

Enhancing Student Learning Outcomes Through the Power of Two Cooperative Learning Model Assisted by Interactive Media in Elementary School Indonesian Language Instruction

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Abstract

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Power of Two, interactive media, learning outcomes, reading comprehension, classroom action research, Indonesian language

The quality of learning outcomes in Indonesian language education at the elementary level remains a persistent challenge, particularly in the domain of reading comprehension. This study investigates the effectiveness of the Power of Two cooperative learning model supported by interactive digital media in improving student learning outcomes in Indonesian language instruction. Employing a Classroom Action Research (CAR) design based on the Kemmis and McTaggart cyclical model, the study was conducted over two cycles with 22 fourth-grade students at an Islamic elementary school in Banda Aceh, Indonesia. Data were collected through structured observation sheets and end-of-cycle achievement tests, then analyzed using descriptive quantitative techniques. Results demonstrated substantial gains across all measured dimensions: teacher activity scores improved from 70.31% (adequate) to 89% (good), student activity scores rose from 65.62% to 86.40%, and overall learning mastery advanced from 54.54% in Cycle I to 81.81% in Cycle II. The average student score increased from 66.81 to 83.63, surpassing the minimum mastery threshold of 75. These findings confirm that integrating the Power of Two model with interactive media creates a more engaging, collaborative, and effective learning environment. The study contributes to the growing body of evidence supporting cooperative and technology-enhanced learning strategies in early formal education, with implications for curriculum design and pedagogical innovation across diverse school settings.

KATA KUNCI:

Power of Two, media interaktif, hasil belajar, pemahaman membaca, penelitian tindakan kelas, bahasa Indonesia

Abstrak:

Kualitas hasil belajar dalam pendidikan bahasa Indonesia di tingkat sekolah dasar masih menjadi tantangan yang terus-menerus dihadapi, khususnya dalam ranah pemahaman membaca. Penelitian ini mengkaji efektivitas model pembelajaran kooperatif *Power of Two* yang didukung oleh media digital interaktif dalam meningkatkan hasil belajar siswa pada pembelajaran bahasa Indonesia. Dengan menggunakan desain Penelitian Tindakan Kelas (PTK) berdasarkan model siklus Kemmis dan McTaggart, penelitian ini dilaksanakan selama dua siklus dengan melibatkan 22 siswa kelas IV di sebuah madrasah ibtidaiyah di Banda Aceh, Indonesia. Data dikumpulkan melalui lembar observasi terstruktur dan tes hasil belajar akhir siklus, kemudian dianalisis

menggunakan teknik kuantitatif deskriptif. Hasil penelitian menunjukkan peningkatan yang signifikan pada semua dimensi yang diukur: skor aktivitas guru meningkat dari 70,31% (cukup) menjadi 89% (baik), skor aktivitas siswa naik dari 65,62% menjadi 86,40%, dan ketuntasan belajar secara keseluruhan meningkat dari 54,54% pada Siklus I menjadi 81,81% pada Siklus II. Nilai rata-rata siswa meningkat dari 66,81 menjadi 83,63, melampaui kriteria ketuntasan minimal sebesar 75. Temuan-temuan ini mengonfirmasi bahwa pengintegrasian model *Power of Two* dengan media interaktif menciptakan lingkungan belajar yang lebih menarik, kolaboratif, dan efektif. Penelitian ini memberikan kontribusi pada kumpulan bukti yang terus berkembang mengenai strategi pembelajaran kooperatif dan berbasis teknologi dalam pendidikan formal awal, dengan implikasi bagi desain kurikulum dan inovasi pedagogis di berbagai latar sekolah yang beragam.

INTRODUCTION

Education is universally recognized as the most fundamental pillar of human development and social progress. At the global level, reading literacy has become one of the most critically monitored indicators of educational quality, particularly as nations seek to prepare their citizens for an increasingly knowledge-intensive global economy. The Programme for International Student Assessment (PISA), administered every three years by the Organisation for Economic Co-operation and Development (OECD) to evaluate the competencies of 15-year-old students across 81 participating countries, provides the most authoritative comparative lens through which national literacy performance can be examined. The results released in December 2023, based on data collected in 2022, present a concerning picture for Indonesia. Indonesian students achieved a reading score of only 359 points substantially below the OECD average of 476 representing a decline of 12 points from the 2018 assessment and marking one of the lowest readings recorded since Indonesia's participation in PISA began (OECD, 2023). Particularly alarming is the finding that only approximately 25% of Indonesian students attained Level 2 or higher in reading proficiency, compared to the OECD average of 74%, meaning that the vast majority of Indonesian 15-year-olds are unable to perform even basic reading comprehension tasks such as identifying the main idea of a moderately complex text (OECD, 2023). While Indonesia's ranking improved by five positions in reading compared to PISA 2018, scholars have cautioned that this ranking gain reflects the relatively greater learning loss suffered by other countries during the COVID-19 pandemic rather than a substantive resolution of Indonesia's deep-seated literacy challenges (Kemendikbudristek, 2023).

