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Enhancing Student Engagement and Participation in Elementary Science and Social Studies through Teams Games Tournament Cooperative Learning

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ABSTRACT

Student engagement and participation are essential for interactive elementary science and social studies (IPAS) learning. Limited involvement in questioning, expressing opinions, and teamwork may hinder meaningful learning. This study examined changes in engagement and participation during the implementation of the Teams Games Tournament (TGT) model at SDN Karawang Wetan III. Classroom action research involved 30 students across a pre-cycle and two intervention cycles. Classroom observations assessed seven engagement and seven participation indicators. Descriptive analysis showed improvements in both outcomes. Engagement increased in attention, enthusiasm, active involvement, peer interaction, persistence, and responsibility. Participation improved in questioning, answering, expressing opinions, discussion, cooperation, tournament involvement, and task completion. Reported percentages represent mean indicator-level observation scores rather than proportions of students meeting specific criteria. The findings suggest that structured teamwork, academic games, and individual accountability can provide practical opportunities for collaborative IPAS learning. Teachers should establish clear team roles and encourage individual contributions and questioning. Because the study involved one school and two cycles without a control group, the findings are context-specific and do not establish causality. Future research should examine multiple schools, longer implementation, sustained improvements, and relationships with IPAS achievement.

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1. INTRODUCTION

Learning in elementary education should extend beyond the transmission of knowledge to provide opportunities for students to construct understanding through interaction, collaboration, and meaningful learning experiences. Student engagement is an important consideration because it encompasses students' behavioral involvement, emotional responses, and cognitive investment in learning activities. In elementary classrooms, however, engagement needs to be translated into learning opportunities that

enable students to express ideas, ask questions, exchange perspectives, solve problems, and collaborate with peers [1], [2]. The distinction between engagement and participation is important in this context. Student engagement refers to students' multidimensional involvement in the learning process, including behavioral, emotional, and cognitive dimensions, whereas student participation refers to observable actions through which students contribute to classroom activities. Although these constructs are related, observable participation represents only one aspect of the broader concept of engagement. Distinguishing them provides a clearer basis for examining how instructional strategies support students' involvement in learning.

These considerations are particularly relevant to Ilmu Pengetahuan Alam dan Sosial (IPAS) in elementary schools. IPAS integrates the study of natural and social phenomena and encourages students to observe their surroundings, identify problems, discuss evidence, formulate explanations, and communicate their understanding. Achieving these objectives requires instructional activities that connect subject matter with students' experiences while providing opportunities for interaction and collaborative inquiry. Learning arrangements dominated by teacher explanations or individual responses may provide fewer opportunities for students to exchange ideas and demonstrate their understanding through collaborative activities. Consequently, IPAS instruction requires approaches that combine meaningful content with structured opportunities for students to participate, interact, and engage with learning tasks.

Cooperative learning offers an instructional approach that aligns with these requirements because it organizes students into groups with shared learning objectives and individual responsibilities. Effective cooperative learning, however, involves more than simply placing students in groups. It requires positive interdependence, individual and group accountability, promotive interaction, interpersonal and small-group skills, and group processing [3]. These components establish conditions in which students are expected to contribute to collective work while remaining responsible for their own learning. Previous research has examined the relevance of cooperative learning to science education, particularly its potential to support conceptual understanding, collaborative problem-solving, and the development of social and academic skills [4]–[9]. Nevertheless, the educational value of group-based instruction depends on how learning activities are structured to ensure that students have meaningful opportunities to contribute rather than allowing participation to remain concentrated among a few group members. This consideration is particularly important in IPAS, where observation, discussion, investigation, and explanation can provide multiple opportunities for students to demonstrate both engagement and participation.

One cooperative learning approach that combines teamwork with game-based activities and constructive competition is the Teams Games Tournament (TGT) model. TGT generally comprises class presentations, team formation, academic games, tournaments, and team recognition. Students first encounter the learning material and subsequently work in heterogeneous teams to discuss concepts and prepare for academic challenges. They then participate in games and tournaments that require them to respond to questions or solve problems related to the instructional content. This structure connects collaborative

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preparation with opportunities for individual performance and collective recognition. The combination of these components may encourage students to contribute to team learning, sustain their attention, and participate in academic activities within a more interactive classroom environment [4], [5]. The relevance of TGT to IPAS therefore lies not merely in the inclusion of games but also in its potential to organize peer interaction, individual accountability, and content-related participation within a coherent instructional sequence.

Previous empirical studies provide support for the potential of TGT to encourage student activity across different educational contexts. For example, a study of TGT in chemistry learning reported that average student activity increased from 53.43% in the first cycle to 57.18% in the second cycle and 64.47% in the third cycle [10]. Research on TGT assisted by Biodomino in ecosystem learning similarly reported that all students in the experimental class were categorized as active, alongside the achievement of expected learning outcomes by a substantial proportion of students [11]. These findings are relevant to IPAS because science-related topics, including ecosystems and environmental phenomena, can be addressed through interactive learning tasks. Evidence from these studies suggests that TGT can support active classroom involvement; however, the reported outcomes also need to be interpreted in relation to the instructional materials, learning contexts, and indicators used in each investigation. The findings do not, by themselves, establish that the same outcomes will occur in every elementary IPAS classroom [10], [12].

