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Student Learning Outcomes in Science and Social Studies (IPAS): Picture Media at Primary School

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ABSTRACT

This research is motivated by the low learning outcomes of students in Natural and Social Sciences (IPAS) in the fourth grade of Kaiwatu Christian Primary School, Southwest Maluku Regency. This study aims to describe and analyze the improvement in IPAS learning outcomes through the application of image media using the Kemmis and McTaggart spiral model. The method used is Classroom Action Research (CAR) implemented in two cycles. The research subjects consisted of 16 fourth-grade students in the 2024/2025 academic year. Data collection techniques included learning outcome tests, observation, and documentation. The results showed a consistent positive trend in quantitative indicators at each stage. In the pre-cycle stage, the class average only reached 65 with a critical classical completion of 19% (3 students). After the intervention in Cycle I, the average score increased to 70 with a classical completion of 44% (7 students). Following reflection-based corrective actions in Cycle II—conducted through enrichment of image variations, intensification of visual-based question-and-answer sessions, and group strengthening—the class average jumped to 78 with an absolute classical completion rate of 100% (all 16 students met the learning objective achievement criteria). This study concludes that the application of image media successfully transforms the learning process from verbalistic and conventional into more visual, interactive, and contextual. Theoretically and practically, this visualization is highly effective in strengthening cognitive schemas and fostering active engagement for primary school students at the concrete operational stage.

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1. INTRODUCTION

Education is a planned and systematic process for developing quality human resources with character, competence, and competitiveness in the era of globalization. In the context of primary education, the success of the learning process is greatly influenced by teachers' ability to select and utilize appropriate learning media aligned

with students' developmental characteristics (Wong & Hughes, 2023). Currently, the Independent Curriculum implemented in Indonesia integrates natural sciences and social sciences into a single subject, Natural and Social Sciences (IPAS) at the Primary School level, with the aim of developing students' scientific and social literacy holistically (Agustina et al., 2022). Through this integrative approach, IPAS is designed to build students' understanding of natural phenomena and social life contextually.

However, various real challenges in the field often hinder the achievement of these learning objectives. One of the most frequently identified problems is low student learning outcomes, which is generally triggered by the lack of use of engaging and meaningful learning media (Ryanto et al., 2025). Verbalistic instructional processes—where teachers rely solely on lectures without adequate visual media support—tend to make students passive, easily bored, and struggle to grasp abstract IPAS concepts (Suparman et al., 2020). This phenomenon of low IPAS learning outcomes among fourth-grade Primary School students is not an isolated case, but rather a widespread challenge occurring in various regions in Indonesia due to the lack of media capable of bridging abstract concepts with students' real-life experiences (Nurhayati, 2022).

A similar situation was found at Kaiwatu Christian Primary School, particularly in fourth-grade students. Based on initial observations by researchers, it was found that most fourth-grade students experienced significant difficulties in understanding the IPAS subject matter. This was reflected in low daily assessment scores, with more than 60% of students failing to meet the learning objective completion criteria set by the school. These low learning outcomes are strongly suspected to be the result of the limited variety of learning media used by teachers during the teaching and learning process. Teachers still largely rely on conventional, one-way methods without optimizing the potential of visual media, which can improve students' memory retention and conceptual understanding.

To address these challenges, the use of visual learning media, particularly images, has proven to be one of the most effective solutions. Images are visual representations of objects, concepts, or events that can convey concrete information to students through the sense of sight (Lo & Wang, 2024). Integrating images into the learning process helps students build stronger knowledge schemas, as information presented visually is easier to process, remember, and relate to real-life contexts than information presented purely verbally (Khotimah et al., 2020). According to Safitri and Kabiba (2020), learning with images provides opportunities for students to develop their own abilities and critically examine each learning object, as they are encouraged to engage more actively through hands-on learning activities.

