4787-Artikel Text-29464-1-2-20260627.docx

by ella.scott93@gmail.com 1

Submission date: 22-Apr-2026 03:00AM (UTC-0400)
Submission ID: 2940122270
File name: 4787-Artikel_Text-29464-1-2-20260627.docx (171.25K)
Word count: 6117
Character count: 34521

ETDC Indonesian Journal of Research and Educational Review
Volume 5, No. 3, 2026, pp 1556 - 1570
e–ISSN 2809-3682
p–ISSN 2809-7505
https://doi.org/10.51574/ijrer.v5i3.4787

Make a Match Cooperative Learning Model: Science Learning Outcomes on Natural Resource Topic at Elementary School

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Article Info

Article history:

Received January 28, 2026
Accepted April 08, 2026
Published April 22, 2026

Keywords:

Cooperative;
Learning Model;
Learning Outcomes;
Make a Match;
Science.

ABSTRACT

Low science learning outcomes are often caused by the lack of active student involvement in the knowledge construction process in the classroom. This study aims to describe and analyze the improvement in science learning outcomes in the natural resource material through the implementation of the Make a Match cooperative learning model for fourth-grade students at Elementary School 2 Tiakur, Southwest Maluku Regency. The method used is Classroom Action Research (CAR) model Kemmis and McTaggart which was implemented in two cycles with 25 students. Data was collected through observation techniques, learning outcome tests, and documentation, then analyzed descriptively. The results of the study showed a significant progressive increase in each stage. In the pre-cycle stage, the average class score was only 65 with a very low classical completeness, namely 12%. The implementation of the first cycle increased the average score to 70 with a completeness level of 60%. In the second cycle, student achievement increased sharply to an average score of 79 and successfully achieved 100% classical completeness. The conclusion of this study empirically proves that the Make a Match cooperative learning model is effective in improving students' science learning outcomes comprehensively, encompassing the cognitive, psychomotor, and affective domains. This research contribution provides a practical solution for educators in island regions in optimizing student participation through interactive and enjoyable learning models.

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1. INTRODUCTION

Science education at elementary school level plays a crucial role in developing a scientific mindset and a comprehensive understanding of natural phenomena (Fitri, 2022; Hasanah et al., 2025; Syachruroji et al., 2024). Science learning is not merely about mastering facts but rather a process of inquiry that demands students' active involvement in exploring themselves and their surroundings (Sulhan, 2020). In line with Mairina and Amini's (2021) view, the essence of this learning lies in providing

hands-on experiences to develop scientific competencies. The focus on natural resources units in fourth grade is highly strategic, as it encompasses a crucial understanding of the types, benefits, and environmental conservation efforts relevant to everyday life.

However, the reality on the ground reveals a disconnect between curriculum ideals and learning practices, as observed at Elementary School 2 Tiakur in Southwest Maluku Regency. Low student learning outcomes in the topic of SDA, characterized by failure to achieve the minimum completion criteria, indicate systemic problems in material delivery. The dominance of teacher-centered lecture methods leads to student passivity and a lack of motivation to learn. Prasetyo et al. (2023) emphasized that low learning outcomes are often triggered using learning models that lack innovation and fail to optimally accommodate students' learning needs.

As a solution, implementing a cooperative learning model offers a new paradigm for improving the quality of classroom interactions. This model places students in small groups to collaborate and help each other understand the material, which has been empirically proven to increase learning activity and motivation (Kebede et al., 2025; Ilmi et al., 2021). Among the various variants, the Make a Match model (finding card pairs) developed by Lorna Curran stands out as a highly adaptive approach for elementary school students. This model integrates elements of play and physical movement into the cognitive process, creating a dynamic learning environment through the interaction of finding pairs of question-and-answer cards (Muslikah et al., 2025; Sucahyo, 2022; Yustiawati et al., 2024).

The advantage of the Make a Match model lies in its ability to create a fun learning environment without reducing the depth of the material (Juliani et al., 2021). Research by Kencono and Harjono (2023) shows that this model significantly increases interest and learning outcomes because students are encouraged to directly understand the content through the matching process. Similarly, Putri and Taufina (2021) and Maknum (2024) demonstrated that structured card-matching activities can provide meaningful learning experiences and progressively improve learning outcomes from one cycle to the next. The novelty of this research lies in the model's effectiveness in converting theoretical material into measurable psychomotor activities.

The urgency of using this model is even more evident in the topic of natural resources, which requires a deep conceptual understanding of biotic and abiotic components. Conventional approaches to this material often fail due to its abstract nature for fourth-grade students (Wahyuningtyas & Zulherman, 2022). Therefore, intermediary media such as matching cards are needed to make the concept of natural resources more concrete and engaging. Rahmawati and Sartono (2018) emphasized that the appropriate selection of learning models, particularly those supported by flashcards, has a positive correlation with improved learning outcomes across subjects in elementary schools.