These figures are not merely statistical abstractions they reflect real and consequential deficits in the educational experiences of millions of Indonesian children. Reading comprehension is not a peripheral academic skill; it is the cognitive foundation upon which all other learning is built. The ability to read, interpret, evaluate, and synthesize written information enables students to access knowledge across every subject of the curriculum, to think critically about the world around them, and to participate meaningfully in civic and social life. When reading comprehension instruction fails, the consequences cascade across subjects and across years of schooling, producing students who are increasingly unable to keep pace with the cognitive demands of more advanced education. This is not a problem that resolves itself spontaneously; it requires deliberate, evidence-based instructional intervention beginning at the earliest stages of formal schooling.

Within Indonesia, the subject of Bahasa Indonesia occupies a central position in the national curriculum across all levels of elementary education. It serves not merely as a communication medium but as the primary vehicle through which students develop language competence, cultural literacy, and academic thinking skills. Reading comprehension, as one of the four foundational language skills alongside listening, speaking, and writing, is particularly critical. Despite this recognized importance, reading comprehension instruction in Indonesian elementary classrooms continues to face persistent structural challenges. Research consistently identifies a predominance of transmission-based, teacher-centered pedagogical approaches in which students are positioned as passive recipients of information rather than active constructors of meaning (Sukma et al., 2023). The use of instructional media remains largely confined to static printed textbooks that fail to capture the attention and sustain the engagement of contemporary students who are increasingly habituated to dynamic, interactive, and multimodal forms of information (Muzaki et al., 2023). These weaknesses in pedagogical design translate directly into low student engagement, poor reading comprehension outcomes, and ultimately, the kind of performance gap documented in international assessments.

The challenges are compounded in the context of madrasah ibtidaiyah Islamic elementary schools which serve a large and growing segment of Indonesia's student population. In many of these schools, instructional resources are constrained, opportunities for teacher professional development are limited, and classroom innovation is infrequent. National educational policy increasingly emphasizes student-centered learning and the integration of digital technology as part of the Merdeka Belajar curriculum reform agenda, but the translation of these policies into everyday classroom practice remains deeply uneven, particularly in schools outside major urban centers (Kemendikbudristek, 2023). There exists, therefore, a pressing and urgent need for practical, implementable, and evidence-based instructional strategies that can realistically be adopted within the existing resource constraints of Indonesian elementary and madrasah schools, and that can produce meaningful and measurable improvements in student language learning outcomes.

Two well-established strands of educational research provide the theoretical and empirical foundations for this study: cooperative learning and technology-enhanced instruction. Understanding what each strand has contributed, and where the gaps between them remain, is essential for locating the specific contribution of the present study. The cooperative learning tradition has generated one of the most robust and consistent bodies of evidence in educational research. Across decades of experimental, quasi-experimental, and meta-analytic studies conducted in diverse national and cultural contexts, structured peer learning has consistently demonstrated its capacity to produce meaningful gains in academic achievement, student motivation, and social skill development. Slavin (2022) argues in his updated synthesis that cooperative learning works because it simultaneously addresses motivational and cognitive mechanisms: group goal structures create incentives for students to invest in each other's learning, while the process of explaining, questioning, and elaborating ideas for a partner deepens individual cognitive processing in ways that solitary study cannot replicate. Johnson and Johnson (2022), in their authoritative handbook chapter on cooperative learning theory and research, further argue that the conditions most essential to productive cooperative learning positive interdependence, individual accountability, and promotive face-to-face interaction are precisely the conditions that activate the higher-order thinking processes associated with deep comprehension and durable retention. The theoretical grounding for these effects is provided most powerfully by Vygotsky's (1978) sociocultural theory

of learning and his concept of the Zone of Proximal Development (ZPD), which holds that cognitive development is inherently a social process: learners advance most effectively when they engage in structured interaction with peers who can provide the scaffolding needed to bridge the gap between their current independent capability and a higher level of performance (Doolittle, 1997).

Among the many cooperative learning strategies available to classroom teachers, the Power of Two model is particularly well-aligned with the cognitive demands of reading comprehension instruction. Based on the fundamental principle that two minds working collaboratively produce richer and more accurate understanding than either mind working alone, this model structures learning into three sequential and mutually reinforcing phases. In the first phase, students individually and silently generate their own responses to a comprehension question or analytical task a process that activates prior knowledge, exposes existing gaps in understanding, and establishes a personal stake in the subsequent discussion. In the second phase, students share their individual responses with a partner and engage in substantive discussion, comparing, challenging, and building upon each other's thinking. In the third phase, the pair jointly constructs a new, improved answer that synthesizes the best of both individual responses a process of collaborative knowledge construction that Vygotsky's framework would identify as operating within each student's ZPD. This three-stage structure addresses individual reflection, dialogic negotiation, and collaborative sense-making simultaneously, providing multiple cognitive encoding opportunities that conventional teacher-centered instruction does not offer.

Prior Indonesian classroom action research studies have documented the Power of Two model's effectiveness across a range of subjects and grade levels. Ratnawilis (2022) demonstrated that combining the Power of Two strategy with picture media in a fourth-grade thematic class produced substantial improvements in teacher activity from 74% to 93.75%, student activity from 67.05% to 86.90%, and learning mastery from 68.57% to 91.43% across two cycles. Amran et al. (2022) similarly reported significant gains in student learning outcomes in a sixth-grade science class, with average scores rising from 68.08% in Cycle I to 84.04% in Cycle II, accompanied by observable improvements in student participation and classroom engagement. Rahman et al. (2026) further confirmed the model's effectiveness in a junior secondary school setting, where its application produced measurable improvements in student achievement in Islamic education. Across these studies, a consistent pattern emerges: the Power of Two model creates more participatory and cognitively active learning environments that translate into better learning outcomes compared to conventional approaches.

