, which means there is a difference
b. If sig > 0,05 H_0 is accepted, which means there is no difference

The results of this statistical test only indicate whether there is a significant difference between the two groups. However, they do not indicate the extent of the treatment's effect. Therefore, an effect size calculation is necessary to determine whether the effect is small, medium, or large(I. P. Sari et al., 2022). The formula for calculating the correlation value from the t-test is as follows.

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

Decription: r : Effect size value in correlation form
t : Statistical value from the t-test results
df : Degrees of freedom

Meanwhile, the formula for calculating the correlation from the results of the Mann-Whitney test includes.

$$r = \frac{z}{\sqrt{N}}$$

Decription: r: Effect size value in correlation from
z: Statistical value from the Mann-Whitney test
N: Total number of student in both classes

In addition, the interpretation of effect size values is divided into the following categories (Yulyanti, 2022).

Table 3. Interpretation of Effect Size Categories

Value Range	Category of Influence
0,01 ≤ D < 0,2	Very Low
0,2 ≤ D < 0,5	Low
0,5 ≤ D < 0,8	Moderate
0,8 ≤ D < 1,2	Big
1,2 ≤ D < 2	Very large
D ≥ 2	Hugh

The formula for calculating Cohen's D (Ellis, P.D, 2010) is as follows

$$d = \frac{2r}{\sqrt{1 - r^2}}$$

Description: d: Efect size Cohen's D
r: Correlation value

RESULTS AND DISCUSSION

Result

The questionnaire results showed that the average learning interest of students in the experimental class reached 91.8%, categorized as "very high." Meanwhile, the average learning interest of students in the control class was 69.4%, categorized as "sufficient." The percentages for each indicator are shown in the following graph.

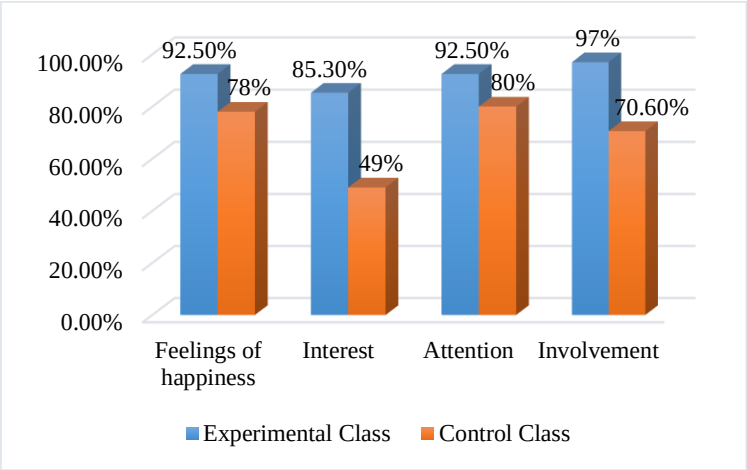

Figure 1. Comparison graph of learning interest in the experimental and control classes

The graph above shows a comparison of the level of learning interest between the experimental class and the control class as measured by four indicators: happiness, interest, attention, and engagement. The happiness indicator for students in the experimental class showed a

percentage of 92.5%, higher than the control class, which reached 78%. Similarly, the interest indicator for the experimental class showed a percentage of 85.3%, while the control class only had 49%. The attention indicator also showed higher results in the experimental class, with a percentage of 92.5% compared to the control class, which reached 80%. Meanwhile, the engagement indicator achieved the highest score in the experimental class, at 97%, much higher than the control class, which obtained a score of 70.6%. To determine whether this difference was statistically significant, a series of data analysis tests were conducted.

The results of the normality test show that the learning interest in both the experimental and control classes has a Shapiro-Wilk significance value > 0.05, so the learning interest data is normally distributed. Furthermore, the results of the homogeneity test show a value greater than 0.05, which means that the learning interest data has a homogeneous variance. Because the learning interest data in the experimental and control classes are normally and homogeneously distributed, the test is continued with a t-test to determine any significant differences between the two. The results of the t-test on the learning interest data obtained a significance value (Sig. 2-tailed) < 0.05, which means there is a significant difference between the learning interest of students in the experimental and control classes. The next step is to calculate the effect size value to determine how much influence the learning model has on learning interest using the following formula.