Further evidence comes from research combining TGT with other instructional approaches. A classroom action research study integrating TGT with Discovery Learning in science education reported an increase in the average achievement score from 59.92 in the pre-cycle to 82.56 in Cycle II, accompanied by improvements in student engagement, participation, and motivation [13]. Related research has also examined the use of TGT in science learning and its potential to support active involvement in classroom activities [13], [14]. Although such findings strengthen the rationale for using TGT in science-related subjects, improvements in achievement, motivation, engagement, and participation should not be treated as interchangeable outcomes. Achievement reflects learning performance, motivation concerns students' willingness or drive to engage in an activity, engagement encompasses broader dimensions of involvement, and participation refers to observable contributions during instruction. These distinctions indicate the importance of specifying the outcomes being examined when evaluating the implementation of TGT.

Research in elementary education further illustrates the potential for adapting TGT to students' developmental characteristics. A study developing a TGT learning model for lower-grade elementary students reported that the average score increased from 21.20 before treatment to 28.10 afterward [15]. Other research has also considered game-based cooperative learning as a means of creating interactive learning experiences for elementary students [15], [16]. Collectively, these studies support the pedagogical relevance of combining games and cooperation. However, the outcomes reported across different grade levels and learning contexts do not automatically establish how TGT supports the distinct dimensions of student engagement and observable participation in elementary IPAS lessons. The instructional context and the specific learning outcomes therefore remain important considerations when interpreting the existing evidence.

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Conceptually, student engagement provides a broader perspective for understanding students' involvement in learning. It encompasses behavioral engagement, emotional engagement, and cognitive engagement rather than merely attendance or compliance with classroom instructions [1]. Within the present study, engagement is understood as students' broader involvement in IPAS learning, reflected in their attention to activities, enthusiasm, willingness to become involved, persistence in completing tasks, and investment in the learning process. Student participation is treated more specifically as observable classroom behavior, including answering questions, asking questions, expressing opinions, contributing to group discussions, cooperating with team members, and participating in academic games and tournaments. These indicators are related but serve different analytical purposes: engagement concerns the nature and extent of students' involvement, whereas participation concerns the actions through which that involvement becomes observable. This distinction is consistent with research emphasizing the importance of student involvement and active learning opportunities in classroom practice [1], [17]–[19].

The distinction also highlights a practical challenge in cooperative learning: participation opportunities do not necessarily guarantee that all students will contribute equally. Some students may dominate group discussions, while others may remain relatively passive despite being assigned to the same team. Cooperative learning therefore requires instructional structures that combine individual accountability with shared responsibility [3]. Individual accountability encourages each student to contribute, while positive interdependence reinforces the relationship between individual contributions and collective achievement. TGT offers a potentially useful structure for addressing this challenge because collaborative team preparation is followed by individual involvement in games and tournaments. These activities can create additional opportunities for students to demonstrate their understanding, respond to academic questions, and contribute to their teams. Nevertheless, the extent to which such opportunities translate into broader engagement and more equitable participation needs to be examined empirically rather than assumed from the instructional design alone [3], [8], [20].

Evidence from Indonesian studies further supports the relevance of TGT while illustrating the need to consider context-specific outcomes. Research applying TGT in biology learning reported positive differences in student activity and learning outcomes between experimental and control groups [21]. Another study reported increased student activity following the implementation of TGT-based learning [22]. These findings indicate that combining teamwork, games, and tournaments may encourage students to become more involved in learning activities. However, evidence from different subjects and educational settings cannot fully resolve questions concerning the implementation of TGT in elementary IPAS classrooms, particularly when engagement and participation are considered as distinct outcomes. The existing evidence therefore provides a rationale for further context-specific investigation rather than a basis for presuming identical effects across settings [21], [22].

The broader literature on cooperative learning provides additional support for investigating structured collaboration. A second-order meta-analysis synthesized findings from previous meta-analytic research on cooperative learning in relation to academic achievement, higher-order thinking, and affective behaviors [23]. This broader evidence

base indicates that cooperative learning is relevant to multiple dimensions of students' educational experiences rather than academic performance alone [23], [7]. Nevertheless, general evidence supporting cooperative learning does not establish the specific contribution of each TGT component to engagement and participation in a particular subject or school. The relationship between the instructional characteristics of TGT, the learning demands of elementary IPAS, and the observable involvement of students consequently warrants examination within the classroom context in which the model is implemented.

Taken together, previous studies establish a reasonable foundation for examining TGT as an approach to interactive learning. They report promising outcomes involving student activity, learning achievement, engagement, and motivation across different subjects and educational levels. At the same time, differences in research contexts, instructional combinations, and outcome measures limit the extent to which these findings can be directly generalized to elementary IPAS learning. In particular, the available evidence discussed above does not sufficiently establish how the implementation of TGT is associated with both the broader engagement of elementary students and their observable participation in IPAS classroom activities within the specific context of SDN Karawang Wetan III. A further consideration is the need to distinguish these two outcomes analytically rather than treating increased participation as equivalent to improved engagement. These issues define the context-specific research gap addressed by the present study.

The novelty of this study lies in its focused examination of the implementation of the TGT cooperative learning model in elementary IPAS learning at SDN Karawang Wetan III, with student engagement and student participation considered as related but distinct outcomes. Rather than merely reiterating the general proposition that games and teamwork can encourage classroom activity, the study examines how the implementation of TGT provides opportunities for students to attend to learning activities, interact with peers, contribute to team discussions, respond to academic questions, and participate in games and tournaments. This focus offers a context-specific account of the instructional processes through which TGT may support active involvement in elementary IPAS learning. The study also provides an opportunity to examine the practical relevance of combining cooperative preparation, individual accountability, academic competition, and team recognition within a single instructional model. These contributions are intended to extend understanding of TGT implementation without presuming that outcomes established in other educational contexts will necessarily be replicated [24], [25].

