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The Implementation of the Teams Games Tournament (TGT) Cooperative Learning Model to Improve Learning Outcomes on the Chemical Reaction Rate Topic in Grade XI

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ABSTRACT

Chemistry is often perceived as a difficult subject by most students. This is largely due to the complexity of the material, which requires deep understanding and strong analytical skills. Based on the initial observation, several issues were identified, ranging from students appearing disengaged to low learning outcomes. To address these problems, the researcher proposed an alternative solution by implementing the Teams Games Tournament (TGT) type of Cooperative Learning model in the learning process. This study aims to examine the effectiveness of applying the Teams Games Tournament Cooperative Learning Model to the Reaction Rate topic. The subjects of this research were 27 eleventh-grade students at the private Islamic Senior High School (MA) Al Riyadhul Janah. The Classroom Action Research (CAR) was conducted in two cycles, each consisting of four stages. The success indicators of this study were an improvement in the teacher's performance scores and an increase in the students' average learning outcomes, reaching above the Minimum Mastery Criteria (KKM), which was set at 75. The findings revealed that the implementation of the Teams Games Tournament Cooperative Learning model was effective in improving students' learning outcomes. In the second cycle, the average score increased to 79, showing a 31.6% improvement compared to the initial observation. However, the first cycle experienced a decrease of 13.3% from the initial results. This decline was caused by several factors, which were then addressed through reflection and improvement in the subsequent cycle. After implementing revisions in the second cycle, the Classical Mastery Level reached 70%, indicating that the research was deemed successful as it had met the predetermined success criteria.

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INTRODUCTION

The rapid advancement of technology today has brought numerous opportunities as well as challenges to human life. In this digitalization era, the growing interconnectedness of various fields has created complex dynamics, making it essential for individuals to prepare themselves to face future challenges and problems. In responding to these developments, education plays a crucial role in equipping students to navigate the Digital Era (Saputra, 2024). Chemistry is one of the subjects

that holds a significant role in technological development and everyday life. This is because almost every aspect of life is inseparable from chemical science, making the inclusion of chemistry as an essential component of the educational curriculum a strategic and effective step (Sulistina et al., 2024). However, students often perceive Chemistry as a difficult subject, as it requires in-depth understanding and strong analytical skills to comprehend its complex concepts. One of the chemistry topics considered challenging is the reaction rate. This is because reaction rate material not only consists of abstract concepts and theories but also involves mathematical calculations that require frequent practice (Muliaman, 2021).

Students' difficulties in understanding chemistry material are not only influenced by the abstract nature of the subject but also by the limitations of teachers in utilizing appropriate learning strategies and media, which in turn affects students' learning interest (Waruwu & Sitinjak, 2022). The use of ineffective or unsuitable teaching methods can hinder students from receiving and applying the material in their daily lives. Furthermore, students' lack of understanding of chemistry concepts may reinforce their perception of chemistry as a difficult subject to comprehend (Taruklimbong & Sihotang, 2023).

One of the learning models that can be implemented in Chemistry instruction is the Teams Games Tournament (TGT) type of Cooperative Learning model. This is because the TGT approach promotes student interaction through peer tutoring roles while fostering collaboration, responsibility, and healthy competition through educational game-based activities (Najmi et al., 2021). The application of cooperative learning in classroom activities contributes to the development of students' social competencies, particularly in areas such as teamwork, mutual support, and increased self-confidence within both social and academic interactions (Amni & Ningrat, 2021). Moreover, the implementation of the Teams Games Tournament (TGT) model also encourages students to construct their own understanding in solving given problems and strengthens collaboration through group discussions and idea exchanges among members (Rahayu et al., 2022).