$t^2 = 7,911^2 = 62,57$

$df = 62,765$

$$r = \sqrt{\frac{t^2}{t^2+df}} = \sqrt{\frac{62,57}{62,57+62,765}} = \sqrt{0,4991} = 0,71$$

The correlation value obtained was 0.71, which was then converted to Cohen's d effect size using the following formula.

$$d = \frac{2r}{\sqrt{1-r^2}} = \frac{2\ x\ 0,71}{\sqrt{1-0,71^2}} = \frac{1,42}{\sqrt{0,4959}} = \frac{1,42}{0,704} = 2,02$$

Based on the calculation results, the Cohen's d value was 2.02, which is included in the "Very Large" category.

The average learning outcome for the experimental class was 68.82, higher than the control class' average of 60.16. A comparison of the average learning outcomes can be seen in the following graph.

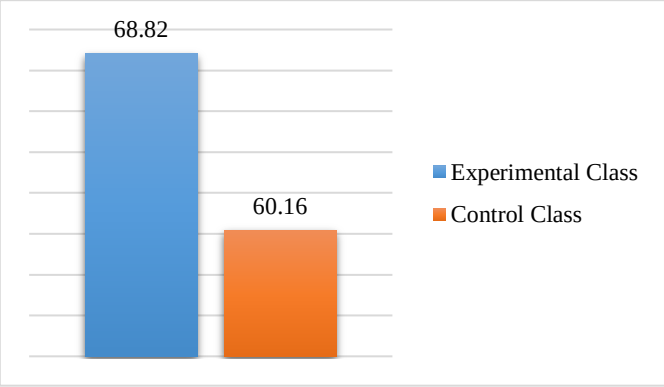

Figure 2. Comparison Graph of Learning Outcomes Experimental and Control Classes

Meanwhile, the results of the normality test showed that the learning outcome data (posttest) of the experimental class and the control class were not normally distributed. Therefore, the

learning outcome hypothesis test was conducted using the Mann-Whitney test. Based on the results of the Mann-Whitney test, the Asymp. Sig. (2-tailed) value was obtained <0.05, which means there was a significant difference between the learning outcomes of the experimental class and the learning outcomes of the control class. The effect size calculation to determine how much influence the learning model has on learning outcomes is carried out using the following formula.

Z = 1,995

N = 66

$$r = \frac{z}{\sqrt{N}} = \frac{1,995}{\sqrt{66}} = \frac{1.995}{8,1} = 0,25$$

Based on the calculations, the correlation value was 0.25. Converting this to Cohen's d effect size yields the following results.

$$d = \frac{2r}{\sqrt{1-r^2}} = \frac{2\ x\ 0,25}{\sqrt{1-0,25^2}} = \frac{1,42}{\sqrt{0,9375}} = \frac{1,42}{0,968} = 0,52$$

The calculation results show a Cohen's d value of 0.52 which is included in the "Moderate" category.

DISCUSSION

Interest in learning is a drive within students to carry out learning activities with a feeling of pleasure and without coercion (Nugroho et al., 2020). Based on the questionnaire results, a difference in the level of student learning interest was found between the experimental and control classes. The average student learning interest in the experimental class reached 91.8% and was categorized as "very high." In contrast, in the control class, the average was only 69.8% and was categorized as "sufficient." This difference indicates that the Talking Chips cooperative learning model based on the Quiz Team strategy is able to create a pleasant learning atmosphere, increase student interest in learning, and encourage their active involvement in class.

According to Sadirman (2011), interest in learning will grow if the learning process takes place in a pleasant atmosphere and provides space for students to actively participate. This is reinforced by Ilham (2022), who states that the Talking Chips model can significantly increase student interest through group discussions that encourage participation and courage in expressing opinions. Meanwhile, conventional learning applied in the control class has not been able to stimulate students' interest in learning. The monotonous classroom atmosphere and lack of student involvement are factors that contribute to low interest in learning in that class. This is supported by findings Ningtyas & Pradikto (2025) which states that conventional learning is less able to attract students' interest in learning because it does not involve creativity, engagement, and an interactive learning atmosphere. Interest in learning in this study was analyzed based on four main indicators, namely feelings of enjoyment, interest in the material, attention, and student engagement during learning.

On the happiness indicator, students in the experimental class showed a very high level of enthusiasm with a percentage of 92.5%. The results of student interviews stated that the learning process was very enjoyable, making them more active. feelings of happiness in learning play an important role in increasing students' interest in learning, because enjoyable learning can foster enthusiasm among students. Conversely, students in the control class also felt happy (78%). The interview results revealed that some students enjoyed the learning

process even though the teacher used the lecture method. They still felt happy because the learning process was calm. In fact, in another study, it was found that with the application of conventional methods, students' feelings of happiness still increased from 73% to 80% (Syarifuddin et al., 2023).

