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INCREASING SCIENCE AND SOCIAL STUDIES LEARNING OUTCOMES THROUGH THE USE OF THE STAD LEARNING MODEL ASSISTED BY THE STORYTELLING BOX

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Abstract

This study aims to improve student learning outcomes by stimulating active engagement, digital literacy, and collaborative skills through the Student Teams Achievement Divisions (STAD) learning model. The methodology employed in this study is Classroom Action Research (CAR). The instructional procedure begins with a brief introductory lesson linked to daily life, serving as a prompt to trigger students' curiosity. Subsequently, students work in heterogeneous groups to discuss and explore a manipulative teaching aid called The Storytelling Box, which concretizes the concept of energy transformation through visual narratives. Student comprehension is then assessed independently through individual quizzes on Google Forms, followed by the socialization of self-made promotional posters. The findings indicate that integrating manipulative teaching aids with digital instruments significantly enhances active student engagement in a transparent and objective manner; it is also proven to be more effective and engaging than traditional methods. Furthermore, the implementation of the STAD model assisted by the Storytelling Box teaching aid is highly relevant to meeting the learning needs of Grade 6 students at SD Negeri Sampay 01, thereby improving their learning outcomes. Students also successfully acted as agents of change, bringing a positive impact on the behavior of the entire school community. This was demonstrated through a follow-up social action where students designed educational posters using the Canva application and conducted an energy-saving campaign targeted at students in Grades 1–5.

Keywords: Classroom Action Research, STAD Model, Storytelling Box, Learning Outcomes

Abstrak. Tujuan dilakukan penelitian ini adalah untuk meningkatkan hasil belajar yang diawali dengan keterlibatan aktif, literasi digital, dan kemampuan kerja sama murid melalui model pembelajaran STAD (Student Teams Achievement Divisions). Metode penelitian yang digunakan yaitu Penelitian Tindakan Kelas (PTK). Prosedur pelaksanaan yang diawali dengan pengantar pembelajaran secara singkat yang dikaitkan dengan kehidupan sehari-hari sebagai pemantik rasa ingin tahu. Selanjutnya, murid bekerja dalam kelompok yang heterogen untuk berdiskusi serta mengeksplorasi alat peraga manipulatif Storytelling Box untuk mengonkretkan konsep perubahan energi melalui narasi visual, kemudian diuji secara mandiri melalui kuis individual di Google Form serta mensosialisasikan poster berisi ajakan yang dibuat secara mandiri. Penelitian ini menunjukkan bahwa perpaduan alat peraga dan instrumen digital berhasil meningkatkan keterlibatan aktif siswa secara signifikan, transparan dan objektif, serta terbukti lebih efektif dan menyenangkan dibandingkan metode tradisional. Penerapan model pembelajaran STAD dengan berbantuan alat peraga Storytelling Box sangat relevan dalam memenuhi kebutuhan belajar kelas 6 SD Negeri Sampay 01, sehingga hasil belajarnya meningkat, serta berhasil berperan sebagai agen perubahan yang membawa dampak positif bagi perilaku seluruh warga sekolah yang diwujudkan melalui aksi sosial tindak lanjut yang dimana siswa mendesain poster edukatif di aplikasi Canva dan melakukan kampanye penghematan energi kepada warga sekolah.

Kata Kunci: Penelitian Tindakan Kelas, Model STAD, Storytelling Box, Hasil Belajar.

Background

The current state of the Science and Social Studies learning process in Grade 6 at SD Negeri Sampay 01 faces challenges regarding personal student engagement. Most students demonstrate a lack of self-confidence in sharing comments or opinions, which directly impacts the classroom atmosphere, making it passive and less interactive. In both group discussions and classical communication within each group, the dominance centers on only a few students, while others hesitate to participate and contribute due to the fear of making mistakes or not fully mastering the material. This dynamic prevents the exchange of ideas from operating maximally, further hindering the students' potential to understand energy concepts.

