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# Improving Relay Running Learning Outcomes through the Cooperative Learning Method of the Team Accelerated Instruction Model among Sixth Grade Students at SD 017137 Mekar Sari Asahan

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**Abstract:** This study aimed to determine the improvement of relay running learning outcomes through the Team Accelerated Instruction (TAI) cooperative learning model for sixth-grade students at SD 017137 Mekar Sari Asahan in the 2023/2024 academic year. Theoretically, this model emphasizes teamwork, individual accountability, and collaborative learning to enhance psychomotor skills and mastery of physical techniques. The research employed a Classroom Action Research (CAR) approach based on the Kemmis and Taggart spiral model, consisting of planning, acting, observing, and reflecting stages. The study involved 18 students as research subjects, using an observation rubric to assess relay running techniques, including starting, baton exchange, and finishing skills. The results showed that only 27.8% of students achieved mastery in the pre-test, with an average score of 57. After applying the TAI model in cycle I, 44.4% of students achieved mastery with an average score of 70. In cycle II, the number increased to 83.3% with an average score of 78, meeting the classical mastery criterion of 80% (minimum score 75). These findings indicate that the TAI model effectively improved students' relay running performance by promoting cooperative interaction, technical skill enhancement, and active participation.
**Keywords:** Relay Running; Cooperative Learning; Team Accelerated Instruction

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## INTRODUCTION

In recent years, educators in physical education have increasingly turned toward cooperative learning strategies to foster more active student engagement, developing not only motor skills but also social interaction and accountability (Morgan, 2019). Morgan (2019) argues that integrating the TARGET structure (task, authority, recognition, grouping, evaluation, time) with cooperative learning elements helps optimize the motivational climate in PE classes. In line with that, Boke (2025) in a meta-analysis of cooperative learning interventions confirmed that cooperative learning significantly outperforms traditional instruction in improving student outcomes across various domains, including psychomotor skills.

Despite these encouraging findings, relatively few studies have specifically explored cooperative learning approaches in the context of relay running. One relevant study is by Fenanlampir (2021) who investigated the effect of the TGT (Teams-Games-Tournament) cooperative learning model on students' cognitive understanding of relay running. He found that students in the TGT group achieved an average posttest score of 81.67, significantly higher than the control group's 75.75 (Fenanlampir, 2021). That study

demonstrates potential cognitive gains, but it does not address the psychomotor performance or technical refinement in relay techniques.

Moreover, research in athletics underscores that cooperative and interactive strategies can enhance technical performance in relay events. For example, a 2025 study on cooperative Kagan structures in track and field contexts reported that structuring teams heterogeneously and emphasizing peer cooperation led to improved 4×100 m relay performance (Al-Samarrai et al., 2025). This suggests that cooperative learning enhancements may translate into more efficient baton exchanges, better synchronization, and stronger inter-athlete coordination.

Beyond athletics, the effectiveness of the TAI model (Team Accelerated Instruction) in boosting academic outcomes provides a theoretical foundation for its potential in motor skill learning. Nasution et al. (2020) showed that applying TAI in reading comprehension significantly improved student motivation and comprehension outcomes. Meanwhile, in mathematics, a quasi-experimental study found that TAI outperformed conventional instruction, with a significance value of $p = 0.000$ (Nasution et al., 2020). These findings indicate that the structural elements of TAI team grouping, formative assessment, and individual accountability are transferable beyond cognitive domains.

On a pedagogical level, the ecology of cooperative learning in physical education has been explored by Casey, Goodyear & Dyson (2015). Their work delineates how teacher practices, class culture, and fidelity to cooperative learning design influence student engagement and outcomes in PE classes (Casey et al., 2015). Such findings highlight that success in applying cooperative methods depends not only on the method itself but also on how well it is embedded in the classroom environment

Given these theoretical and empirical foundations, the present study aims to examine whether applying the TAI cooperative learning model can improve the relay running performance (including starting, baton passing, and finishing) of sixth-grade students at SD 017137 Mekar Sari Asahan in the 2023/2024 academic year. Through classroom action research cycles, this study will assess both the magnitude of improvement and the conditions under which TAI can be most effective in enhancing motor and teamwork competencies..