In line with Pusvyta Sari (2015), feelings of happiness in learning play an important role in increasing students' interest in learning, because enjoyable learning can foster enthusiasm among students. Conversely, students in the control class also felt happy (78%). The interview results revealed that some students enjoyed the learning process even though the teacher used the lecture method. They still felt happy because the learning process was calm. In fact, in another study, it was found that with the application of conventional methods, students' feelings of happiness still increased from 73% to 80% (Syarifuddin et al., 2023).

Interest indicators also showed differences, with 85.3% of students in the experimental class feeling interested in learning because they felt challenged and confident when discussing. They said they felt challenged and confident because in learning activities, students had to compete to answer questions with the rule that they had to raise their chips first, so that the classroom atmosphere became competitive. In line with the findings Sarifa et al (2021), which states that this talking chips model is able to increase student interest and activity through structured interaction. Meanwhile, in the control class, student interest only reached 49%. Students admitted to being bored because the learning process was dominated by the teacher's explanations without any activities that directly involved them. This is in line with the opinion of Nesi & Akobiarek (2018), who stated that the lecture method is only able to attract the attention of a small number of students, while the rest easily get bored and lose focus.

Differences in learning interest were also seen in student attention indicators. The experimental class obtained an attention percentage of 92.5%, indicating that the majority of students paid full attention during learning. Based on interview results, students said that during team quizzes, they were required to listen carefully in order to answer quickly and accurately, thereby increasing their concentration levels during learning activities Anggara & Kustini (2021) also found that the quiz team strategy was able to improve student concentration. In contrast, although the attention of students in the control class was also high (80%), the interview results mentioned that students still paid attention to the teacher's explanations because they were worried about missing important points related to the material for answering test questions. Rahmawati (2018) emphasizes that extrinsic motivation, such as fear of falling behind in class, is very effective in focusing students' attention.

The engagement indicator shows that 97% of students in the experimental class were actively engaged during the learning process. Students said that they were more enthusiastic about learning because the learning was conducted in the form of group competitions, so they had to participate because they wanted to support their group and did not want to lose.Anggara & Kustini (2021) revealed that the quiz team model encouraged students to be more responsible and actively participate. Meanwhile, student engagement in the control class was 70.6%. The interview results showed that students participated in learning only because they felt obligated to do so, not because they were interested, and they studied only to get good grades on daily assignments and tests.

Juwariah (2018) states that the lecture method only makes students more passive and turns the learning process into a mere routine. Overall, the t-test results show a significant effect on learning interest with a significance value of < 0.05 and an effect size of 2.02, which falls into the “very large” effect category. This proves that the quiz team-based talking chips learning approach can create more interesting and competitive learning and trigger the overall involvement of students. Mulyadi (2012) states that interest in learning will grow when students feel involved, are given space to express their opinions, and experience a meaningful

learning process. Learning outcomes are everything that students acquire after participating in the learning process, which in this study was measured through a final test (post-test). The following figure presents a comparison of post-test scores between the experimental class and the control class.

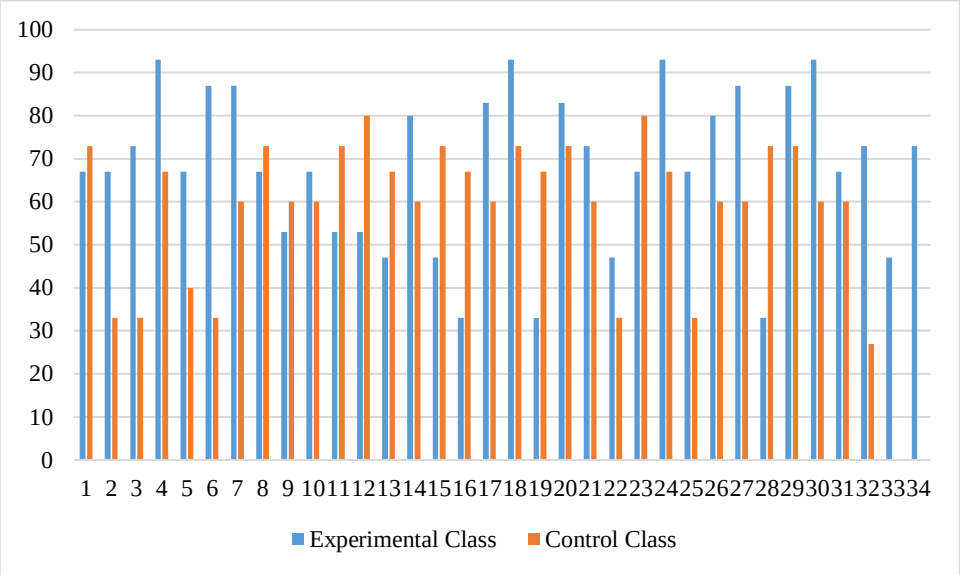

Figure 3. Comparison chart of post-test scores for the experimental class and control class