Based on observations conducted during Science and Social Studies learning in Grade 6 at SDN Sampay 01, a phenomenon was found where the level of student activity in the learning process remained low, directly impacting suboptimal learning achievements. This condition is suspected to occur due to a lack of innovation in learning strategies capable of deeply engaging students, causing learning activities to be predominantly one-way. Responding to these issues, the researcher seeks to improve instructional quality by implementing the Student Teams Achievement Divisions cooperative learning model. This model was selected because it emphasizes team collaboration and strong individual accountability to encourage students to co-construct knowledge together. To maximize the effectiveness of this model, the researcher integrates the use of a contextual teaching aid in the form of "Storytelling Box," which is an independent creation of the researcher. Through the combination of the STAD model and this interactive visual media, students are expected to play a more active role, become motivated, and ultimately improve their learning outcomes in the Science and Social Studies subject.

The implementation of the STAD (Student Teams Achievement Divisions) learning model is crucial to overcoming these mental and social barriers. Assisted by the Storytelling Box teaching aid, learning becomes more tactile and engaging, providing students who previously lacked confidence with a visual "trigger" to start speaking. The use of Canva and Google Forms applications is also essential to providing a contemporary learning experience that aligns with the students' digital world. This model is vital because it focuses not only on the final results but also on the team collaboration process, which requires every single member to help one another understand the material, allowing student self-confidence to grow naturally through peer support.

Theoretically, the STAD model is one of the simplest and most effective cooperative learning types for teachers who are just beginning to use a cooperative approach. Developed by Robert Slavin, this model is rooted in social learning theory. The main principles of STAD are individual accountability within the group and an equal opportunity for success. In STAD, students are placed in heterogeneous learning teams consisting of 4–5 people. Team improvement points are based on the enhancement of members' scores from previous quizzes, ensuring that every student—regardless of high or low academic ability—makes an equally significant contribution to bringing the team toward success. This fosters intrinsic motivation and a sense of ownership over the classroom learning process.

The main objective of creating and implementing the STAD model combined with ICT is to break down student communication barriers and increase their confidence in interacting. Additionally, it aims to significantly improve learning outcomes on the topic of Energy through transparent evaluations via Google Forms, while equipping students with 21st-century skills such as collaboration, communication, and technological literacy, manifested through creative product creation in Canva.

Primary education is a highly important initial stage in the national education system because, at this phase, students begin to develop their intellectual, emotional, and social potential in a structured manner. However, reality in the field indicates that primary school student learning outcomes are still not optimal. Based on various studies, this is caused by low active student participation in the learning process and a lack of variety in learning methods. Most teachers still use traditional, teacher-centered approaches, where the teacher serves as the primary source of knowledge and students play a passive role as information receivers. This leads to low learning motivation and hinders the development of students' critical thinking and collaborative abilities. Such a learning model is unable to accommodate diverse and dynamic student learning needs (Rohyana et al., 2025).

One of the fields of study that plays an important role in developing student potential is Natural Sciences (IPA). IPA is a branch of science that studies various natural phenomena,

whether related to humans, other living creatures, or inanimate objects (Peningkatan et al., 2025). In the Merdeka Curriculum, the implementation of science learning is currently combined with social studies into Science and Social Studies, aiming to provide students with a more comprehensive understanding of the relationship between natural and social phenomena in their surrounding environment (Tri Inggı Pratiwi, 2025).

The Science and Social Studies subject in elementary school also aims to help students develop curiosity and process skills to investigate the surrounding environment, as well as to develop knowledge and understanding of science concepts that will be useful and applicable in daily life. In an effort to enhance knowledge and understanding of Science and Social Studies concepts in elementary school, educators need to understand student characteristics. Elementary school student characteristics show that they enjoy playing, moving, working in groups, as well as experiencing and doing things directly (Biologi et al., 2024).