Accordingly, this study aims to examine the implementation of Cooperative Learning Using the Teams Games Tournament (TGT) Model to Increase Student Engagement and Participation in IPAS Learning at SDN Karawang Wetan III. Specifically, it investigates students' involvement in learning activities, their interactions and contributions during team discussions, and their participation in academic games and tournaments. The study is expected to contribute empirical evidence concerning the implementation of cooperative and game-based learning in elementary IPAS education. Practically, the findings may inform teachers' decisions about structuring collaborative activities and providing opportunities for more active student involvement. The study may also provide a basis for further research

examining the relationship between instructional design, student engagement, and observable participation in elementary classrooms.

2. METHOD

2.1. Research Design

This study employed a classroom action research (CAR) design to examine the implementation of the Teams Games Tournament (TGT) cooperative learning model and its contribution to student engagement and participation in IPAS learning. CAR was selected because it enables teachers and researchers to identify instructional problems, implement planned interventions, observe classroom processes, and improve teaching practices through systematic cycles of action and reflection. According to [26], action research constitutes a form of self-reflective inquiry undertaken by participants in social situations to improve the rationality and quality of their practices. In educational settings, this approach provides a framework for improving instructional practices and students' learning experiences through iterative planning, action, observation, and reflection [6]–[8].

The research was organized into a pre-cycle and two intervention cycles, namely Cycle I and Cycle II. The pre-cycle was used to document the initial conditions of student engagement and participation before the TGT intervention. Cycle I involved the initial implementation of TGT, followed by observation and reflection to identify aspects requiring improvement. Cycle II was conducted using instructional modifications informed by the findings of Cycle I. Each intervention cycle followed four stages: planning, action, observation, and reflection. This design enabled the researcher and classroom teacher to examine changes in classroom participation and refine the implementation of TGT in response to the observed learning conditions [26].

2.2. Research Location, Time, and Participants

The study was conducted at SDN Karawang Wetan III, an elementary school in Indonesia, during [insert the actual research period, including month and year]. The participants comprised 30 elementary school students in [insert grade and class designation], with an age range of [insert the actual age range]. The relevant classroom characteristics included [describe the initial learning conditions, students' participation patterns, and other characteristics documented during preliminary observations]. These characteristics provided the contextual basis for implementing a cooperative learning intervention intended to strengthen students' engagement and participation in IPAS learning.

The participants were selected using [specify the actual sampling technique and selection procedure]. The 30 students represented [the entire population of the selected classroom / a subset of the classroom population; select the statement that accurately reflects the research]. If all students in the selected classroom participated, the study used a class-based total population approach. If only some students participated, the inclusion criteria and reasons for selecting those students should be explained. The final description should also clarify whether all 30 students participated in the pre-cycle, Cycle I, and Cycle II and whether any absences or incomplete observations occurred.

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The research was conducted over [insert the actual duration] and consisted of three phases. The pre-cycle took place during [insert dates or duration], Cycle I during [insert dates or duration], and Cycle II during [insert dates or duration]. Cycle I comprised [insert the number] instructional meetings, while Cycle II comprised [insert the number] instructional meetings. Each meeting lasted [insert the actual duration] minutes. The duration and number of meetings should be reported separately for each phase to establish whether instructional exposure was consistent across cycles and to clarify the basis for comparing the observed results.

2.3. Researcher and Classroom Teacher Roles

The research involved collaboration between the researcher and the classroom teacher. The researcher was responsible for coordinating the research procedures, preparing the research instruments, documenting classroom activities, analyzing observation data, and facilitating reflection on the implementation of TGT. The classroom teacher was responsible for [specify the teacher's actual responsibilities, such as delivering the IPAS content, organizing student teams, facilitating academic games and tournaments, and providing instructional guidance]. Observation was conducted by [identify the actual observer or observers] using the predetermined observation instruments. Following each cycle, the researcher and teacher reviewed the evidence collected, discussed implementation challenges, and identified instructional adjustments for the subsequent cycle. This collaborative process supported systematic reflection and evidence-informed improvement throughout the CAR procedure [26].

2.4. TGT Intervention and Instructional Procedures

The intervention consisted of implementing the TGT cooperative learning model in IPAS lessons. TGT was selected because it integrates collaborative teamwork, academic games, tournaments, and team recognition, thereby providing structured opportunities for students to interact and contribute to learning activities. The model incorporates principles of positive interdependence, individual accountability, promotive interaction, interpersonal skills, and group processing [3]. These principles were relevant to the study because students were expected to understand IPAS concepts while communicating with peers, contributing to team activities, and demonstrating their individual understanding. Previous studies have also reported the potential of TGT to encourage student activity and engagement through cooperative and game-based learning [4]–[6], [10], [11].

The intervention was implemented through the following instructional components.

1. Class presentation. At the beginning of each lesson, the teacher introduced the learning objectives, explained the relevant IPAS concepts, and provided the information necessary for students to participate in subsequent activities. The instructional content for Cycle I focused on [insert the actual IPAS topic and learning objectives], whereas Cycle II addressed [insert the actual IPAS topic and learning objectives]. If the same topic was continued across both cycles, this should be stated explicitly, together with the changes in learning activities or instructional emphasis. The academic games and

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tournament questions were aligned with the learning objectives and content taught during each cycle.