Comparatively, various previous studies, such as those conducted by Hadijah et al. (2022) and Mikran et al. (2018), have confirmed that Make a Match is effective in helping students understand abstract concepts through concrete activities. In fact,

Oktavianingrum et al. (2025) reported an increase in learning outcomes of up to 89.27%, accompanied by strengthening students' social skills. Based on this foundation, this study aims to analyze whether the implementation of the Make a Match model can specifically address learning barriers in areas with limited facilities, such as Southwest Maluku. It is hoped that this study will make a significant contribution to the development of innovative science learning practices and serve as a crucial reference for educators in underdeveloped regions to improve the quality of national education.

2. METHOD

This study employed a Classroom Action Research (CAR) approach. This approach was chosen because the study aimed to address a real classroom problem specifically, the low science learning outcomes on the Natural Resources topic among Grade IV students at Elementary School 2 Tiakur, Southwest Maluku Regency through the implementation of the Make a Match cooperative learning model. Moreover, CAR enables the teacher-researcher to be directly involved in the systematic and continuous process of instructional improvement. The research design adopted the CAR model developed by Kemmis and McTaggart, which consists of four interrelated stages within each cycle: (1) planning, (2) acting, (3) observing, and (4) reflecting. These four stages constitute one cycle, and if the success indicators have not been achieved at the end of the first cycle, the study continues to the next cycle with improvements based on the reflective findings of the previous cycle. This study was planned to run for two cycles, with each cycle comprising two learning sessions.

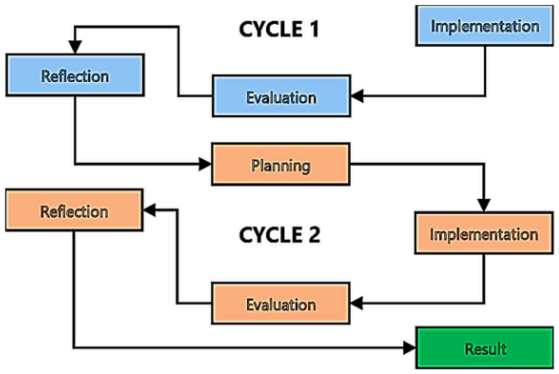

Figure 1. Classroom Action Research Flow

This research was conducted at Elementary School 2 Tiakur, Southwest Maluku Regency, involving 25 fourth-grade students—consisting of 10 boys and 15 girls—and the class teacher as the implementer of the action. The determination of the location and research subjects was carried out purposively based on the results of initial

observations and interviews that identified the urgency in addressing the low learning outcomes of science, especially in the material of Natural Resources. By synchronizing with the school academic calendar, this study is expected to provide applicable solutions to learning problems found factually in the field.

Data in this study were collected through three complementary primary techniques. First, observation, that is, direct observation conducted by an observer during the learning process to assess the teacher's activities in implementing the Make a Match model and students' learning activities. The observation sheets used were developed based on indicators of the implementation of the Make a Match cooperative learning model. Second, learning outcome tests that is, written evaluation items in the form of multiple-choice and short-answer questions administered to students at the end of each cycle to measure their level of comprehension and mastery of the Natural Resources topic. The test items were developed based on the core competencies and learning indicators that had been established. Third, documentation that is, the collection of data in the form of photographs of learning activities, student attendance records, and student learning outcome scores as supporting data to strengthen the validity of the research findings.

The data analysis technique used in this study was quantitative data analysis. Analysis was conducted at each cycle. The initial test results of each cycle were always compared with the final test results. The final test results from Cycle I were then compared with those from Cycle II. If an increase in data was observed, it was assumed that the Make a Match cooperative learning model improved student learning outcomes. The formula used to analyze the research data was class-based assessment, as follows:

$$Final\ Score = \frac{Total\ Score\ Obtained}{Total\ Overall\ Score} x\ 100\%$$

To calculate the class, mean score, the following formula was used:

$$Class\ Average = \frac{\Sigma\ \text{Student Score}}{Number\ of\ Students} x\ 100\%$$

Table 1. Student Mastery Level Criteria

No.	Score	Criteria
1	70–100	Passed
2	0–64	Not Passed

3. RESULTS AND DISCUSSION

Results

This section presents the findings of the classroom action research conducted over two cycles in Grade IV of Elementary School 2 Tiakur, Southwest Maluku Regency, in the subject of Natural Science (IPA), specifically on the Natural Resources topic. The research data encompasses three measurement stages: the initial test results (pre-

cycle), learning outcomes in Cycle I, and learning outcomes in Cycle II. Each stage was assessed based on three evaluation domains cognitive, psychomotor, and affective. The final score of each student was calculated based on the combination of these three domains, and learning mastery was determined based on the Minimum Mastery Criterion set by the school, which is 70.