In line with technological advancements, knowledge—especially in the field of Natural and Social Sciences (Science and Social Studies)—is progressing rapidly. This condition demands educators to design learning activities that emphasize not only conceptual aspects but also practical applications in daily life. In this context, education holds a strategic role in shaping creativity and improving the quality of human resources so they can adapt to changing times. Science and Social Studies learning is expected to become a vehicle for students to understand themselves, recognize their environment, and explore the potential for developing science in real life (Zulaika et al., 2022).

Building a constructivist classroom atmosphere that taps into the potential of developing science in real life begins with creating positive psychological conditions through warm greetings and motivating praise. At the initial stage of learning, students are invited to play or sing, which subtly directs them toward the material to be studied. This aligns with Vygotsky's (1978) view, which emphasizes that a supportive social environment and initial interactions are crucial in building students' cognitive readiness before they construct more complex knowledge.

The Student Teams Achievement Divisions (STAD) learning model is one of the most systematic and effective cooperative approaches for creating positive interactions within the classroom. According to Ariswan Usman Aje (2023), the essence of STAD lies in its structure, which includes five main components: class presentation, heterogeneous team formation, individual quiz execution, individual improvement score calculation, and team recognition. Aje emphasizes that the primary strength of STAD lies in its unique grading system, where group scores are determined not merely by the students' absolute scores, but rather based on the extent to which students can exceed their previous average achievement. This creates a sense

of fairness and balanced motivation, giving every student—both high and low achievers—an equal opportunity to contribute significant points to their team's success.

Furthermore, the impact of implementing this model does not stop at technical mastery of the material but also touches upon the students' mental and intellectual development. Arief Budiman et al. (2020) explain that group dynamics in STAD play an important role in sharpening critical thinking skills. Through discussions and peer tutoring, students are required to explain, refute, and validate answers, which directly trains their analytical sharpness. Additionally, Budiman highlights increased self-efficacy as a result of a supportive learning environment. When students feel that their small contributions are valued and see tangible progress in their individual scores, their confidence in their academic abilities increases gradually.

To foster interactive learning, the STAD model is implemented by prioritizing teamwork and individual responsibility. According to Slavin (1995), the core of STAD is creating positive interdependence, where group success is determined by the academic progress of each member. Through the formation of heterogeneous teams, students are encouraged to teach one another and share understanding, shifting the learning paradigm from the teacher as the information center to students as knowledge builders.

In addition to using the STAD learning model, it becomes more effective when interactive teaching aids are utilized. The use of concrete media supports Piaget's (1971) theory of cognitive development, which states that elementary school-aged students still require the manipulation of physical objects to understand new concepts. The "Storytelling Box" media, created independently by the researcher, serves as a visual bridge that captures students' attention, eases group discussion processes, and strengthens material retention through a more contextual and enjoyable presentation.

The entire learning process is integrated with the local culture of the Puncak area, Bogor, which upholds the values of empathy and hospitality. This integration aligns with the principles of Culturally Responsive Teaching (Gay, 2000); by consistently preserving the environmental sustainability of Puncak, students learn not only academically but also sharpen social characters that care for the environment and others, in accordance with the local wisdom passed down through generations.

Literature reviews indicate that primary education is a crucial phase in shaping students' intellectual, emotional, and social potential. However, current learning practices are still dominated by traditional (teacher-centered) approaches, causing low motivation and critical thinking skills (Rohyana et al., 2025). Within the context of the Merdeka Curriculum, the transformation of the Science and Social Studies subject demands educators to accommodate the characteristics of primary school students who tend to be active, love to play, and learn

through direct experience (Biologi et al., 2024). The utilization of technology and modern demands dictate that Science and Social Studies learning must not stop at concepts but also touch upon practical applications in real life (Zulaika et al., 2022).