## METHOD

This research employed Classroom Action Research (CAR) as its methodological approach, following the spiral model proposed by Kemmis and McTaggart. CAR is particularly suited for educational settings because it combines action, observation, and reflection, allowing researchers (often teachers) to iteratively improve instructional practice in situ (Koshy, 2010).

In the context of physical education, action research has been used to adapt teaching methods responsively, refine pedagogical design, and enhance student learning outcomes. The study was conducted in two cycles, each including four phases: planning, acting, observing, and reflecting. During the planning phase, the researcher designed lesson plans incorporating the TAI cooperative learning model specifically for relay running techniques (start, baton exchange, finish). In the acting phase, these lesson plans were implemented in class. The observing phase involved systematic data collection on students' motor performance, group interactions, and responses during the lessons. Finally, the reflecting phase allowed the researcher, sometimes in collaboration with students, to assess the effectiveness of the intervention and refine strategies for the next cycle.

The participants included the entire class of sixth-grade students at SD 017137 Mekar Sari Asahan, totaling 18 students (both male and female). The research was carried out during regular physical education classes over the academic year 2023/2024. The setting was the school's outdoor athletic facility or field, which permitted full-scale relay practice. To maintain consistency, the same teacher (also the researcher) guided all treatment sessions, ensuring familiarity with the students and the pedagogical approach.

Data collection employed a relay running performance rubric developed from standard motor-skill assessment criteria, focusing on the three components: start technique, baton exchange quality, and finishing technique. Each component was scored on a 4-point scale (e.g. 1 = poor, 4 = excellent). Additionally, observation sheets and field notes were used to record qualitative information such as student behavior, peer interaction, errors, and reaction to the TAI method. To strengthen triangulation, pretest and posttest scores were also collected at the start of the first cycle and at the conclusion of the second cycle. Quantitative data (scores) were analyzed using descriptive statistics (mean, percentage mastery), while qualitative data (observations, reflections) were interpreted thematically to inform adjustments in subsequent cycles.

## RESULT AND DISCUSSION

### Result

The results indicate that the TAI cooperative learning approach was highly effective in enhancing the psychomotor performance and teamwork abilities of elementary school students in relay running. The data achieved the expected classical mastery criterion of 80%, confirming that the TAI model successfully bridged gaps in student performance and fostered both skill improvement and cooperative engagement throughout the learning process.

Table 1. Improvement of Relay Running Learning Outcomes through the TAI Model

| Cycle | Number of Students (n) | Students Achieving Mastery (≥75) | Percentage of Mastery (%) | Average Score | Description |
|---|---|---|---|---|---|
| Pre-test | 18 | 5 | 27.80% | 57 | Below Mastery |
| Cycle I | 18 | 8 | 44.40% | 70 | Improved but not yet optimal |
| Cycle II | 18 | 15 | 83.30% | 78 | Achieved Mastery |

The results presented in Table 1 demonstrate a steady and substantial improvement in students' learning outcomes in the relay running activity after applying the Team Accelerated Instruction (TAI) cooperative learning model. During the pre-test phase, only 5 out of 18 students (27.8%) met the minimum mastery criteria (KKM = 75), with an average score of 57, indicating that most students had not yet achieved proficiency in the technical aspects of relay running, particularly in baton passing and start techniques.

Following the first intervention cycle (Cycle I), students were divided into small heterogeneous teams to perform collaborative drills, peer coaching, and reflection sessions as per the TAI framework. This implementation led to an increase in performance, with 8 students (44.4%) achieving mastery and the class average rising to 70. Observations during this phase revealed that students showed greater enthusiasm,

improved coordination, and enhanced understanding of start and baton-handling techniques, though timing and synchronization remained inconsistent.

By the end of Cycle II, there was a marked improvement across all indicators. Fifteen students (83.3%) successfully met or exceeded the mastery criterion, with the class average climbing to 78. This represents an overall gain of 55.5 percentage points in student mastery from the pre-test phase to Cycle II. The improvements were particularly evident in students' ability to coordinate their starts and perform seamless baton exchanges. The increased peer collaboration and feedback core principles of the TAI model appeared to have a positive influence on technical execution and motivation.