The second relevant strand of research concerns the role of interactive digital media in supporting and enhancing classroom learning. Interactive media encompassing digital tools such as multimedia-rich presentations, interactive quizzes, educational simulations, and responsive application-based platforms is increasingly recognized as a powerful complement to structured pedagogical strategies. Hartika Aulia (2024) reviewed the empirical evidence on interactive learning media and confirmed that it exerts a consistently positive effect on student engagement, with students who actively interact with digital learning modules demonstrating improved academic performance and higher final test scores compared to peers learning from static materials. In the specific context of Indonesian elementary schools, research has identified interactive digital media as one of the most promising tools for improving student motivation and learning outcomes in language subjects, particularly when media design is well-aligned with instructional objectives and adapted to students' developmental levels (Hafizin et al., 2024). A systematic review of digital

literacy-based learning media trends in Indonesian elementary language education from 2020 to 2025 further confirmed that the majority of effective digital learning tools in this context are multimedia-based, combining textual, visual, and interactive elements to create richer and more engaging learning experiences than traditional printed materials can provide (Maisarah et al., 2022). In madrasah settings specifically, the integration of digital technology in instruction has been found to significantly increase student motivation, active participation, and preparedness for contemporary learning demands (Resti et al., 2024).

However, a critical and consequential gap exists in the existing literature. While numerous studies have examined the Power of Two cooperative learning model in combination with various types of media including picture cards, animation software, and Powtoon-based presentations and while separate bodies of research have documented the benefits of interactive digital media in Indonesian elementary classrooms, no prior study has systematically investigated the combined application of these two approaches specifically within Indonesian language instruction at the elementary school level. This gap is theoretically significant because Indonesian language learning, with its emphasis on reading comprehension, narrative text analysis, and main idea identification, presents a unique pedagogical context with distinctive cognitive and linguistic demands that differ meaningfully from the science, mathematics, and general thematic subjects that have been the focus of most prior Power of Two research. It is also practically significant because the combination of a structured cooperative learning strategy with interactive digital media addresses two of the most consistently identified weaknesses of Indonesian language instruction simultaneously: the lack of active student engagement and the absence of dynamic, stimulating instructional resources. The present study is therefore positioned to fill this gap by providing the first systematic empirical evidence of the combined model's effectiveness in the specific context of elementary Indonesian language learning.

Drawing from the theoretical foundations, empirical evidence, and identified research gap outlined above, this study is guided by three specific and interrelated research objectives. First, the study aims to examine the effect of implementing the Power of Two cooperative learning model assisted by interactive media on the quality of teacher instructional activity during Indonesian language learning. Second, the study seeks to analyze the changes in student learning activity and engagement that result from this combined instructional approach across two cycles of classroom action research. Third, the study investigates the impact of the Power of Two model supported by interactive media on student learning outcomes in Indonesian language, as measured by end-of-cycle achievement test scores and classical mastery percentages.

This study carries both theoretical and practical significance that extends beyond the immediate classroom context in which it was conducted. Theoretically, it contributes to the expanding international literature on cooperative and technology-enhanced learning by providing empirical evidence generated within a real Indonesian elementary classroom for the synergistic effects of combining a structured peer-interaction strategy with interactive digital tools in language instruction. From a constructivist theoretical standpoint, the combination is theoretically coherent: the Power of Two model operationalizes Vygotsky's (1978) principles of social knowledge construction and zone-of-proximal-development scaffolding, while interactive digital media provides the multimodal stimulation and immediate feedback that sustains student engagement and supports diverse learning styles (Hartika Aulia, 2024; Hafizin et al., 2024). The theoretical synergy between these two approaches cooperative dialogue and technology-mediated engagement

creates learning conditions that are simultaneously cognitively challenging, socially supported, and motivationally compelling.

Practically, this study responds to the urgent and widely documented need for implementable instructional innovations in Indonesian elementary and madrasah schools that do not require prohibitive resources, specialized infrastructure, or extensive prior training. By demonstrating meaningful and measurable improvements in teacher activity, student engagement, and learning outcomes within a real classroom context over two structured cycles, this study provides a replicable and accessible instructional model that teachers and school administrators can adapt across different subjects, grade levels, and school types. In doing so, it contributes not only to the academic literature on language instruction and cooperative learning but also to the practical toolkit of educators working to improve literacy outcomes in one of Southeast Asia's most educationally significant and challenging national contexts.

RESEARCH METHOD

This study adopted a mixed-methods descriptive approach grounded within the tradition of Classroom Action Research (CAR). The overall epistemological orientation of the study is consistent with what Creswell and Creswell (2018) describe as a pragmatist worldview one that prioritizes the practical utility of research knowledge over adherence to a single methodological paradigm, and that treats the combination of quantitative and qualitative data as mutually reinforcing rather than philosophically incompatible. Within this orientation, quantitative data in the form of percentages derived from observation scores and end-of-cycle achievement tests provided the primary evidence for measuring whether meaningful change occurred across cycles, while qualitative observational data enriched the interpretation of those measurements by illuminating how and why change occurred which specific teacher behaviors improved, how the nature of student discussion shifted, and what patterns of individual student growth emerged. This integration of evidence types aligns with what Creswell and Creswell (2018) identify as an explanatory mixed-methods design: quantitative results define the scope of change, while qualitative data explain its mechanisms.