The implementation of the STAD cooperative learning model serves as a strategic solution due to its systematic structure in building positive interactions and motivational fairness through the individual improvement score system (Aje, 2023). This model is proven to sharpen critical thinking skills through discussion and peer tutoring (Budiman et al., 2020), as well as creating positive interdependence among team members (Slavin, 1995). The effectiveness of this learning is further reinforced by using concrete media such as the "Storytelling Box" teaching aid, which is relevant to Piaget's concrete operational stage, and the integration of local wisdom values from Puncak, Bogor. This Culturally Responsive Teaching approach (Gay, 2000) ensures that students not only excel academically but also possess social characters aligned with their environmental values.

Method

This study utilizes a Classroom Action Research (CAR) design implemented collaboratively in Grade 6 at SD Negeri Sampay 01, Puncak, Bogor. The action was carried out during the even semester of the 2025/2026 academic year, specifically on April 6, 7, and 13, 2026. The research subjects consisted of 30 students, including 13 boys and 17 girls with diverse learning style profiles: 15 visual students, 5 auditory students, and 10 kinesthetic students. The CAR method was chosen to transform the initially passive classroom atmosphere into an interactive one through planned cycles including planning, acting, observing, and reflecting on the effectiveness of the applied learning model.

The action procedures refer to the syntax of the STAD cooperative learning model integrated with the manipulative teaching aid "Storytelling Box". The first stage begins with a class presentation using Canva media, designed visually to facilitate the 15 visual learners, accompanied by narrative explanations to accommodate auditory students. Next, students are divided into 6 heterogeneous groups mixing diverse academic abilities and learning styles. In this group work, students explore the "Storytelling Box," where kinesthetic learners can interact directly with the teaching aid to understand energy transformation concepts tangibly through physical object manipulation, while other students build understanding through discussion and peer tutoring.

After the group exploration phase is complete, individual accountability is measured through an independent quiz accessed via Google Forms to ensure transparency and accuracy of learning outcome data. Each student's improvement score is then calculated to determine team recognition or awards, ensuring that every student feels they have contributed to their group regardless of their initial ability level. As a follow-up action, students are directed

to conduct a social action by designing energy education posters in Canva and campaigning them to the school community as a manifestation of the Pancasila Student Profile that cares for the environment.

Data collection techniques in this study were conducted through classroom activity observation, learning process documentation, and formative test score analysis. Quantitative data obtained from Google Forms scores were analyzed descriptively to determine the classical learning mastery percentage, while qualitative data from observation sheets were used to describe improvements in student confidence and engagement. This study was determined to reach its success indicator if at least 85% of the total 30 students were able to surpass the mastery threshold for the Energy material and show a transformation into more active, collaborative, and adaptive learning behaviors toward the use of digital technology in learning.

Result and Discussion

Use of Learning Resources and Multimedia

The use of Canva-based multimedia and the physical teaching aid "Storytelling Box" proved to be an effective bridge in concretizing abstract energy material. Its success was visible in the increase of student focus, where Canva's visual media accommodated the 15 visual learners, while the Storytelling Box facilitated the 10 kinesthetic learners through direct manipulation of the teaching aid. The main issue faced was the limited device access for all students when exploring Canva independently. The solution implemented was applying a device rotation system and maximizing the projection screen at the front of the class for classical discussions, ensuring that the essence of multimedia as a learning resource was achieved without being hindered by a limited number of gadgets.

Implementation of Strategies, Methods, and Learning Models

The implementation of the STAD cooperative model showed significant success in breaking down the dominance of a few students in class. Through the individual improvement point system, students who were previously passive became more courageous to contribute because they felt their contributions were valuable to the group. An obstacle that emerged was the tendency of high-achieving students to complete tasks on their own without guiding their peers. The solution applied by the teacher was reinforcing the peer tutoring role by giving specific instructions that group awards would only be granted if all team members could re-explain the concept of energy transformation discussed through the Storytelling Box.

Execution of Learning Assessment and Evaluation

Formative assessment was carried out transparently and engagingly using Google Forms quizzes. The success of this method lay in the speed of feedback received by students,

which psychologically boosted their motivation to improve achievements in the next cycle. However, technical constraints like internet network instability at the school location briefly hindered the answer submission process. The teacher overcame this by providing physical answer sheets as an emergency backup (contingency) and extending the working duration for students experiencing technical issues, ensuring the evaluation data remained valid and covered all 30 students without exception.