2. Team formation and cooperative learning. Students were organized into [insert the actual number] heterogeneous teams, with [insert the actual number] students per team. Team composition was determined according to [specify the actual criteria, such as prior academic performance, teacher assessment, or a combination of documented student characteristics]. The grouping procedure involved [describe how students were assigned to teams and whether team composition remained consistent across cycles]. During team activities, students discussed the learning materials, completed assigned tasks, and helped one another understand the concepts. The teacher facilitated discussion and encouraged students to contribute rather than allowing the same individuals to complete all the tasks. These activities were intended to support positive interdependence and individual accountability [3], [9], [24].
3. Academic games. Following team preparation, students participated in academic games consisting of [describe the actual question formats, such as oral questions, written question cards, multiple-choice questions, or short-answer questions]. The questions addressed the IPAS content taught in the relevant lesson and were prepared according to the learning objectives and students' grade level. The game procedure followed [describe the actual rules, including how questions were distributed, how students responded, the time allowed, and how correct answers were scored]. The teacher facilitated the activities and ensured that students had opportunities to respond and contribute. The games were designed to connect content knowledge with active classroom participation [4].
4. Tournaments and scoring. The tournament stage involved [describe the actual competition arrangement, including how students were matched, whether they competed individually or in groups, and how turns were assigned]. Students answered questions related to the IPAS material, and their performance was recorded using [specify the actual scoring system]. A correct answer earned [insert the actual score], while [explain how incorrect answers, unanswered questions, or other scoring conditions were handled, if applicable]. Individual scores were subsequently [explain how scores were recorded and whether they contributed to team totals]. These details should reflect the tournament procedures actually implemented during the study rather than a generic description of TGT. The activities provided opportunities for students to demonstrate their understanding and contribute to their teams.
5. Team recognition. At the end of the tournament, team scores were calculated using [describe the actual method of score aggregation]. Team recognition was provided according to [insert the actual criteria used to determine recognition, including any score thresholds or ranking procedures]. Recognition took the form of [specify the actual rewards or forms of appreciation used in the classroom]. The purpose of this stage was to acknowledge students' contributions and reinforce cooperation, responsibility, and constructive competition rather than to emphasize winning alone. Connecting individual contributions with collective achievement was consistent with the cooperative learning principles underlying the intervention [3], [8].

2.5. Action Research Cycles

The research proceeded through a pre-cycle and two intervention cycles. The procedures for each phase are described below.

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Pre-cycle. Before the intervention, the researcher documented the initial conditions of student engagement and participation during regular IPAS instruction. The observations focused on students' attention to learning activities, enthusiasm, involvement in discussions, willingness to ask and answer questions, expression of opinions, cooperation with peers, and completion of learning tasks. The researcher also collected [specify any actual interviews, documents, or other baseline evidence] to establish the initial classroom conditions. The findings were used to identify instructional issues and establish the baseline against which subsequent observations could be interpreted. No TGT intervention was implemented during this phase [retain this statement only if it accurately describes the actual procedure].

Cycle I. The first intervention cycle consisted of planning, action, observation, and reflection. During planning, the researcher and teacher prepared the lesson plans, IPAS materials, student worksheets, academic questions, tournament procedures, and observation instruments. During action, the teacher implemented the planned TGT activities through class presentation, team preparation, academic games, tournaments, and team recognition. During observation, [identify the observer or observers] recorded student engagement and participation using the predetermined indicators. At the end of the cycle, the researcher and teacher reviewed the observation results, interview findings, and implementation records to identify students' responses, participation patterns, and difficulties encountered during the activities. The reflection findings were used to determine the instructional adjustments required for Cycle II [26].

Cycle II. The second intervention cycle incorporated modifications based on the reflection conducted after Cycle I. The specific modifications included [describe the actual changes introduced, such as revised team arrangements, clearer game instructions, adjusted question difficulty, additional opportunities for individual responses, modified tournament procedures, or more systematic teacher support, where applicable]. These modifications were intended to address the issues identified during Cycle I and provide more equitable opportunities for students to engage and participate. The teacher then implemented the revised activities, while the researcher and/or designated observer documented the learning process using the same core observation indicators applied in the previous phase. Following Cycle II, the observation records and supporting qualitative evidence were examined to determine the extent to which the identified classroom issues had improved. The actual modifications should be reported explicitly to demonstrate how the reflection stage informed subsequent action rather than presenting Cycle II as a repetition of Cycle I without documented changes.

2.6. Data Sources, Collection Techniques, and Research Instruments

The study used primary data obtained from classroom observations, interviews, and documentation. Observation served as the primary technique for examining student engagement and participation throughout the pre-cycle, Cycle I, and Cycle II. Interviews with the classroom teacher and selected students provided additional information about their experiences, perceptions, and responses to the TGT activities. Documentation provided supporting evidence concerning lesson implementation and student activities.

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The principal research instrument was a classroom observation sheet containing indicators of student engagement and participation. The engagement indicators addressed students' attention to learning activities, enthusiasm, willingness to become involved, persistence in completing tasks, and overall involvement in the learning process. The participation indicators addressed observable actions, including asking questions, answering questions, expressing opinions, contributing to group discussions, cooperating with team members, participating in academic games and tournaments, and completing assigned learning tasks. These indicators were informed by the multidimensional conceptualization of student engagement [1]. Because engagement and participation are related but distinct constructs, the analysis distinguished broader involvement in learning from specific observable contributions during classroom activities.

The observation instrument used [insert the actual response scale or recording method, such as a checklist, frequency count, or rating scale]. Each indicator was recorded according to [explain the actual scoring criteria and how an observed behavior was classified]. The instrument was administered during [specify the observation periods within each lesson] by [identify the observer or observers]. The interview instrument consisted of [describe the actual interview format and the main topics covered]. Documentation included [specify the materials actually collected, such as lesson plans, student worksheets, photographs, student work, attendance records, and tournament score sheets]. The final manuscript should also report any instrument review, expert assessment, pilot testing, or observer training that was actually conducted.