Pre-Cycle Test Results

Prior to the implementation of the learning intervention, the researcher administered an initial test, or pre-cycle test, to all Grade IV students of Elementary School 2 Tiakur. The purpose of this initial test was to obtain an accurate picture of the students' baseline science learning outcomes on the Natural Resources topic before the Make a Match cooperative learning model was applied. The data obtained from this initial test subsequently served as a baseline for analyzing the improvement in student learning outcomes following the intervention. The complete initial test results for all students are presented in Table 2 below.

Table 2. Pre-Cycle Initial Test Results of Grade IV Students

No.	Student Initial	Cognitive	Psychomotor	Affective	Final Score	Remarks
1	AK	54	60	85	66	Not Passed
2	AB	53	60	85	66	Not Passed
3	AM	49	55	85	63	Not Passed
4	BW	53	55	85	64	Not Passed
5	CMH	43	50	85	59	Not Passed
6	CK	51	55	90	65	Not Passed
7	CU	74	70	100	81	Passed
8	CML	38	45	95	59	Not Passed
9	DB	51	45	90	62	Not Passed
10	DK	53	50	85	63	Not Passed
11	PD	54	55	80	63	Not Passed
12	FDS	63	55	85	68	Not Passed
13	FMT	45	55	85	62	Not Passed
14	GAL	38	60	80	59	Not Passed
15	GSA	51	55	85	64	Not Passed
16	GM	41	55	85	60	Not Passed
17	CNK	38	60	90	63	Not Passed
18	JDE	58	60	85	68	Not Passed
19	JMT	70	60	90	73	Passed
20	JS	44	60	85	63	Not Passed
21	JW	49	50	90	63	Not Passed
22	KS	51	50	90	64	Not Passed
23	KPR	58	35	90	61	Not Passed
24	MT	57	55	95	69	Not Passed
25	MT	64	55	95	71	Passed
		Total Score			1,619	
		Class Average			65	

No.	Student Initial	Cognitive	Psychomotor	Affective	Final Score	Remarks
			Highest Score		81	
			Lowest Score		59	
			Students Passed		3 students	
			Students Not Passed		22 students	
			Pass Rate (%)		12%	
			Fail Rate (%)		88%	

The data in Table 2 shows that the science learning outcomes of fourth-grade students at Elementary School 2 Tiakur during the pre-cycle phase were dismal, with a classical completion rate of only 12%. Of the 25 students who took the initial test, only 3 students exceeded the minimum completion criteria threshold of 70, while the remaining 22 students (88%) were declared incomplete. The class average achievement remained at 65, with a score range of 59 to 81, confirming that student scores remained concentrated below the established passing standard.

This low achievement was particularly evident in the cognitive and psychomotor domains, which were dominated by low scores, ranging from 38–64 and 35–70, respectively, indicating students' weaknesses in conceptual mastery and practical application of Natural Resources material. Although the affective domain showed more positive results (80–100), this did not significantly improve students' final scores. This finding is in line with initial observations regarding learning which is still monotonous and teacher-centered, thus becoming a strong empirical basis for researchers to implement the Make a Match cooperative model as an improvement intervention in the next cycle.

Cycle I

Following the baseline data obtained through the pre-cycle test, the researcher implemented the Cycle I learning intervention using the Make a Match cooperative learning model. In this cycle, students were invited to learn the Natural Resources topic through the activity of searching for and matching questions and answer cards in an active and enjoyable manner. At the end of Cycle I, an evaluation was conducted to measure the extent to which the intervention had succeeded in improving student learning outcomes. The complete Cycle I evaluation results are presented in Table 3 below.

Table 3. Student Learning Outcomes in Cycle I

\	Student Initial	Cognitive	Psychomotor	Affective	Final Score	Remarks
1	AK	76	70	75	74	Passed
2	AB	63	70	75	69	Not Passed
3	AM	66	70	75	70	Passed
4	BW	71	70	75	72	Passed
5	CMH	68	65	75	69	Not Passed
6	CK	66	70	75	70	Passed
7	CU	76	80	80	79	Passed
8	CML	58	70	75	68	Not Passed

\	Student Initial	Cognitive	Psychomotor	Affective	Final Score	Remarks
9	DB	58	80	75	71	Passed
10	DK	55	70	70	65	Not Passed
11	PD	61	75	75	70	Passed
12	FDS	66	65	70	67	Not Passed
13	FMT	49	70	75	65	Not Passed
14	GAL	61	80	75	72	Passed
15	GSA	80	65	70	72	Passed
16	GM	51	70	75	65	Not Passed
17	CNK	63	75	70	69	Not Passed
18	JDE	63	75	70	69	Not Passed
19	JMT	83	65	70	73	Passed
20	JS	58	80	75	71	Passed
21	JW	71	70	75	72	Passed
22	KS	63	75	75	71	Passed
23	KPR	66	70	75	70	Passed
24	MT	74	50	75	66	Not Passed
25	MT	76	70	75	74	Passed
		Total Score			1,753	
		Class Average			70	
		Highest Score			79	
		Lowest Score			65	
		Students Passed			15 students	
		Students Not Passed			10 students	
		Pass Rate (%)			60%	
		Fail Rate (%)			40%	