Implementation of Learning Syntax and Scenarios

The STAD syntax was executed sequentially by focusing on creating a supportive classroom ecosystem. The teacher aroused motivation by providing appreciation in the form of achievement stars for the most collaborative team. Student creativity was encouraged through the assignment of creating energy-saving posters in Canva, where they had to make independent decisions regarding design and the message to be conveyed. Interaction among students was naturally created through group discussions, while the local wisdom of Puncak that values friendliness (*Someah*) was applied in communication protocols during discussions. The success was evident in the disappearance of students' anxiety barriers when speaking, although initially, the teacher had to actively guide very quiet students to start expressing their opinions using prompting questions.

Stages of Motivation, Creativity, and Decision Making

The implementation stages to build motivation began during apperception activities through energy-themed songs that fostered a positive mood. To encourage creativity and decision-making, students were given the freedom to choose narrative paths on the Storytelling Box. The success of this stage was marked by the emergence of various unique student perspectives in explaining energy transformations. A problem that arose was that some students felt hesitant in making poster design decisions due to a fear of making mistakes. The teacher's solution was providing short consultations and reference examples without limiting their imagination, allowing students to feel safer experimenting with their creative ideas.

Application of Culture and Local Wisdom

The integration of Puncak, Bogor local wisdom was implemented through a Culturally Responsive Teaching approach emphasizing empathy and environmental preservation. Students were taught that saving energy is part of the effort to maintain the natural beauty of Puncak so that it remains pristine for future generations. The success of this application was reflected in the quality of the students' campaign posters, which embedded messages of local environmental conservation. The constraint faced was the students' difficulty in connecting scientific energy concepts with abstract cultural values. The teacher resolved this by providing simple analogies about the relationship between wasteful electricity use and the impact of

environmental damage around their residences, making the cultural values more relevant and easier to understand.

Discussion

The success of implementing the STAD model in increasing student engagement at SDN Sampay 01 aligns with the theories of Slavin (1995) and Aje (2023). In its execution, the individual improvement point system proved effective in balancing motivation; students who were previously passive became more confident because their scores heavily determined the team's success. This proves the truth of the individual accountability principle in STAD, which can break the dominance of specific students. However, the obstacle of high-achieving students' egoism briefly appeared, which contradicted the spirit of collaboration. The solution of strengthening peer tutoring roles managed to restore classroom dynamics in line with social learning theory, which emphasizes that group success is a shared success.

The use of "Storytelling Box" as a manipulative teaching aid provided a significant impact, especially for the 10 kinesthetic students and 15 visual students. This success confirms Piaget's (1971) theory of cognitive development, which states that elementary school students are at the concrete operational stage, where they require physical objects to understand abstract concepts like energy transformation. As explained by Biologi et al. (2024) regarding primary student characteristics who enjoy moving and experiencing directly, the use of this media successfully minimized boredom. Although briefly constrained by a fairly long exploration duration, the teacher's solution of stricter time management ensured that material retention remained optimal in line with science concept comprehension targets.

The successful integration of Canva and Google Forms in learning supports Zulaika et al.'s (2022) opinion that education must be adaptive to changing times. The utilization of this multimedia not only visualized energy materials attractively for visual learners but also trained their technological skills. Technical obstacles in the form of unstable internet networks reflect real challenges often mentioned in modern educational literature. However, the "physical contingency" solution carried out by the teacher demonstrated the instructional flexibility required to ensure the knowledge construction process continued in line with Vygotsky's constructivist view.