2.7. Data Analysis

Quantitative observation data were analyzed descriptively to compare student engagement and participation across the pre-cycle, Cycle I, and Cycle II. For each indicator, the number of students demonstrating the specified behavior was recorded and converted into a percentage using the total number of students observed during the relevant phase as the denominator. The percentage was calculated using the following formula:

$$P = \frac{f}{N} \times 100\%$$

where (P) represents the percentage of students demonstrating a specified indicator, (f) represents the number of students demonstrating that indicator, and (N) represents the number of students observed during the relevant phase. The denominator should reflect actual attendance and valid observations when these differed across research phases. The resulting percentages were compared descriptively to identify patterns of change in student engagement and participation.

Qualitative data from classroom observations and interviews were organized and interpreted to identify recurring patterns concerning student responses, peer interaction, implementation challenges, and changes introduced between cycles. Documentary evidence, including lesson implementation records and tournament results, was used to contextualize the observation findings. Evidence from different collection techniques was compared to examine the consistency of the findings across sources [17], [18]. The analysis was

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descriptive and focused on changes observed during the classroom action research process; causal conclusions beyond the evidence provided by the research design were not assumed.

2.8. Success Criteria and Research Trustworthiness

The success of the intervention was evaluated against predetermined criteria for student engagement and participation. The criteria included students' involvement in group discussions, willingness to ask and answer questions, expression of opinions, cooperation with team members, participation in academic games and tournaments, and completion of assigned learning tasks. The intervention was considered successful when [insert the actual minimum percentage or score established before the intervention] of the students met the specified criteria, accompanied by an improvement in the relevant observation indicators across the research phases. Engagement and participation were evaluated separately where the instruments provided distinct measures for each construct.

The credibility of the findings was supported through comparison of observation records, interview data, and relevant documentation [17], [18]. The research report should specify any additional procedures actually used to support trustworthiness, such as independent observation, discussion of interpretations with the classroom teacher, review of observation records, or verification of data entry. Any procedure not conducted during the study should not be reported as having been implemented.

2.9. Ethical Considerations

Because the study involved elementary school students, the research procedures should be documented in accordance with the applicable institutional and school requirements. The final report should specify the actual permissions obtained from the school, the procedures used to inform parents or guardians and obtain consent where required, and the arrangements for protecting student identities and the confidentiality of research records. Participation, classroom documentation, and the use of photographs or student work should follow the relevant ethical requirements and permissions. The manuscript should report the actual ethical approval or authorization details, where applicable, rather than assuming that approval was obtained.

Through this methodology, the study examined the implementation of the TGT cooperative learning model in IPAS learning at SDN Karawang Wetan III across a pre-cycle and two intervention cycles. The combination of structured cooperative activities, academic games, tournaments, classroom observation, interviews, documentation, and reflective improvement provided a framework for examining changes in student engagement and participation. The methodological account links the instructional procedures with the observed classroom outcomes while allowing the specific implementation conditions and modifications to be documented transparently.

3. RESULTS AND DISCUSSION

This section presents the findings of the classroom action research involving 30 students at SDN Karawang Wetan III. The results are organized according to the initial classroom conditions, changes in student engagement and participation across the pre-cycle

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and two intervention cycles, and differences across individual indicators. The discussion then interprets these findings in relation to the instructional components of the Teams Games Tournament (TGT) model and relevant previous research. Student engagement and student participation are examined as related but distinct outcomes.

3.1. Baseline Conditions and Changes Across Research Cycles

The classroom action research consisted of a pre-cycle followed by Cycle I and Cycle II. During the pre-cycle, student engagement averaged 58.57%, while student participation averaged 55.71%. These baseline results indicate that the observed indicators had not yet reached the levels recorded during the subsequent intervention cycles. In particular, participation in asking questions and expressing opinions was comparatively low, suggesting that opportunities for students to communicate their understanding required further attention. The baseline percentages provide the initial reference for examining subsequent changes, although a more detailed description of the initial classroom conditions should also be supported by the original observation records.

Following the implementation of TGT in Cycle I, student engagement increased to 72.86%, while student participation reached 70.43%, based on the arithmetic means of the seven indicator percentages reported in Tables 4 and 5. In Cycle II, engagement increased further to 87.14% and participation to 85.71%. These descriptive results show a consistent upward pattern across the three research stages. Because the study employed classroom action research without a separate control group, the changes are interpreted as improvements observed during the implementation of TGT rather than definitive evidence that TGT alone caused the improvements. Table 1 summarizes the development of student engagement and participation across the research stages.

Table 1. Comparison of Student Engagement and Participation Across Research Stages

Research stage	Student engagement	Student participation
Pre-cycle	58.57%	55.71%
Cycle I	72.86%	70.43%
Cycle II	87.14%	85.71%
Increase from pre-cycle to Cycle II	28.57 percentage points	30.00 percentage points

Note. Cycle I participation is calculated as the arithmetic mean of the seven indicator percentages reported in Table 3 below. The reported percentages are descriptive averages across indicators, not percentages of students who achieved a particular student-level category.

As shown in Table 1, student engagement increased by 14.29 percentage points from the pre-cycle to Cycle I and by a further 14.28 percentage points from Cycle I to Cycle II. Overall, the increase was 28.57 percentage points. Student participation increased by 14.71 percentage points from the pre-cycle to Cycle I and by 15.28 percentage points from Cycle I to Cycle II, resulting in an overall increase of 30.00 percentage points. The participation increase in Cycle I is calculated using the corrected average of 70.43%, rather than the previously reported 70.48%.

The progression across cycles indicates that improvement continued after the initial implementation of TGT. The additional increase in Cycle II is consistent with the iterative

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nature of classroom action research, in which reflection on an initial intervention informs subsequent instructional adjustments. Nevertheless, the numerical pattern alone does not identify which specific adjustments contributed most to the observed improvement. Such an interpretation requires documentation of the modifications introduced in Cycle II and evidence concerning students' responses to those changes.