The theoretical basis that supports the importance of using images comes from Edgar Dale's Cone of Experience (Novianty et al., 2025). Dale emphasized that the selection and use of appropriate learning resources and media are key to achieving interactive, meaningful, and efficient learning (Cecep et al., 2024). Image media occupies the middle position in the cone hierarchy, functioning as a bridge between concrete and abstract experiences. This position makes it very suitable for IPAS

learning in grade IV Primary Schools whose material coverage includes natural phenomena, living things, and social environments that require concrete visualisations such as ecosystems and life cycles. The use of this media innovation is also in line with the demands of the independent curriculum, where Parisu and Sisi (2025) emphasized that optimizing IPAS learning requires innovation in teaching methods and the use of appropriate strategies so that IPAS becomes an interesting subject in improving student competencies holistically.

The empirical effectiveness of this visual media is supported by several previous studies showing significant results. A study by Oktiana and Sari (2022) on third-grade Primary School students in Bener Village showed a significant difference in learning outcomes, with the experimental group using visual media achieving significantly higher learning outcomes than the control group. Similarly, action research by Siregar (2017) demonstrated that visual media can gradually improve IPAS learning outcomes for fifth-grade students, from Cycle I to Cycle II. Research by Sinaga et al. (2023) also confirmed the positive impact of visual media on the theme of living things, while a meta-analysis by Utami (2020) of six relevant studies concluded that visual media consistently improves Primary School students' IPAS learning outcomes.

Based on the background presented, this study aims to describe and analyze the improvement in learning outcomes of IPAS using picture media in fourth-grade students of Kaiwatu Christian Primary School. This research is expected to provide a significant contribution to improving the quality of IPAS learning at Kaiwatu Christian Primary School and serve as a practical reference for educators in optimizing visual media.

2. METHOD

This study employed a Classroom Action Research (CAR) approach, utilizing the systematic and practical spiral model developed by Kemmis and McTaggart, which is highly compatible with daily instructional contexts. In this framework, the teacher simultaneously functions as the researcher to observe, reflect upon, and resolve real classroom challenges through a continuous improvement process. Each research cycle comprises four interrelated stages—planning, action implementation, observation, and reflection—wherein the outcomes of the reflection phase directly inform the planning of the subsequent cycle. The design of this classroom action research is illustrated in Figure 1.

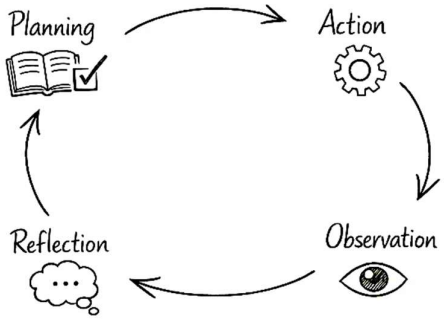

Figure 1. Classroom Action Research Design

This research was conducted at Primary School Kristen Kaiwatu, Maluku Province. The selection of this specific location was informed by preliminary observations that revealed a critical issue regarding low student learning outcomes within the Ilmu Pengetahuan Alam dan Sosial (IPAS) subject. By anchoring the study in this setting, the research directly addresses immediate instructional challenges where targeted pedagogical interventions are most needed. The research subjects comprised all 16 students enrolled in Grade IV at Primary School Kristen Kaiwatu, consisting of 12 male students and 4 female students. Grade IV was intentionally selected as the research environment because it represents the initial grade where IPAS is formally introduced under the Independent Curriculum framework. Furthermore, baseline assessment data indicated that more than 60% of these students had not yet achieved the standard Learning Objective Mastery Criteria established by the school, justifying the need for empirical intervention.

Adopting the Kemmis and McTaggart model, this study was structured into two operational cycles, with each cycle encompassing four distinct stages: planning, implementation, observation, and reflection. In line with the cyclical nature of action research, if the predetermined success indicators were not fulfilled in the first cycle, the study systematically proceeded to the second cycle, utilizing strategic revisions derived from the initial reflection phase. To capture a holistic view of the classroom dynamics, data collection was executed through learning outcome tests, direct observation, and thorough documentation.