Based on the Figure 3, it can be seen that in general, the scores of students in the experimental class were higher than those in the control class. The average post-test score of students in the experimental class reached 68.82, while that of the control class was only 60.16. This difference was then analyzed using the Mann-Whitney test, which produced a significance value of < 0.05, indicating that there was a significant difference between the learning outcomes of the two classes. To determine the extent of the treatment's influence, an effect size calculation was performed, which yielded a value of 0.52. This value falls into the “moderate” influence category, indicating a positive impact of the Talking Chips cooperative learning model based on the Quiz Team strategy on student learning outcomes. The results of this study are in line with the findings of Harefa (2023), which state that the Talking Chips learning model has a positive effect on students' academic achievement. Dewi (2019) also showed that the use of the Talking Chips cooperative model was effective in improving student learning outcomes. Furthermore, Jawaher (2023) proved that the Quiz Team strategy contributed to improving learning outcomes, and Febriyanti, Andi, dan Ahmad (2023) expressed similar findings in their research.

The difference in average scores and hypothesis test results between the two classes shows that interactive and collaborative learning approaches contribute to improved learning outcomes. Activities such as group discussions, turn-taking systems using chips, and team quizzes encourage students to be more actively involved and give them equal opportunities to participate. (Mufidah et al., 2025). A fair, enjoyable learning atmosphere that is not dominated by certain individuals creates an environment that encourages students to express their opinions and answer questions. These conditions have an impact on student learning outcomes. This is reinforced by Sembiring (2023), who states that cooperative learning models can improve academic achievement because involve students in working together to achieve common goals.

Further analysis of the relationship between interest and learning outcomes in the experimental class shows that high interest in learning does not always correlate with student learning outcomes. Of the 34 students, 22 students (64.7%) had high interest in learning but their post-test scores were still below the minimum passing grade. The interview results showed that the

main cause was not a lack of mastery of the material, but rather non-academic factors such as uncertainty, carelessness when reading questions, limitations in time management, and not understanding the meaning of the questions. Sari (2018) emphasized that self-confidence greatly influences the utilization of knowledge in exams.

Lutvaidah & Hidayat (2019) mentioned that attention and thoroughness are important aspects in the learning process, and Fitriya (2023) added that time management skills are also part of learning readiness that directly influences students' final results. In fact, answering questions without deep understanding is also an obstacle, as explained by Kusuma & Nurmawanti (2023), that good learning strategies are the key to understanding and the ability to solve problems correctly. Thus, interest in learning does play a major role in increasing student engagement in learning, but it is not the only determinant of academic success. Learning outcomes are also greatly determined by initial abilities, learning strategies, question-answering skills, and independent learning habits outside the classroom. As stated by Tohir & Herpratiwi (2022), interest in learning is an internal drive that fosters enthusiasm, but learning success still requires intellectual ability and continuous reinforcement of material.

CONCLUSION

Based on the research results, it can be concluded that the implementation of the Talking Chips cooperative learning model based on the Quiz Team strategy has a significant influence on the interest and learning outcomes of class VIII students at SMPN 26 Pontianak City. Students in the experimental class who received treatment through this model showed a very high level of learning interest, reaching 91.8%, while the control class only obtained 69.4% with a sufficient category. The t-test results showed a significance value below 0.05 and an Effect Size of 2.02, which means there was a very strong influence on increasing student learning interest. Meanwhile, for learning outcomes, the average post-test score of the experimental class showed a value of 68.23, higher than the control class which obtained a value of 60.16, with an Effect Size of 0.52 (moderate category) based on the results of the Mann-Whitney test.

RECOMMENDATIONS

To obtain a more comprehensive improvement in learning outcomes, it is recommended to conduct further testing on factors that can improve learning outcomes, such as learning motivation, student learning styles, learning environments, or the role of learning media.

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