3.2. Student Engagement in IPAS Learning

Student engagement was examined through seven indicators: attention to learning activities, enthusiasm, active involvement, interaction with peers, persistence, responsibility, and participation in games and tournaments. These indicators describe different aspects of students' involvement in the learning process. The results for each indicator are presented in Table 2.

Table 2. Student Engagement Based on Individual Indicators

No.	Engagement indicator	Pre-cycle	Cycle I	Cycle II
1	Attention to learning activities	60%	74%	88%
2	Enthusiasm during learning	57%	72%	87%
3	Active involvement	55%	70%	86%
4	Interaction with peers	58%	72%	87%
5	Persistence in completing tasks	59%	73%	86%
6	Responsibility	62%	75%	89%
7	Participation in games and tournaments	59%	74%	87%
	Average	58.57%	72.86%	87.14%

Note. Percentages are reported as provided in the research data. The averages are calculated from the seven displayed indicator percentages.

Table 2 shows that all seven engagement indicators increased across the research stages. During the pre-cycle, active involvement recorded the lowest percentage at 55%, followed by enthusiasm at 57%. Responsibility recorded the highest baseline percentage at 62%. This distribution suggests that the initial observations showed variation across aspects of student engagement, with active involvement and enthusiasm requiring particular attention. However, these descriptive values should be interpreted in relation to the operational definitions and scoring criteria used in the observation instrument.

During Cycle I, active involvement increased from 55% to 70%, while enthusiasm increased from 57% to 72%. Participation in games and tournaments reached 74%, and attention to learning activities reached the same percentage. The pattern indicates that students' observed involvement increased during the first implementation of TGT, particularly in indicators associated with taking part in learning activities. Nevertheless, the percentages do not establish whether every student improved or whether the changes were concentrated among particular students. Individual-level records would be needed to determine the distribution of changes within the class.

The engagement indicators increased further in Cycle II. Responsibility reached 89%, followed by attention to learning activities at 88%. Enthusiasm and interaction with peers both reached 87%, while active involvement and persistence each reached 86%. The increase in active involvement from 55% in the pre-cycle to 86% in Cycle II represents a gain of 31 percentage points, the largest increase among the seven engagement indicators.

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This pattern suggests that active involvement was particularly responsive to the instructional changes observed during the research.

One possible explanation is that TGT provides several structured opportunities for students to contribute to learning activities. During team preparation, students can exchange ideas and discuss IPAS concepts. Academic games and tournaments subsequently provide opportunities to respond to questions and demonstrate individual understanding. These activities may make participation more explicit than in lessons in which interaction primarily occurs through teacher-led questioning. The increase in active involvement is therefore consistent with the instructional characteristics of TGT, although the present data cannot isolate the contribution of any single component.

The increase in responsibility from 62% in the pre-cycle to 89% in Cycle II also deserves attention. Cooperative preparation combined with individual performance requirements may encourage students to recognize that their contributions matter to the team. This interpretation is consistent with the principles of individual accountability and positive interdependence in cooperative learning [3], [8], [9]. The results are also broadly consistent with previous studies reporting increased student activity through TGT and game-supported cooperative learning [10], [11], [14], [16]. However, comparisons should remain cautious because the studies may differ in their subjects, instructional procedures, observation instruments, and definitions of student activity.

The findings also relate to the multidimensional conceptualization of student engagement, which distinguishes behavioral, emotional, and cognitive dimensions [1]. In the present study, the indicators directly represent observable classroom behaviors, while enthusiasm provides an observable indication of students' affective responses. Persistence and efforts to complete learning tasks may also be associated with cognitive engagement, but the observation percentages alone do not establish students' internal cognitive investment. The results therefore provide stronger direct evidence of behavioral engagement and observable enthusiasm than of the full range of emotional and cognitive engagement [1], [17]–[19].

3.3. Student Participation in IPAS Learning

Student participation was examined through seven indicators: asking questions, answering questions, expressing opinions, participating in group discussions, cooperating with team members, participating in tournaments, and completing learning tasks. These indicators focus on observable actions through which students contribute to classroom learning. Table 3 presents the changes in each indicator across the three research stages.

Table 3. Student Participation Based on Individual Indicators

No.	Participation indicator	Pre-cycle	Cycle I	Cycle II
1	Asking questions	50%	65%	82%
2	Answering questions	56%	71%	86%
3	Expressing opinions	52%	68%	83%
4	Participating in group discussions	58%	72%	87%
5	Cooperation with team members	60%	74%	89%
6	Participation in tournaments	57%	72%	87%
7	Completing learning tasks	57%	71%	86%

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Average	55.71%	70.43%	85.71%

Note. The averages are calculated from the seven displayed indicator percentages. The Cycle I mean is 70.43% when rounded to two decimal places.

Table 3 indicates that all seven participation indicators increased across the research stages. During the pre-cycle, asking questions recorded the lowest percentage at 50%, followed by expressing opinions at 52%. Cooperation with team members was comparatively higher at 60%. This pattern suggests that students' observed participation differed according to the type of activity, with initiating questions and articulating personal ideas representing particular challenges in the initial learning conditions.

Following Cycle I, asking questions increased to 65% and expressing opinions to 68%. Participation in group discussions rose from 58% to 72%, while cooperation reached 74%. These results indicate that students' observed contributions increased during the initial TGT implementation, particularly in collaborative activities. The team structure may have provided students with additional opportunities to clarify concepts, compare answers, and prepare responses before participating in whole-class activities. However, the extent to which these opportunities reduced students' hesitation requires confirmation from interview data or detailed observation notes.