The approach is further shaped by the epistemological principles of action research as a distinct research tradition. Unlike experimental or survey research, which seek to generate findings generalizable to populations beyond the study site, action research as Cohen, Manion, and Morrison (2018) define it is purposefully situational and practitioner-oriented, aiming to diagnose and resolve specific problems within a particular educational context through systematic cycles of inquiry. This study's aim was not to produce statistically generalizable conclusions about the Power of Two model, but rather to generate reliable, locally grounded evidence about whether its implementation in combination with interactive digital media could meaningfully improve Indonesian language learning outcomes within one specific classroom context, and to document the instructional dynamics through which that improvement was produced.

The specific research design employed in this study was Classroom Action Research using the spiral cyclical model developed by Kemmis and McTaggart (1988). This model is among the most widely adopted frameworks for systematic practitioner inquiry in educational settings, and it is distinguished by its organization of the research process into iterative, self-correcting cycles rather than a single linear sequence. Each cycle in the Kemmis and McTaggart model consists of four interconnected and mutually informing phases: planning, action, observation, and reflection. In the planning phase, the researcher and classroom teacher collaboratively identified learning

objectives, prepared lesson plans structured according to the Power of Two model's procedural steps, developed observation instruments for documenting teacher and student activity, and designed end-of-cycle achievement tests aligned with the Indonesian language curriculum. In the action phase, the planned lesson was implemented in the classroom, with the Power of Two model and interactive digital media deployed in accordance with the prepared instructional design. In the observation phase, structured observation sheets were used by trained observers to systematically record the quality and completeness of teacher instructional behaviors and student learning behaviors across the full duration of each lesson. In the reflection phase, all data collected during the observation and testing phases were analyzed collaboratively by the research team to identify what had been effective, what had fallen short of expectations, and what specific adjustments were needed in the subsequent cycle.

This study was conducted over two complete cycles. The first cycle used narrative text comprehension as its instructional content, requiring students to identify story elements, sequence events, and respond to inferential questions about a narrative passage. The second cycle addressed the identification of main ideas and distinguishing supporting ideas within expository texts, a skill that represents a more analytically demanding reading comprehension task than narrative structure identification. This deliberate sequencing from narrative to informational text was designed to build cumulative reading comprehension skills across cycles, moving students from comprehension of familiar story-based structures toward the more abstract analytical demands of expository text. Cycle I was conducted in the second week of April 2026 and Cycle II in the third week of the same month. The relatively brief interval between cycles was intentional, ensuring that instructional momentum and student engagement were maintained and that reflective insights from Cycle I could be promptly translated into refined instructional practice in Cycle II.

The research subjects were 22 fourth-grade students enrolled in an Islamic elementary school a madrasah ibtidaiyah located in Banda Aceh, Aceh Province, Indonesia. In accordance with ethical commitments to participant confidentiality, the name of the school institution and the identities of all student and teacher participants have been fully anonymized throughout this report. The student group consisted of male and female students in roughly equal proportions, spanning a range of prior academic achievement levels from well below to well above the established minimum mastery threshold for Indonesian language. This class was selected as the research site following a preliminary observational visit and review of prior assessment records, both of which confirmed the presence of significant and persistent difficulties in Indonesian language learning including low student engagement during reading activities, widespread difficulty in comprehending text content beyond surface-level word reading, and below-threshold learning outcome scores for a majority of students. These conditions made the class both an appropriate and an educationally meaningful site for action research intervention. The classroom teacher, whose identity is similarly anonymized, participated actively in the research process across all phases as the primary implementer of the instructional intervention, as an observed subject during the action and observation phases, and as a reflective collaborative partner during the planning and reflection phases.

Data were collected through two primary instruments, each targeting a distinct dimension of the research objectives. The first instrument was a structured observation sheet, of which two versions were developed: one focused on teacher instructional activity and one focused on student learning activity. The teacher observation sheet contained items corresponding directly to the procedural steps of the Power of Two model, including the clarity and completeness of task

instructions for each phase, the quality of facilitation during paired discussion, the purposefulness of interactive media use at different points in the lesson, and the management and effectiveness of whole-class answer comparison sessions. The student observation sheet recorded behavioral indicators of active learning engagement, including attentiveness during the individual response phase, quality of verbal exchange during paired discussion, ability to construct a revised joint answer that improved upon individual responses, and participation in class-wide sharing. Both observation sheets used a numerical item scoring system that was subsequently converted into percentage scores using a standardized formula. Each observation session was conducted by an assigned observer the classroom teacher observed the researcher's instructional behaviors, while a peer researcher separately observed student behaviors to reduce the potential for simultaneous observation bias. As Miles, Huberman, and Saldaña (2014) emphasize, the quality of qualitative observational data in action research depends substantially on the systematic design of observation instruments and the consistency with which they are applied; these principles guided the development and use of both observation sheets in this study.