Based on the initial observations conducted using the lecture method, it was found that students tended to be passive during the learning process, resulting in one-way instruction. In addition, the average learning outcomes were still far below the Minimum Mastery Criteria (KKM), which was set at 60. As outlined above, such issues may arise due to the use of inappropriate learning models. Therefore, the researcher deemed it necessary to conduct a study on improving student learning outcomes in the Reaction Rate topic for eleventh-grade students through the implementation of the Teams Games Tournament type of Cooperative Learning model. The purpose of this study was to examine the effectiveness of applying the Teams Games Tournament Cooperative Learning Model to the Reaction Rate material in grade XI.

METHODS

The method used in this study was Classroom Action Research (CAR). Classroom Action Research is a reflective form of research aimed at improving the learning process so that instruction becomes more effective. Essentially, this research seeks to enhance and refine the quality of teaching by focusing on the teaching and learning activities that take place within the classroom (Solehan et al., 2023). Classroom Action Research was first introduced in Indonesia in the late 1980s. However, it had

previously been developed earlier in the United States by a social psychologist named Kurt Lewin in 1949, and was later refined by other experts such as Robbin McTaggart, Stephen Kemmis, Dave Ebbutt, John Elliott, and others (Alfaqih et al., 2023). In its implementation, this study adopted Kurt Lewin's model of Classroom Action Research, which was carried out in two cycles, each consisting of four stages: Planning, Action (Acting), Observation, and Reflection. These stages can be illustrated as follows.

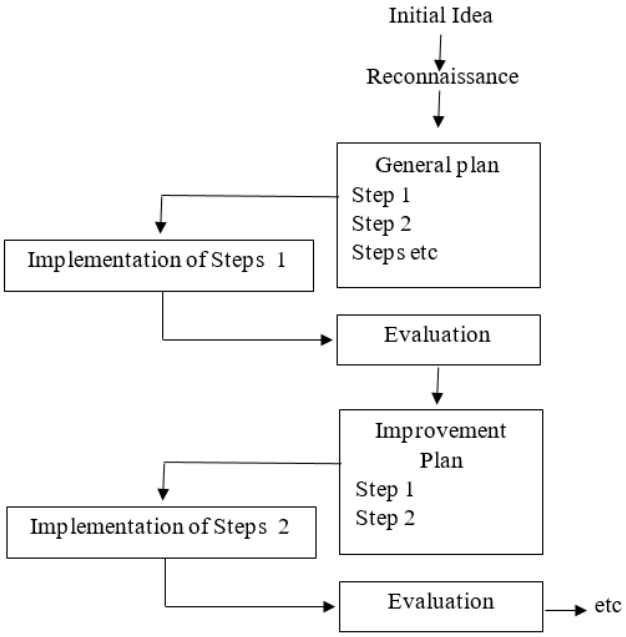


Figure 1. Kurt Lewin's Action Research Model (Source: Solehan et al., 2023)

This research was conducted at MA Swasta Al-Riyadhul Janah, located in the Maja area of Lebak Regency, Banten. The research subjects consisted of 27 eleventh-grade students, comprising 11 males and 14 females. The data collection techniques included classroom observations conducted together with a peer collaborator, as well as assessment of student learning outcomes. A total of 10 multiple-choice questions were administered to students at the end of each learning session. The success indicator of this study was determined by an increase in observation results and an improvement in the average student learning outcomes, reaching a score above the Minimum Mastery Criteria (KKM), which was set at 75. To calculate the improvement in learning outcomes, the following formula was used:

$$KK = \frac{X}{Z} \times 100\%$$

where **KK** refers to Classical Mastery, **X** represents the number of students who scored ≥ 75, and **Z** denotes the total number of students (Aswadin et al., 2023).

RESULT AND DISCUSSION

Pre-Cycle

The students' learning outcomes obtained during the initial observation showed that the average score was still below the Minimum Mastery Criteria (KKM). The learning process at this stage was conducted using only a single method, namely lecturing, which resulted in teacher-centered instruction with minimal student

engagement. The students' learning outcomes in the pre-cycle observation are presented in Table 1.