In Cycle II, cooperation reached 89%, the highest percentage among the participation indicators. Group discussion and tournament participation both reached 87%, while answering questions and completing learning tasks reached 86%. Asking questions remained the lowest indicator at 82%, despite increasing by 32 percentage points from the pre-cycle. Expressing opinions reached 83%, representing an increase of 31 percentage points. These results indicate that participation improved across all recorded indicators, although the relative levels differed according to the specific behavior being observed.

The continued lower position of asking questions is an important finding. Responding to a question presented during a game or tournament differs from independently initiating a question when a concept is unclear. Students may be willing to respond when the teacher or game structure provides a clear prompt while remaining hesitant to disclose uncertainty, request clarification, or formulate their own questions. This is a possible interpretation rather than a demonstrated explanation, because the available percentages do not reveal why students chose to ask or not ask questions. Interview evidence and classroom observation notes could help determine whether hesitation, uncertainty about the material, limited question-formulation skills, or insufficient opportunities contributed to this pattern.

The results further suggest that cooperation and discussion were prominent aspects of participation during TGT implementation. These findings are consistent with cooperative learning principles, particularly positive interdependence, promotive interaction, and individual accountability [3], [8], [9], [20], [24]. The team preparation stage provides opportunities for students to exchange information and help their peers understand the IPAS content, while the tournament creates a context for applying that understanding. The increase in task completion also suggests that students' contributions extended beyond verbal interaction to include responsibility for assigned activities.

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Previous research has reported positive patterns of student activity in TGT-based learning [10], [11], [13], [28]. The present findings are consistent with this general pattern, particularly in the increased percentages for cooperation, group discussion, and tournament participation. The current study adds a context-specific description of participation across two action cycles in elementary IPAS learning. Nevertheless, direct comparisons of the magnitude of improvement are limited because the available descriptions do not establish that the previous studies used identical indicators, scoring procedures, or observation periods.

3.4. Distribution of Student Participation Across Categories

In addition to the indicator-level percentages, the study reported the distribution of the 30 students across four participation categories. Table 4 presents the reported student counts at each research stage.

Table 4. Distribution of Students Across Participation Categories

Participation category	Pre-cycle	Cycle I	Cycle II
Very active (81–100%)	2 students	8 students	24 students
Active (61–80%)	13 students	19 students	6 students
Moderately active (41–60%)	15 students	3 students	0 students
Less active (≤40%)	0 students	0 students	0 students
Total	30 students	30 students	30 students

Note. The reported category boundaries should be checked against the original scoring rubric, particularly the treatment of scores at the boundaries between categories.

The reported distribution shows a shift toward higher participation categories across the research stages. During the pre-cycle, 2 students were categorized as very active, 13 as active, and 15 as moderately active. In Cycle I, the number categorized as very active increased to 8, while 19 were categorized as active and 3 as moderately active. By Cycle II, 24 students were categorized as very active and 6 as active, with no students remaining in the moderately active category.

If the category counts were derived from a consistent student-level scoring procedure, the distribution indicates that the observed improvement extended beyond the average indicator percentages to a larger proportion of students attaining higher participation categories. This pattern is compatible with the possibility that the TGT activities and subsequent instructional adjustments provided more students with opportunities to contribute. However, the categorical results must be interpreted separately from the indicator averages because the two summaries represent different levels of aggregation. The category counts should therefore be verified against the individual student scores and scoring rubric before being used to support conclusions about the distribution of improvement.

3.5. Discussion: How TGT May Support Engagement and Participation

The principal finding is that the reported indicators of student engagement and participation increased across the pre-cycle, Cycle I, and Cycle II. Engagement increased

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from 58.57% to 87.14%, while participation increased from 55.71% to 85.71%. The indicator-level results show that the changes were not restricted to tournament participation: attention, enthusiasm, interaction, responsibility, discussion, cooperation, and task completion also increased. This pattern suggests that the implementation of TGT coincided with broader changes in classroom involvement rather than changes confined to the game component.

Several characteristics of TGT may help explain this pattern. First, cooperative teamwork provides opportunities for students to discuss content, compare responses, and receive support from their peers. These interactions may make contributions more accessible to students who are less inclined to respond immediately during whole-class discussions. Second, academic games provide structured prompts for responding to IPAS questions. Third, tournaments connect individual performance with team outcomes, potentially reinforcing individual accountability. Finally, team recognition provides feedback about collective achievement. Together, these components offer a plausible explanation for the observed pattern, but their separate contributions cannot be determined from the aggregate percentages alone.

The increase in active involvement is particularly relevant because this indicator showed the largest gain among the engagement indicators, rising from 55% to 86%. One possible explanation is that TGT explicitly organizes student activity through team preparation, games, and tournaments, whereas attention and enthusiasm may not necessarily translate into observable contributions. The structured sequence may provide students with clearer expectations about when and how to participate. The increase should nevertheless be interpreted as a descriptive change in the observed indicator rather than proof that active involvement was more strongly affected by TGT than other dimensions in a statistical sense.

Teamwork and individual accountability may also help explain the increases in cooperation and responsibility. Cooperative learning requires students to contribute to group objectives while remaining responsible for their own learning [3]. In TGT, team preparation creates opportunities for peer support, while tournament activities require students to demonstrate their understanding individually or through the competition format used. This combination may help connect collective learning with individual contribution [8], [9], [20]. The increases in these indicators are consistent with that explanation, although more detailed observation records would be needed to establish how students actually distributed tasks and supported one another.