The second instrument was an achievement test administered at the end of each instructional cycle. As Cohen, Manion, and Morrison (2018) note, achievement tests in classroom research serve as the most direct measure of whether instructional interventions have produced the intended cognitive outcomes. In Cycle I, the test assessed students' comprehension of a narrative text, requiring them to identify story elements, place events in sequence, and respond to both literal and inferential comprehension questions. In Cycle II, the test focused on students' ability to identify main ideas in an expository passage and to distinguish them accurately from supporting ideas. Each test was constructed with items of equal weight, and scores were expressed as percentages out of 100. The tests were designed in alignment with the fourth-grade Indonesian language curriculum standards and were reviewed by the classroom teacher prior to administration to ensure content validity and appropriateness for the student group's developmental level.

Data analysis in this study followed a descriptive quantitative approach that employed two core formulas. For observation data, the percentage score for teacher and student activity in each cycle was calculated using the formula $P = (F/N) \times 100\%$, where P represents the resulting percentage, F represents the total score obtained across all observation items, and N represents the maximum possible total score. The resulting percentages were then categorized using a pre-established performance rubric: below 54% was classified as very poor, 55–64% as poor, 65–74% as adequate, 75–84% as good, and 85–100% as very good. This rubric enabled consistent cross-cycle comparison of activity quality in a standardized and interpretable format.

For student learning outcomes, classical mastery was calculated using the formula $KS = (ST/N) \times 100\%$, where KS represents the classical mastery percentage, ST represents the number of students whose individual test scores reached or exceeded the minimum mastery threshold, and N represents the total number of students in the class. A student was considered to have achieved individual mastery if their score reached or exceeded 75 the established minimum competency achievement criterion (KKTP) for Indonesian language in the fourth grade at the research site. Overall classroom mastery was considered satisfactory, and the cycle's success indicator met, if at least 75% of all students achieved individual mastery. These formulas and criteria were established prior to data collection, ensuring that success was defined prospectively rather than adjusted retrospectively to fit observed outcomes a principle that Creswell and Creswell (2018) identify as essential to the credibility of descriptive quantitative research.

This study was conducted in full accordance with the ethical principles governing educational research involving human participants, as outlined by Cohen, Manion, and Morrison (2018), who identify informed consent, confidentiality, anonymity, and minimization of harm as the foundational ethical commitments of educational research. Prior to the commencement of data collection, written institutional permission was obtained from the school principal, who was informed of the research's objectives, design, and intended use of findings. The classroom teacher provided explicit informed consent, with a clear explanation of their role as both an implementing participant and an observed subject, and was given the opportunity to withdraw participation at any stage without consequence. All student participants are represented in data tables and throughout this report using two-letter initials only, ensuring that no individual can be identified from published findings. The name of the school institution has similarly been withheld. All data collected in the course of this study were used exclusively for the purposes of this research and stored securely. The research was conducted during regular instructional time and designed to minimize disruption to the school schedule, with the educational welfare and learning experience of students prioritized at every stage of the research process.

RESULT AND DISCUSSION

Result

Changes in Teacher Activity Quality Across Cycles

The first cycle revealed that while the teacher implemented the Power of Two model in a broadly correct sequence, several aspects of the instructional process remained underdeveloped. The total teacher activity score in Cycle I was 90 points out of a maximum possible score, yielding a percentage of 70.31%, which falls within the "adequate" category. Observational records from this cycle indicated that the teacher's instructions for the individual thinking phase were clear and well-received, but the transition to the paired discussion phase was somewhat abrupt, leaving some student pairs uncertain about what exactly they were expected to discuss. The use of interactive media which in this study took the form of a digitally projected reading text, comprehension questions, and an embedded interactive quiz was implemented but not fully exploited. The teacher tended to display the media content without allowing sufficient time for students to interact with it independently before moving to the discussion phase. Additionally, the whole-class comparison of paired answers at the end of the lesson was conducted hurriedly, reducing its effectiveness as a formative learning opportunity. Reflection on Cycle I identified several specific areas for improvement. The research team and the classroom teacher agreed that clearer scaffolding was needed during the transition from individual to paired work, that more structured time should be allocated for students to interact with the digital media content, and that the class-sharing phase needed to be extended and made more systematic. These reflections directly informed the planning and implementation of Cycle II.

In the second cycle, the teacher's activity score increased substantially to 114 points, corresponding to a percentage of 89%, which falls within the "good" category. Observational records from Cycle II showed marked improvement across all dimensions of the observation sheet. The teacher provided explicit and well-sequenced instructions for each phase of the Power of Two model, including a clear explanation of how individual responses should be written before discussion began. The interactive media was used more purposefully, with the teacher directing students' attention to specific textual features on the screen before asking them to generate responses, and returning to the media during the class-sharing phase to validate or challenge paired

answers against the text. The class-sharing phase was conducted with greater deliberateness, with multiple pairs invited to present and compare their answers, generating richer discussion. These improvements reflected the teacher's internalization of the model's procedural logic and greater confidence in managing the combined pedagogical approach.