## Discussion

The findings of this study clearly demonstrate that the Team Accelerated Instruction (TAI) cooperative learning model can effectively improve students' learning outcomes in relay running. The significant increase in the percentage of students achieving mastery from 27.8% at pre-test to 83.3% in Cycle II suggests that the integration of structured teamwork and peer interaction facilitated better understanding, motivation, and technical performance. This improvement aligns with Morgan (2019), who emphasized that cooperative learning climates in physical education increase intrinsic motivation and enhance psychomotor outcomes through positive peer interdependence and shared responsibility.

The improvement in students' baton-passing and start techniques observed across the cycles supports Fenanlampir's (2021) findings, which highlighted that cooperative strategies such as Teams-Games-Tournament (TGT) improve students' engagement and understanding in athletics. Similar to TGT, the TAI model encourages peer tutoring and mutual accountability, helping students internalize skill sequences more effectively than in traditional, teacher-centered settings. The structured group learning and formative feedback phases in TAI gave students multiple opportunities to observe, imitate, and correct their relay techniques, consistent with motor learning theories emphasizing repetition, modeling, and feedback.

In addition, this study's results resonate with Al-Samarrai et al. (2025), who found that cooperative Kagan-based learning in track-and-field events improved 4×100 m relay performances through enhanced synchronization and teamwork. The TAI model provided similar benefits by promoting communication and coordination among group members. Students learned to adjust their timing and positioning in baton exchanges an essential element for performance efficiency in relay running. The group-based competitive but collaborative environment appears to have nurtured social responsibility, reduced anxiety, and increased task persistence, consistent with the motivational frameworks described by Casey, Goodyear, and Dyson (2015).

From a pedagogical standpoint, the present findings reinforce the theoretical assumptions of Nasution et al. (2020), who showed that TAI can significantly enhance cognitive achievement and student motivation across various disciplines. By merging individualized learning with cooperative group accountability, the model allows students to learn at their own pace while contributing to the success of the team. This combination appears to have a similar effect on psychomotor domains, where individualized correction and collective reflection promote more stable motor learning outcomes..

## CONCLUSION

The findings of this study demonstrate that the application of the Team Accelerated Instruction (TAI) cooperative learning model effectively improved students'

relay running learning outcomes in physical education. Through structured teamwork, active participation, and peer collaboration, students showed significant progress in mastering the technical elements of the relay event starting, baton exchange, and finishing. The improvement from pre-test to the final cycle indicates that the TAI model not only enhanced psychomotor skills but also strengthened students' motivation, cooperation, and confidence during performance. Therefore, the implementation of TAI in elementary physical education can be considered a productive pedagogical approach to support both cognitive understanding and practical skill development in athletics learning, particularly in relay running activities.

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**CONFLICT OF INTEREST**

Clearly explain whether there are any conflicts of interest related to the reported research.

**REFERENCES**

Al-Samarrai, R., Hassan, M., & Zainuddin, F. (2025). The effect of cooperative learning structures on student performance in track and field relay events. Journal of Physical Education and Sports Pedagogy, 18(2), 112–121.

Boke, O. (2025). A meta-analysis of cooperative learning interventions and their effects on student performance and motivation. International Journal of Educational Research, 124, 102–113.

Casey, A., Goodyear, V. A., & Dyson, B. (2015). Action research in physical education: Focusing beyond myself through cooperative learning. Educational Action Research, 23(3), 479–496.

Fenanlampir, A. (2021). Peningkatan hasil belajar lari estafet melalui model pembelajaran kooperatif tipe Teams Games Tournament (TGT). Jurnal Pendidikan Jasmani, 5(2), 121–130.

Koshy, V. (2010). Action research for improving educational practice: A step-by-step guide (2nd ed.). SAGE Publications.

Morgan, K. (2019). Developing a motivational climate in physical education through the TARGET framework. European Physical Education Review, 25(1), 65–82.

Nasution, F., Rahmadani, A., & Hidayat, N. (2020). The effect of Team Accelerated Instruction (TAI) model on students' learning outcomes in mathematics and reading comprehension. Jurnal Pendidikan dan Pembelajaran, 27(3), 215–226.

Trimantara, I. K. B. (2020). Implementasi model pembelajaran TAI untuk meningkatkan hasil belajar PJOK pada siswa sekolah dasar. Jurnal Ilmu Keolahragaan Undiksha, 8(1), 45–54.