The increase in asking questions was substantial, from 50% in the pre-cycle to 82% in Cycle II, yet this remained the lowest participation indicator in the final cycle. This distinction suggests that participation may be easier to encourage when the instructional activity provides an explicit task than when students must independently initiate an interaction. Answering a question during a tournament involves responding to a prompt, whereas asking a question requires students to identify a gap in their understanding and formulate a request for clarification. The difference may help explain why asking questions remained comparatively less frequent. Future instructional refinements could provide explicit opportunities for students to formulate questions, discuss uncertainties in pairs, and submit questions before or after tournament rounds. These suggestions should be understood

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as practical implications of the observed pattern, not as interventions already tested in this study.

The relationship between engagement and participation also requires careful interpretation. Both outcomes increased across the three research stages, and some indicators overlap conceptually. For example, active involvement in the engagement measure is closely related to participation in group discussions, while participation in games and tournaments appears in both sets of indicators. This overlap is understandable because observable participation is one manifestation of behavioral engagement [1]. However, the two measures should not be treated as fully independent evidence of improvement when they contain similar behaviors. The findings are more appropriately interpreted as complementary descriptions of students' involvement, with engagement representing the broader construct and participation emphasizing specific observable contributions.

The findings are broadly consistent with previous studies reporting increased classroom activity through TGT [10], [11]. They also align with research combining TGT and Discovery Learning, which reported improvements in student engagement and participation in science education [13]. The current study extends this general pattern by documenting indicator-level changes in elementary IPAS learning over a pre-cycle and two action cycles. However, the differences in educational level, subject matter, instructional combinations, and measurement procedures prevent direct attribution of differences in improvement to the instructional models themselves.

The results should also be considered in relation to the broader evidence on student engagement and cooperative learning [1], [17]–[19]. The observed increases in attention, enthusiasm, cooperation, and participation are compatible with the proposition that structured collaborative activities provide opportunities for active involvement. Nevertheless, the present study does not directly establish changes in all emotional and cognitive dimensions of engagement. Further, because the study did not include a control group, alternative explanations—including increased familiarity with classroom routines, teacher attention, repeated exposure to the learning material, and changes made between cycles—cannot be ruled out.

3.6. Research Implications and Limitations

The findings have practical implications for elementary IPAS instruction. Teachers implementing TGT may benefit from combining cooperative preparation with clearly defined individual responsibilities and content-aligned academic games. The relatively lower percentage for asking questions also suggests that teachers should not assume that participation in tournaments automatically encourages students to initiate questions. Dedicated opportunities for clarification, question formulation, and reflection may be needed to support this aspect of classroom participation.

The findings also highlight the importance of documenting changes introduced between action cycles. The increases observed in Cycle II are consistent with an iterative improvement process, but the instructional modifications made after Cycle I need to be reported explicitly to establish how reflection informed subsequent teaching. Detailed

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documentation would help readers understand the implementation process and assess whether similar procedures could be adapted to other elementary classrooms.

Several limitations should be acknowledged. First, the study involved 30 students in a single school, which limits the generalizability of the findings to other classrooms and educational settings. Second, the results are based on descriptive observation percentages, and no inferential statistical tests were reported to determine whether the changes exceeded what might occur through other influences. Third, the absence of a control group means that the observed changes cannot be attributed exclusively to TGT. Fourth, the overlap between some engagement and participation indicators may limit the extent to which the two outcomes can be interpreted as distinct measures. Finally, the absence of raw observation scores and a fully documented scoring procedure in the reported results limits independent verification of the percentages and category distributions.

Future research should examine TGT implementation across multiple elementary schools, provide transparent reporting of observation instruments and scoring procedures, and document the specific modifications introduced between action cycles. Researchers could also distinguish behavioral, emotional, and cognitive engagement more explicitly and investigate whether structured question-formulation activities help address the comparatively lower participation in asking questions. These directions may strengthen the evidence concerning how cooperative teamwork, academic games, individual accountability, and team recognition relate to student involvement in elementary IPAS learning.

4. CONCLUSION

This study examined changes in student engagement and participation during the implementation of the Teams Games Tournament (TGT) model in IPAS learning at SDN Karawang Wetan III. The findings indicate improvements in both outcomes across the pre-cycle and two classroom action research cycles. Student engagement improved in observable aspects of learning, including attention, enthusiasm, active involvement, interaction, persistence, and responsibility, whereas student participation improved in specific behaviors such as cooperation, group discussion, tournament involvement, and task completion. Asking questions remained comparatively less frequent than other participation behaviors, highlighting the need for explicit opportunities for students to formulate questions and clarify their understanding. The practical contribution of this study is to illustrate how structured teamwork, meaningful academic games, individual accountability, and team recognition can provide opportunities for more collaborative and interactive learning in elementary IPAS classrooms. Teachers adopting or adapting TGT should align game activities with learning objectives, establish clear team roles and rules, ensure that every student contributes, and provide opportunities for questioning and reflection.

These findings should be interpreted within the study's limitations. The research involved 30 students at one elementary school and covered only a pre-cycle and two intervention cycles; therefore, the results cannot be generalized to all elementary schools. The findings were based on classroom observations over a limited implementation period, and the absence of a comparison group means that the observed improvements cannot be

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attributed exclusively to TGT. The study also did not directly establish whether changes in engagement and participation were associated with improved IPAS learning achievement or sustained over time. Future research should involve larger samples and multiple schools, extend implementation periods, and include comparison groups where feasible. Further investigation should examine the long-term sustainability of improvements in engagement and participation and their relationship with actual IPAS learning achievement. Transparent reporting of observation instruments, scoring procedures, and instructional adjustments across cycles would also strengthen the reliability and comparability of future findings.

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