Changes in Student Learning Activity Across Cycles

Student activity in Cycle I yielded a total score of 84 points, corresponding to a percentage of 65.62%, which is classified as "adequate." Observations revealed that a meaningful portion of students engaged genuinely with the individual thinking phase particularly those who were already stronger readers but that a significant number struggled to formulate written individual answers before discussion. During the paired discussion phase, some pairs engaged in substantive exchange, but others tended to simply copy one partner's answer onto their shared response sheet rather than synthesizing and improving upon both partners' thinking. Engagement with the interactive media was generally positive in terms of attention, as the visual and digital format captured students' interest, but this engagement was largely receptive rather than interactive. Several students were observed to look at the screen passively rather than using the displayed content actively to inform their responses. Following Cycle I's reflection, adjustments were made to the structure of student tasks. Students were given a brief guided prompt sheet to support the individual thinking phase, helping them organize their initial responses before discussion. The paired discussion phase was given clearer time boundaries and a structured discussion guide that prompted partners to explicitly compare their individual answers, identify similarities and differences, and construct a new, improved joint answer. These scaffolding adjustments proved effective in Cycle II.

Student activity in Cycle II reached a total score of 110.6 points, corresponding to 86.40%, classified as "good." Observers documented significantly higher levels of genuine discussion between partners, with most pairs demonstrably engaging in comparison and synthesis rather than simple copying. Students were observed referring back to the interactive media display during their discussions to locate textual evidence for their answers, indicating a more strategic and purposeful use of the digital resource. The class-sharing phase in Cycle II also saw greater student willingness to volunteer answers and to respond to other pairs' contributions, suggesting a growing sense of collaborative academic identity within the group. Overall, the shift from Cycle I to Cycle II represented a qualitative change in the nature of student participation from compliance-based engagement to genuinely active intellectual involvement.

Changes in Student Learning Outcomes Across Cycles

The achievement test results across the two cycles provided the most concrete evidence of improvement in student learning outcomes. In Cycle I, the class average score was 66.81 out of 100, with 12 students (54.54%) achieving mastery (score ≥ 75) and 10 students (45.45%) falling below the mastery threshold. This placed overall class performance in the "adequate" category and below the pre-established success criterion of 75% class mastery. The distribution of scores in Cycle I was notably wide, ranging from a low of 30 to a high of 90, suggesting considerable heterogeneity in students' prior reading comprehension ability and in the degree to which they were able to benefit from the first cycle of intervention.

In Cycle II, the class average score increased to 83.63, representing a gain of approximately 16.82 percentage points over Cycle I. The number of students achieving mastery rose to 18 (81.81%), while only 4 students (18.18%) remained below the mastery threshold, compared to 10 in Cycle I. This mastery rate of 81.81% surpasses the pre-established success criterion of 75%,

confirming that the intervention met its target in the second cycle. The score range in Cycle II narrowed somewhat compared to Cycle I, with most students clustering in the 70–100 range, and only a small number scoring below 70. Of the four students who did not achieve mastery in Cycle II, two had also not achieved mastery in Cycle I, while two others showed a decline from their Cycle I scores a pattern that warrants further individual diagnostic attention.

At the individual level, the majority of students demonstrated improvement from Cycle I to Cycle II. Several students who had scored in the 40–50 range in Cycle I advanced dramatically in Cycle II, achieving scores of 80–100. For instance, one student who scored 40 in Cycle I achieved 80 in Cycle II, and another who scored 50 in Cycle I achieved 100 in Cycle II an improvement of 50 points. These dramatic individual gains speak to the transformative potential of the combined Power of Two and interactive media approach for students who were previously disengaged or lacking the confidence to participate actively in reading comprehension tasks. The overall trajectory of results across both cycles strongly supports the conclusion that the instructional intervention produced meaningful and measurable improvement in student learning outcomes.

Discussion

Teacher Activity and Pedagogical Transformation

The improvement in teacher activity scores from 70.31% in Cycle I to 89% in Cycle II reflects far more than a quantitative gain in procedural compliance with the Power of Two model's instructional steps. It represents a qualitative transformation in the teacher's pedagogical orientation a shift from mechanical technique execution toward integrated, responsive, and purposeful facilitation. In Cycle I, the teacher implemented the model's core sequence correctly: posing questions, directing individual thinking, organizing paired discussion, and facilitating class-wide answer comparison. However, the execution lacked the fluency and depth that allows a cooperative learning strategy to reach its full potential. Instructions for paired discussion were somewhat abrupt, transitions between phases were hurried, and the interactive media while visually present was used primarily as a content display tool rather than as an active pedagogical instrument. The result was a lesson that was structurally sound but insufficiently dialogic, limiting the degree to which students could engage meaningfully with both the content and each other.

Following systematic reflection in Cycle I, the teacher made deliberate and targeted adjustments in Cycle II. Instructions were more scaffolded and explicit, transition management was smoother, and the interactive media was integrated purposefully at multiple points in the lesson as a stimulus for individual thinking, a reference resource during paired discussion, and a shared verification tool during whole-class answer comparison. These improvements produced the substantial gain reflected in the Cycle II observation score.

This developmental trajectory is consistent with what the action research literature identifies as iterative professional growth through reflective cycles. Mertler (2017) argues that classroom action research is uniquely powerful as a vehicle for teacher professional development precisely because it connects theory to practice within the teacher's own classroom, creates structured opportunities for critical reflection on outcomes, and empowers teachers to become active agents of their own pedagogical improvement. The improvement dynamic observed in this study where a teacher's implementation becomes meaningfully more effective after one cycle of structured reflection exemplifies this mechanism. More recently, Crawford (2025) has argued that action research supports teacher deprofessionalization resistance by restoring practitioners' sense

of ownership over their pedagogical decisions, an effect visible in the teacher's increased confidence and flexibility in Cycle II. The convergence of these findings suggests that the improvement in teacher activity is not incidental but is a predictable outcome of the CAR process when it includes genuine, data-informed reflection.