The primary research instruments deployed for data collection included evaluation test sheets—comprising multiple-choice and short-answer items aligned with the IPAS Learning Achievement Standards for Phase B of the Independent Curriculum—alongside detailed activity observation sheets. To ensure the integrity and reliability of the gathered data, all instruments underwent rigorous expert validation by two qualified validators, a senior teacher and a supervising lecturer, prior to implementation. Finally, quantitative data analysis was utilized to compute the class mean score and determine the overall percentage of student mastery, applying the standard formula for calculating the class mean score.

$$\bar{X} = \frac{\Sigma X}{n}$$

Information:
$\bar{X}$ = class mean score
ΣX = sum of all student test scores
n = number of students who participated in the test

Formula for Calculating the Percentage of Student Mastery:

$$P = \frac{F}{n} \times 100\%$$

Information:
P = percentage figure
F = number of students who scored ≥ 70
n = total number of students

3. RESULTS AND DISCUSSION

Results

Pre-Action Results

The data collected during the pre-action phase describes the initial condition of Grade IV students' learning outcomes at Primary School Kristen Kaiwatu in the IPAS subject prior to the implementation of picture media as a corrective instructional intervention. Based on the pre-action data table below, it was found that of the 16 students who participated in the test, the total cumulative score reached 1,038, yielding a class mean score of 65. The highest score achieved by a student was 81, while the lowest score was 59.

Table 1. Student IPAS Learning Completion Data (Pre-Action)

Completion Category	Number of Students	Percentage (%)	Status
Complete (Meets KKTP)	3	19%	Not Yet Reaching Classical Completion
Incomplete (Does Not Meet KKTP)	13	81%	Majority Experiencing Difficulties
Total Research Subjects	16	100%	

The learning achievement of fourth-grade students at Kaiwatu Christian Primary School showed very low achievement, where only 3 students (19%) successfully met the Learning Objective Completion Criteria, while 13 students (81%) were categorized as not having completed the learning because they experienced significant difficulties in understanding the IPAS material. This low learning outcome is a direct impact of the teacher's conventional instructional approach, which is dominated by lecture methods without adequate visual media support. This verbalistic and one-way learning model fails to accommodate the psychological needs of primary school students who are at the concrete operational stage, so that the absence of visual stimuli makes abstract IPAS material difficult to digest and relate to students' real experiences. This finding is in line with various previous studies that confirm that low IPAS learning achievement at the Primary School level is a systemic problem rooted in the minimal use of innovative media, while providing a strong empirical basis for researchers to carry out corrective interventions through the implementation of visual media in the next cycle.

Cycle I

Following the implementation of the Cycle I intervention namely, the use of picture media in IPAS instructionthe evaluation results indicated an improvement in student learning outcomes compared to the pre-action condition. Based on the Cycle I data table presented below, the total cumulative score increased to 1,121, yielding a class mean score of 70, representing an increase of 5 points from the pre-action mean of 65. The highest score in this cycle was 83, while the lowest score was 65

Table 2. Comparison of the Development of IPAS Learning Completion (Pre-Action and Cycle I)

Development Indicators	Pre-Action Stage	Cycle I Stage	Trend Change	Success Target	Cycle I Status
Students Complete (Meet KKTP)	3 Students (19%)	7 Students (44%)	Up 25%	—	Not Optimal
Students Not Complete	13 Students (81%)	9 Students (56%)	Down 25%	—	Needs Improvement
Classical Completeness	19%	44%	Up 25%	Minimum ≥80%	Not Yet Achieved