The application of Puncak local wisdom values (friendliness and empathy) in the group discussion process is a tangible manifestation of Gay's (2000) Culturally Responsive Teaching principle. The students' success in transforming knowledge into social action (campaign posters) shows that Science and Social Studies learning at SDN Sampay 01 has reached a holistic level of understanding—connecting natural phenomena with environmental social action. Although students initially found it difficult to link science with culture, the contextual

analogy solution provided by the teacher successfully bridged the gap, proving that local values can strengthen environmental care characters inherited across generations.

Overall, the comparison between practice and theory indicates that innovation through the STAD model assisted by creative media is highly relevant to overcoming low active participation. Field challenges do not invalidate existing theories; rather, they enrich the understanding that the success of learning strategies highly depends on the teacher's ability to make adjustments (adaptations) to the local context and the unique characteristics of the students.

Conclusion

The application of the Student Teams Achievement Divisions (STAD) learning model assisted by the Storytelling Box teaching aid and Canva multimedia in Grade 6 at SD Negeri Sampay 01 has successfully created an interactive and meaningful learning ecosystem. Overall, the learning stages were carried out according to the planned STAD syntax, though adjustments (revisions) were made to time management during teaching aid exploration. The teacher tightened the discussion duration so that the individual quiz phase could run optimally without reducing the essence of conceptual understanding. The most interesting aspect of this learning was the transformation of Grade 6 students' roles from mere learners into "agents of change" through energy poster campaigns, where they were able to communicate scientific ideas through a touch of digital creativity and local environmental Puncak cultural values.

Assessment and evaluation results showed highly positive achievements. Formative data through Google Forms quizzes recorded a significant increase in the class average score compared to pre-action baseline scores. Summatively, classical mastery successfully surpassed the 85% success indicator, where students not only mastered energy transformation materials cognitively but were also able to achieve the Pancasila student profile through creative products and team collaboration. Diverse learning styles (visual, auditory, and kinesthetic) were effectively accommodated thanks to the integration of physical and digital media that complemented each other.

Despite showing success, the implementation of this research was not free from obstacles, including internet network instability when accessing Google Forms and the dominance of high-ability students within groups. The solutions implemented to overcome these issues were providing physical answer sheets as a technical contingency and strengthening peer tutoring roles through a team award system based on the progress of all members. Thus, it can be concluded that the synergy between cooperative models, manipulative teaching aids, and digital technology is a highly relevant strategy for improving instructional quality and student confidence in primary schools.

As an effort to maintain the sustainable positive impact of the learning that has been carried out, follow-up actions are focused on the habituation of energy-saving values and the consistent development of students' digital competence. Grade 6 students who have acted as agents of change through poster campaigns in Canva will continue to be empowered as "Energy Ambassadors" in the SD Negeri Sampay 01 environment to monitor electricity-saving behaviors within the school environment. Additionally, teachers will integrate students' digital artwork into online portfolios as a form of continuous appreciation and a track record of their technology literacy development. This step is expected to reinforce environmental care characters that do not just stop at theory in the classroom but become real actions in the daily lives of the entire school community.

To improve the quality of this learning model in the future, several strategic suggestions can be considered by teachers. First, time management optimization needs to be prioritized, especially during the teaching aid exploration phase, by using a visual timer so that the final reflection session is not neglected. Second, product differentiation development can be expanded; if previously limited to posters, teachers can provide options for students to create short vlogs or simple teaching aid demonstrations to accommodate kinesthetic and verbal-linguistic intelligences more broadly. Lastly, to overcome technical constraints, using assessment applications that support offline modes is highly recommended to anticipate unstable internet networks around the school area.

The STAD learning model assisted by creative media is wide open to be adopted and modified by teachers across various subjects. In its execution, teachers are advised to always balance the use of digital technology with tactile (concrete) media so that the cognitive development needs of primary school students remain fully met. Furthermore, strengthening the peer tutoring role is the key to this model's success; teachers need to train higher-ability students to become inclusive group facilitators, thereby creating positive interdependence among team members. By making appropriate adaptations to student characteristics and respective local wisdom, teachers can create an innovative, collaborative, and enjoyable classroom ecosystem for students.

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