From a theoretical standpoint, the observed improvement also resonates with Shulman's (1987) foundational concept of pedagogical content knowledge (PCK). Shulman argued that effective teaching requires not merely subject matter knowledge or general pedagogical skill, but a specialized integrated knowledge the capacity to transform content into forms that are organized, represented, and adapted to meet the specific needs and abilities of particular learners. The teacher's growing ability in Cycle II to use the interactive media as a pedagogical lever directing students toward specific textual features before posing questions, returning to digital content to anchor class discussion, and deploying the interactive quiz as a formative assessment checkpoint exemplifies the practical development of PCK in action. These are not generic teaching skills; they are subject-specific, strategy-specific, and media-specific competencies that developed through structured reflective practice within the CAR cycle. Star (2023), in his revisitation of Shulman's construct, further emphasizes that PCK is dynamic rather than static it develops progressively through experience and critical reflection, a process that the CAR framework structurally supports. The findings of this study thus affirm that two cycles of action research, while a relatively brief intervention, can produce meaningful and observable PCK development when guided by clear observational criteria and systematic reflection.

Student Activity and Collaborative Engagement

The improvement in student activity from 65.62% in Cycle I to 86.40% in Cycle II constitutes one of the most substantively meaningful findings of this study, not merely because of the magnitude of the gain but because of what the qualitative observation data reveal about its nature. In Cycle I, student engagement was largely compliance-based: students completed the tasks they were assigned, but many did so passively or superficially, particularly during the paired discussion phase, where a significant number of pairs simply copied one partner's individual answer onto their shared response sheet rather than engaging in genuine synthesis. In Cycle II, by contrast, observers documented substantively different behavior: pairs actively reading each other's individual answers, verbally comparing and debating differences, pointing at specific sections of the interactive media display to locate textual evidence, and constructing joint answers that demonstrably differed from and improved upon either individual response. This qualitative shift from task completion to genuine collaborative intellectual engagement is theoretically significant and practically consequential.

The Vygotskian theoretical framework provides the most coherent explanation for this shift. Vygotsky (1978) argued that all higher mental functions originate in social interaction before becoming internalized as individual cognitive processes. In his sociocultural theory, learning is most effective when it occurs within the zone of proximal development the space between what a learner can do independently and what they can achieve with appropriate social support. The paired structure of the Power of Two model creates exactly these conditions: each partner provides the other with access to alternative understandings and complementary knowledge that extends their individual cognitive reach beyond what either could achieve alone. Kozulin (1998), drawing on Vygotsky's concept of psychological tools, further notes that culturally designed artifacts including digital media serve as mediational means that extend and transform the cognitive activity of learners. The interactive media used in this study functioned precisely in this capacity: it

provided a shared visual and textual reference point that anchored paired discussion, reduced ambiguity, and directed students' attention toward specific linguistic features of the text a mediational function that static printed materials cannot provide as effectively.

The improvement in discussion quality between cycles also aligns with the findings of a meta-analysis of cooperative learning outcomes in physical education conducted by Boke et al. (2025), which found that the effectiveness of cooperative learning in producing genuine student engagement depends critically on the quality of task scaffolding and the explicitness of role expectations both of which were enhanced in Cycle II through the introduction of a structured discussion guide and clearer time management. In the language learning context specifically, Cochon Drouet, Lentillon-Kaestner, and Margas (2023) demonstrated in their systematic review and meta-analysis of the Jigsaw cooperative learning method that structured peer interaction consistently produces improvements in student motivation, self-esteem, and academic engagement when the method is implemented with adequate scaffolding a finding that directly parallels the trajectory observed across Cycles I and II in the present study. Furthermore, Du, Chen, and Lin (2022), in their experimental study of collaborative learning among fourth-grade Chinese elementary students, found that the benefits of peer collaboration for learning are optimized when task structure is designed to ensure genuine interdependence rather than simple division of labor a design principle that the Power of Two model embodies in its requirement that individual responses be generated before discussion and that the joint answer represent a synthesis rather than a selection.

Learning Outcomes and Academic Achievement

The improvement in student learning outcomes from a class average of 66.81 with 54.54% mastery in Cycle I to an average of 83.63 with 81.81% mastery in Cycle II represents the most direct and practically significant evidence of the intervention's effectiveness. The gain of more than 27 percentage points in the proportion of students achieving the minimum competency threshold (KKTP = 75) within two instructional cycles is substantial by any reasonable standard of educational impact, and it demands careful interpretive attention to understand the cognitive mechanisms through which it was produced.

From a cognitive science perspective, the Power of Two model's three-phase structure individual response generation, paired discussion and synthesis, whole-class answer comparison creates multiple sequential opportunities for what Craik and Lockhart (1972) termed deep processing, and what subsequent cognitive research has characterized as elaborative encoding. Elaborative encoding refers to the cognitive process of actively connecting new information to existing knowledge structures through meaningful elaboration generating explanations, making comparisons, constructing relationships in ways that produce richer, more interconnected, and more durably retrievable memory representations than surface-level processing alone (Bradshaw & Anderson, 1982). The individual response generation phase of the Power of Two model activates this process by requiring students to engage with the text at a level deeper than passive reading they must retrieve, organize, and articulate what they understand. The paired discussion phase deepens elaboration further by exposing students to alternative interpretations that require them to evaluate, compare, and justify their own understanding against a partner's. The joint answer construction phase represents a third elaborative act, requiring students to synthesize two perspectives into a coherent, improved response. This cascading elaboration across three phases explains why learning outcomes in Cycle II improved so substantially compared to Cycle I, where

the quality of the paired discussion phase was insufficient to activate the full depth of elaborative processing that the model is designed to produce (Monita,2024).