The implementation of visual media in Cycle I successfully provided positive visual stimulus for fourth grade students of Kaiwatu Christian Primary School in building mental representations of abstract IPAS concepts, in line with Edgar Dale's Cone of Experience theory which positions visual media as an effective bridge from verbalistic experience to concrete understanding. This positive response was evidenced by a significant increase in the number of students who met the criteria for achieving learning objectives from 3 children (19%) in the pre-action stage to 7 children (44%) in Cycle I, as well as a decrease in the number of incomplete students from 13 students (81%) to 9 students (56%). However, the classical completeness achievement which only reached 44% was considered not optimal and had not been able to meet the research success indicators set at a minimum of 80%. The still high level of incomplete students (56%) was identified as originating from several inhibiting factors, such as the students' adaptation phase to the new approach, the lack of full integration of visual media with participatory group activities, and the lack of representative image variations in covering all materials, so that the findings and reflections in this cycle became an empirical basis for researchers to make improvements to strategies in Cycle II.

Cycle II

The implementation of Cycle II, which incorporated a range of refinements based on Cycle I reflections, produced highly significant and satisfying improvements in student learning outcomes. Based on the Cycle II data table, the total cumulative score increased to 1,247, with a class mean score of 78, representing an increase of 8 points from the Cycle I mean of 70. The highest score in this cycle was 87, while the lowest score was 70 notably, the lowest score in Cycle II already exceeded the class mean score from the pre-action phase (65).

Table 3. Cycle II Student Learning Outcomes

Analysis Components	Pre-Action Condition	Cycle II Conditions	Success Factors & Interpretation
Classical Completion Percentage	19%	100%	All 16 students successfully achieved and exceeded the Learning Objective Achievement Criteria (KKTP) threshold.
Cognitive Perspective	Not optimal	Very Optimal	The systematic and contextual use of visual media successfully optimized information

Analysis Components	Pre-Action Condition	Cycle II Conditions	Success Factors & Interpretation
			encoding and strengthened students' knowledge schemas in understanding concepts.
Motivational Perspective	Low	High	The engaging visual media successfully generated student interest, enthusiasm, and active engagement throughout the learning process.
Pedagogical Perspective	Needs improvement	Very Effective	The teacher successfully implemented reflection-based improvements in Cycle I through media variations, intensified image-based question-and-answer sessions, and more structured reinforcement.

The most prominent achievement in Cycle II was the attainment of 100% classical mastery, wherein all 16 students successfully achieved mastery, with not a single student scoring below the Criteria for Achieving Learning Objectives threshold. This outcome represents a substantial and extraordinary leap compared to the pre-action phase, which recorded a mere 19% mastery rate. This significant quantitative increase constitutes tangible evidence of the success of integrating picture media as a strategic intervention for continuous instructional improvement.

From a theoretical perspective, this comprehensive mastery can be analyzed through cognitive and motivational dimensions. Cognitively, the refined application of picture media in Cycle II successfully optimized the information encoding process within the students' memory; presenting visuals in a systematic, varied manner that directly anchored to real-life contexts strengthened the students constructed knowledge schemas and enhanced conceptual understanding. Motivationally, the visually engaging nature of the media effectively aroused student interest and enthusiasm, which significantly heightened active engagement throughout the instructional process.

From a pedagogical standpoint, these positive outcomes were heavily driven by the reflective adjustments made by the teacher following the initial cycle. The strategic improvements implemented—such as expanding media variety, intensifying picture-based question-and-answer interactions and providing more structured reinforcement—successfully optimized the overall effectiveness of the classroom instruction. Consequently, the synergy between targeted media refinement and reflective teaching practices proved instrumental in ensuring the academic success of all students in Cycle II.

Improvement of Student Learning Outcomes using Picture Media

The findings demonstrate a significant and progressive improvement from the baseline phase through the final cycle; specifically, the class mean score advanced from 65 in the pre-action phase (19% classical mastery, representing 3 out of 16 students) to 70 in Cycle I (44% mastery, representing 7 students), and ultimately culminated in a mean score of 78 with 100% classical mastery in Cycle II, where all

16 students successfully achieved the learning thresholds. This cumulative advancement empirically demonstrates that the strategic implementation of picture media effectively enhances student learning outcomes in IPAS, as systematically summarized in Table 4 below.