Table 1. Students' learning outcomes in the pre-cycle

Category	Number of Students	Percentage
X ≥ 75	5	19%
X < 75	22	81%
Average Score: 60		

Based on Table 1, the average student score was 60, which remains below the KKM. Furthermore, only 5 students (19%) were classified as "Mastery" based on achieving scores above the KKM. The low learning outcomes may be caused by several factors, one of which is the selection of an inappropriate learning model. The learning model used must align with the teaching material in order to achieve the learning objectives (Marfu'ah et al., 2022). These findings are consistent with a study conducted by Bunga M. H. D. et al. (2022), which stated that the monotonous use of lecture-based instruction can lead to low student achievement. Therefore, an interactive learning model is needed to improve student learning outcomes.

Cycle I

Based on the results of the initial observation, improvements were made in Cycle I by implementing the Teams Games Tournament (TGT) type of Cooperative Learning model. This learning model was expected to improve student learning outcomes through group-based activities and tournament sessions designed to increase student motivation. The students' learning outcomes in Cycle I are presented in Table 2.

Table 2. Students' learning outcomes in cycle I

Category	Number of Students	Percentage
X ≥**75**	1	4%
X <**75**	26	96%
Average Score: 52		

Based on the results in Cycle I, the percentage of students who achieved mastery was only 4%, equivalent to 1 student scoring above the KKM, while 96% or 26 students scored below the KKM. The overall average score was 52. Although students appeared more active during the learning process in Cycle I, the improvements made were still far from optimal. The outcomes did not yet meet the success indicators set for this study. Therefore, additional improvements to the learning process were deemed necessary.

In Cycle I, the Teams Games Tournament Cooperative Learning model was implemented using a lecture method supported by presentation slides, which did not provide students with direct hands-on experience. As a result, students struggled to internalize the material and apply it in real-life contexts. Consequently, for the next cycle, the researcher decided to incorporate a practicum method into the learning process.

Cycle II

Cycle II was conducted by incorporating a practicum method into the learning activities. The steps implemented in Cycle II to improve the learning process were as follows: (1) Students were divided into heterogeneous groups; (2) The teacher explained the material using presentation slides; (3) Each group assigned different practicum tasks to each member; (4) Students with the same practicum task gathered with members from other groups to conduct the practicum collaboratively; (5) After completing the practicum, students returned to their original groups and discussed the experimental data obtained; (6) Each group held a discussion and completed the Student Worksheet (Lembar Kerja Peserta Didik); (7) Tournament; (8) Reflection and evaluation. After evaluating students' understanding, the learning outcomes in Cycle II were obtained as shown in Table 3.

Table 3. Students' learning outcomes in cycle II

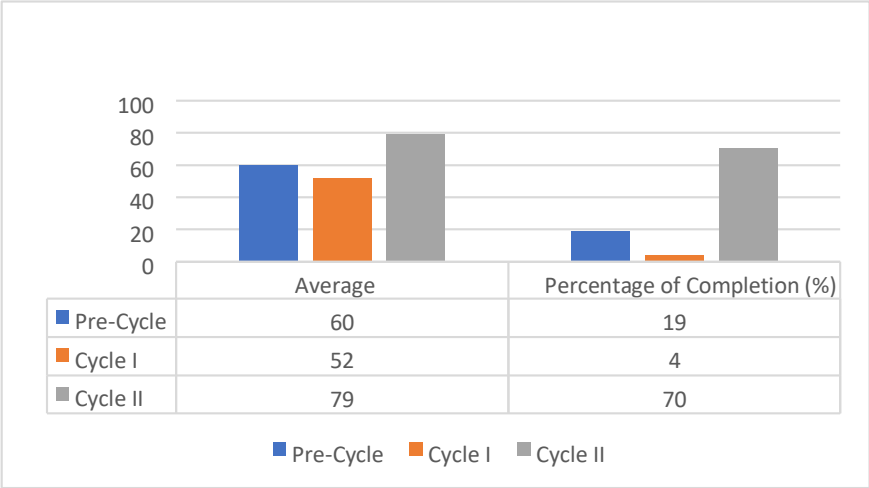
Category	Number of Students	Percentage
X ≥ 75	19	70%
X < 75	8	30%
Average Score: 79		