The role of interactive media in amplifying this effect is both theoretically and empirically important. Permatasari, Suarman, and Gimin (2024) specifically examined the relationship between learning media quality and student motivation and learning outcomes in Indonesian educational settings, finding that purposefully designed media significantly increases both the effort students invest in learning tasks and the quality of outcomes they achieve. Munawir, Roriqoh, and Khairani (2024), in their investigation of interactive media in madrasah settings, confirmed that digital learning tools increase student attention, reduce distraction, and create a more motivationally engaging classroom atmosphere all of which facilitate the kind of sustained cognitive engagement that elaborative encoding requires. The multimodal character of the interactive media in this study combining text, visual presentation, and interactive quiz elements also aligns with Mayer's (2009) cognitive theory of multimedia learning, which holds that learning is enhanced when information is presented through complementary verbal and visual channels simultaneously, allowing learners to build dual-coded representations that are both more robust and more flexibly accessible than single-channel representations. Together, these theoretical and empirical perspectives explain why the combination of the Power of Two model and interactive media produced stronger learning outcomes than either approach would likely have produced in isolation (Hasan, 2024).

The pattern of dramatic individual gains among previously low-performing students is particularly theoretically significant. Several students who scored in the 30–50 range in Cycle I achieved scores of 80–100 in Cycle II, a magnitude of improvement that is unlikely to be attributable to test familiarity or regression to the mean alone. This pattern is consistent with the broader cooperative learning literature's consistent finding that structured peer interaction benefits lower-achieving students disproportionately. Slavin (2022) attributes this disproportionate benefit to the fact that lower-achieving students, when placed in properly structured cooperative tasks, gain access to the understanding of more capable peers as a cognitive scaffold a form of just-in-time support that allows them to engage with content at levels beyond their independent capability. This is precisely the mechanism that Vygotsky's ZPD framework predicts: the paired structure of the Power of Two model positions struggling students within the ZPD of their partners, enabling temporary access to comprehension strategies and textual interpretations that they have not yet independently internalized, and providing the social scaffolding through which internalization can progressively occur. The dramatic gains of several previously low-performing students in Cycle II provide compelling individual-level evidence for this theoretical mechanism operating within the real-world complexity of an elementary classroom (Nugraheni, 2026).

CONCLUSION

This study set out to address three specific research objectives, and the findings provide clear, empirically grounded responses to each. With respect to the first objective examining the effect of the Power of Two model assisted by interactive media on teacher activity quality the study found substantial improvement across two cycles, with teacher activity rising from 70.31% (adequate) to 89% (good). This improvement reflected not merely an increase in procedural compliance with the model's steps, but a qualitative deepening of the teacher's pedagogical facilitation, particularly in the purposeful use of interactive media as a shared instructional resource. With respect to the second objective analyzing changes in student learning activity the findings revealed a significant shift from 65.62% to 86.40%, accompanied by observable qualitative

changes in the nature of student engagement: from passive reception to active discussion, from copying to genuine collaborative synthesis. With respect to the third objective investigating the impact on student learning outcomes the study documented an increase in class average scores from 66.81 to 83.63, and in mastery rates from 54.54% to 81.81%, the latter surpassing the pre-established success criterion of 75%. Taken together, these findings provide strong evidence that the combined application of the Power of Two cooperative learning model and interactive digital media is effective in improving the quality of Indonesian language instruction and student learning outcomes at the elementary school level.

Based on the findings and conclusions of this study, several recommendations are offered for different stakeholder groups. For classroom teachers, it is recommended that the Power of Two model be adopted as a regular instructional strategy in Indonesian language lessons, particularly for reading comprehension activities. Teachers should pay careful attention to scaffolding the transition between the individual and paired phases of the model, providing structured prompts or templates that help students formulate and compare their individual responses before discussion. The use of interactive media should be integrated purposefully into each phase of the lesson not merely as a visual display tool at the opening of the class, but as an ongoing reference resource that students and teachers consult throughout the cycle of individual thinking, paired discussion, and whole-class sharing. For school administrators and curriculum coordinators, it is recommended that professional development activities be organized to familiarize teachers with both the Power of Two model and the effective pedagogical use of interactive digital tools, particularly in language and literacy subjects. Administrative support for access to digital projection equipment and educational software platforms is also important for enabling this kind of instruction at scale. For future researchers, it is recommended that subsequent studies build upon this work by employing larger and more diverse samples, incorporating comparison groups to allow causal inference about the specific contribution of each component of the intervention, extending the duration of observation to assess long-term retention of learning gains, and applying the combined approach across different subjects and grade levels. Special attention should be given to understanding the learning needs of students who do not achieve mastery within the standard two-cycle CAR framework, as targeted differentiation strategies for these students represent an important area for further inquiry.

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