Table 4. Summary of Student Learning Outcome Improvements

Research Phase	Total Score	Class Mean Score	Highest Score	Lowest Score	Classical Mastery (%)
Pre-Action	1.038	65	81	59	19%
Cycle I	1.121	70	83	65	44%
Cycle II	1.247	78	87	70	100%

Discussion

The implementation of Classroom Action Research (CAR) using visual media in Natural and Social Sciences (IPAS) subjects in Grade IV of Kaiwatu Christian Primary School has shown very significant and progressive results. The success of this intervention is clear in the transformation of quantitative data on student learning outcomes, which moved linearly from the pre-cycle stage, Cycle I, to its peak in Cycle II. Based on empirical data, the class average experienced a constant increase from an initial score of 65 in the pre-cycle, increasing to 70 in Cycle I, and reaching a peak of 78 in Cycle II. In parallel, the most extraordinary surge occurred in the classical completeness indicator, which was initially at a critical level of 19% (3 of 16 students) at the initial stage, successfully increased to 44% (7 students) in Cycle I, and finally reached absolute success of 100% (all 16 students completed) in Cycle II. This cumulative achievement provides strong empirical validation that the use of visual media can effectively and sustainably address the problem of low IPAS learning outcomes.

Theoretically, the low student learning outcomes in the pre-cycle stage are rooted in teachers' conventional instructional approaches, dominated by one-way lectures without the support of visual media. This verbalistic learning model fails to bridge the psychological characteristics of primary school students, who, according to Jean Piaget's cognitive development theory, are in the concrete operational stage (Babakr et al., 2019; Ghazi et al., 2016; Oogarah-Pratap et al., 2025). Children at this stage require concrete object representations to understand logical concepts. Without visual stimuli, abstract IPAS material becomes difficult to understand and fails to connect with students' real-life experiences. Consequently, most students (81%) experience serious learning barriers. This condition aligns with the premise of the dual-coding theory developed by Allan Paivio, which states that human cognitive processes are much more effective when verbal information is reinforced by non-verbal visual representations (Mir et al., 2023; Susanti et al., 2025).

The intervention step in Cycle I, which included visual media, proved successful in breaking this chain of verbalism. Referring to Edgar Dale's Cone of Experience Theory, visual media acts as a tactile bridge that transforms abstract experiences into

more concrete understanding (Novianty et al., 2025). This visual stimulus helped fourth-grade students generate mental representations of complex IPAS concepts, which was immediately indicated by a 25% increase in classical mastery scores at the end of Cycle I. This positive phenomenon confirms the findings of various previous studies on the effectiveness of visual-based media in IPAS learning, which showed that the use of visual aids significantly reduces abstract misconceptions and facilitates the retention of lesson material in students' minds (Anggraini & Wijayanto, 2024; Martanti et al., 2025).

Despite the positive trend, the results in Cycle I fell short of the research success indicator, which stipulates a minimum classical mastery threshold of 80%. Through reflective analysis, researchers identified several inhibiting factors, including students' stuttering adaptation to the new media, a lack of representative imagery covering the full range of material, and the incoherent integration of visual media into participatory group activities. These critical findings from Cycle I then served as an empirical basis for developing corrective actions in Cycle II. In a pedagogical context, this reflective step refers to the emancipatory action cycle by Kemmis and McTaggart, where sharp reflection on the weaknesses of the initial implementation is essential for reconstructing subsequent action plans to be more adaptive to class needs (Feldman, 2025; Martos-García & García-Puchades, 2023).