Based on Table 3, the average student score was 79, which is above the KKM, with a mastery percentage of 70%, equivalent to 19 students. Although not all students achieved scores above the KKM, there was a clear improvement in both observational results and average learning outcomes, surpassing the Minimum Mastery Criteria (KKM) of 75. Therefore, the results of Cycle II indicated that the success indicators of the study had been achieved.

Discussion

Based on the results obtained in the pre-cycle, Cycle I, and Cycle II, the comparison of students' learning outcomes can be presented as follows. Figure 2 illustrates the comparison across each stage, from the pre-cycle to Cycle II. The learning outcomes in Cycle I showed a decline compared to the pre-cycle results. There was a decrease of 8 points in the average student score compared to the pre-cycle, and the number of students who achieved mastery also dropped by 15%. A similar pattern was reported by Jumrah (2023) in her research on the role of the Jigsaw learning model in improving achievement in Mathematics. Her findings revealed that student learning outcomes declined in Cycle I compared to the pre-cycle. The average score in the pre-cycle was 45.00, but in Cycle I it decreased to 42.18, indicating a drop of 2.82 points.

The decline in students' learning outcomes during Cycle I may have been caused by several factors, such as their unfamiliarity with the newly implemented learning model and the use of methods that were not yet fully aligned with the material being taught. Moreover, Chemistry itself is characterized as a field of science that requires a systematic process based on scientific methods to understand concepts, laws, rules, and scientific principles.



	Average	Percentage of Completion (%)
Pre-Cycle	60	19
Cycle I	52	4
Cycle II	79	70

Figure 2. Comparison of learning outcomes in the pre-cycle, cycle I, and cycle II

According to Suswati (2021), several factors contribute to low achievement in Chemistry learning, namely: (1) the abstract nature of Chemistry materials, which demand conceptual understanding and application, (2) students' difficulty in applying chemical theories, (3) low learning motivation, and (4) the perception that Chemistry is a difficult subject. Among these four factors, the third issue has been addressed through the use of the Tournament model during the learning process. In Cycle I, students appeared enthusiastic in participating in the activities, as illustrated in Figure 3.

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Figure 3. Learning activities in cycle I

Meanwhile, issues related to points (1) and (2) can be addressed by implementing methods that provide students with hands-on learning experiences. One such method is experimentation or laboratory practice. Besides offering direct experience, experimental methods also create an active and interactive learning atmosphere (Permatasari et al., 2022).

In Cycle II, students' learning outcomes showed a significant improvement compared to the pre-cycle and Cycle I. There was an increase of 66% in the number of students who achieved scores above the Minimum Mastery Criterion (KKM) compared to Cycle I. Additionally, the average score of students in Cycle II increased by 27 points compared to Cycle I. Based on these improvements, it can be concluded

that the corrective actions implemented based on the reflection in Cycle I had a positive impact on students' learning outcomes.

CONCLUSION

Based on the classroom action research conducted in Class XI of MA Alriyadhul Janah over two cycles, it was found that the implementation of the Cooperative Learning Model of the Teams Games Tournament (TGT) type was able to improve students' learning outcomes. The results showed an increase in learning achievement in Cycle II compared to Cycle I and the pre-cycle. Although students' performance had initially declined in Cycle I, the reflection and improvements made after Cycle I succeeded in enhancing the learning process in Cycle II. The decrease in Cycle I performance may have been caused by several factors, one of which was the use of a teaching method that was not aligned with the nature of the subject matter. Chemistry is an abstract subject consisting of both concepts and processes; therefore, practical or experimental methods are essential in chemistry instruction to provide students with direct learning experiences through hands-on activities.

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