The impact of these reflection-based improvements yielded highly satisfactory results in Cycle II, with absolute success for classical mastery reaching 100%. Cognitively, the refinement and arrangement of visual media, presented in a varied and contextual manner, successfully optimized the process of encoding information into students' long-term memory, thereby strengthening knowledge schemas and enhancing in-depth conceptual understanding. This success was evident in the lowest student score in Cycle II, which reached 70, even surpassing the class average score in the pre-cycle phase of 65. The success of these more contextual visual media refinements aligns with David Ausubel's principle of meaningful learning, which asserts that new information will be optimally absorbed if it can be logically correlated with students' existing cognitive structures through everyday life (Bryce & Blown, 2024; Sexton, 2025; Khoeriyah & Mahmudah, 2023).

Furthermore, this success was also supported by the synergistic motivational and pedagogical aspects throughout the learning process. The presence of aesthetic and relevant visual media can arouse students' interest, curiosity, and active engagement (Ji et al., 2025; Yasin & Parisu, 2025), while simultaneously shifting the learning paradigm from teacher-centered to student-centered. The synergy between teacher corrective actions and students' positive responses proves that learning effectiveness is largely determined by teachers' reflective abilities in each cycle. Overall, the results of this study confirm that the problem of low achievement in IPAS at the Primary School level is not a permanent obstacle, but rather a systemic problem that can be resolved through innovation in learning media. The successful implementation of visual media combined with a reflective action cycle in this study not only provides a practical solution for Kaiwatu Christian Primary School but also enriches the empirical treasury

regarding the importance of visualization in IPAS learning for children of concrete operational age.

The main contribution of this study is to provide empirical evidence and practical guidance regarding the effectiveness of implementing image media in the Kemmis and McTaggart spiral model to improve IPAS learning outcomes for primary school students in the 3T (Frontier, Outermost, and Disadvantaged) areas, especially in Southwest Maluku Regency. Theoretically, this study strengthens the relevance of Piaget's cognitive development theory and Edgar Dale's Cone of Experience (Masters, 2020; Oogarah-Pratap et al., 2025) by showing that the transformation of learning from verbalistic-conventional methods to visual-contextual methods can optimally explore students' cognitive potential to achieve 100% classical mastery. For educational practitioners, especially teachers at Kaiwatu Christian Primary School, this study presents a reflective and adaptive instructional improvement strategy that can be replicated to address the low achievement of learning objective achievement criteria within the independent curriculum framework.

4. CONCLUSION

The application of image media through the Kemmis and McTaggart spiral model was significantly able to improve the learning outcomes of Natural and Social Sciences (IPAS) of fourth grade students at Kaiwatu Christian Primary School, Southwest Maluku Regency, through the transformation of the learning process from verbalistic and conventional to more visual, interactive, and contextual. The quality of these learning outcomes was shown by a consistent positive trend in quantitative indicators, where the concerning pre-cycle conditions with a class average of 65 and a critical classical completion of 19% (3 out of 16 students), were successfully improved in Cycle I to an average of 70 with a classical completion of 44% (7 students). At its peak, after reflection-based corrective actions were carried out in Cycle II through enrichment of image variations, intensification of visual-based questions and answers, and group strengthening, the class average jumped to 78 with the achievement of absolute success of 100% classical completion (all 16 students met the Learning Objective Achievement Criteria). Theoretically and practically, this impressive achievement surge provides empirical validation that visualizing material through visual media is highly effective in optimizing information encoding into memory, strengthening cognitive schemas, and fostering active engagement in primary school students whose psychological development is still at the concrete operational stage.

As a recommendation, primary school teachers, particularly at Kaiwatu Christian primary School, are advised to consistently integrate varied and contextual visual media into the implementation of the Independent Curriculum to minimize the abstract, verbal approach to IPAS. School management should respond to these results by facilitating the availability of supporting visual media facilities and holding regular workshops on developing innovative learning media to enhance teachers' pedagogical competence. Furthermore, future researchers are encouraged to replicate or expand this reflective spiral model across a broader range of materials, grade levels, or

regional characteristics to test the consistent effectiveness of visual media in optimizing student learning outcomes across the classroom.

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