The implementation of the Make a Match cooperative learning model in Cycle I showed significant improvement, marked by a 5-point increase in the average class score to 70, as well as a jump in classical completion from 12% to 60%. However, 40% of students still did not reach the Minimum Competency due to weaknesses in the cognitive and psychomotor domains that were not compensated by affective values. These findings indicate that although the initial intervention has yielded results, strategic improvements are still needed in the next cycle, particularly related to optimizing time management during the game, providing individual guidance for students with slow learning rhythms, and simplifying the wording on the question cards to make them easier to understand in an inclusive manner.

Cycle II

Building upon the reflective findings of Cycle I, the researcher made several refinements in the implementation of Cycle II. These refinements included: (1) simplifying the wording of the card questions to make them more comprehensible to all students, (2) extending the card game time to reduce pressure on students who needed more time, (3) providing more intensive individual guidance to the 10 students who had not passed in Cycle I, and (4) reinforcing concept explanations through class discussions after each card-matching session. With these refinements in place, the implementation of Cycle II was expected to enable all students to achieve the KKM.

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The complete student learning outcome data for Cycle II are presented in Table 4 below.

Table 4. Student Learning Outcomes in Cycle II

No.	Student Initial	Cognitive	Psychomotor	Affective	Final Score	Remarks
1	AK	76	70	75	74	Passed
2	AB	77	80	80	79	Passed
3	AM	66	70	75	70	Passed
4	BW	71	70	75	72	Passed
5	CMH	70	75	75	73	Passed
6	CK	80	70	75	75	Passed
7	CU	76	80	80	79	Passed
8	CML	85	70	75	77	Passed
9	DB	80	80	75	78	Passed
10	DK	90	70	70	77	Passed
11	PD	85	75	75	78	Passed
12	FDS	80	90	80	83	Passed
13	FMT	80	80	85	82	Passed
14	GAL	80	80	90	83	Passed
15	GSA	80	90	70	80	Passed
16	GM	90	80	90	87	Passed
17	CNK	80	75	87	81	Passed
18	JDE	63	75	70	69	Passed
19	JMT	83	89	70	81	Passed
20	JS	87	80	75	81	Passed
21	JW	80	70	75	75	Passed
22	KS	80	75	90	82	Passed
23	KPR	90	80	75	82	Passed
24	MT	74	90	79	81	Passed
25	MT	90	87	90	89	Passed
		Total Score			1,968	
		Class Average			79	
		Highest Score			89	
		Lowest Score			69	
		Students Passed			25 students	
		Students Not Passed			0 students	
		Pass Rate (%)			100%	
		Fail Rate (%)			0%	

The results of the Cycle II evaluation, as shown in Table 4, show a significant improvement in learning quality, with the class average increasing by 9 points to 79. The most crucial achievement was seen in the classical completion rate, which reached 100%, with all 25 students passing, exceeding the Minimum Competency threshold. This improvement was particularly evident in students who had not completed Cycle I, such as the GM student, who recorded an extraordinary 22-point jump in score, and the CML and DK students, who showed consistent progress, demonstrating that the improved actions in Cycle II successfully addressed learning barriers across the board.

Comprehensively, the distribution of scores in Cycle II became more even, with scores ranging from 69 to 89, reflecting proportional strengthening across the three assessment domains. The cognitive domain recorded the sharpest improvement, with

scores dominating in the 80 to 90 range, while the psychomotor and affective domains also experienced strengthening, emphasizing students' ability to actively and positively apply knowledge about Natural Resources. By achieving all indicators of research success through absolute classical completeness, this study was declared complete in Cycle II and has succeeded in providing effective solutions to learning problems in the class.

Summary of Learning Outcomes Improvements Across Pre-Cycle, Cycle I, and Cycle II

To obtain a comprehensive and holistic picture of the trajectory of student learning outcome improvements from the pre-cycle phase to the end of Cycle II, data from the three stages are summarized in Table 5 below.

Table 5. Summary of Student Learning Outcome Improvements

Assessment Component	Pre-Cycle	Cycle I	Cycle II
Class Mean Score	65	70	79
Highest Score	81	79	89
Lowest Score	59	65	69
Students Passed	3 students	15 students	25 students
Students Not Passed	22 students	10 students	0 students
Classical Mastery Rate	12%	60%	100%
Mean Score Increase	–	+5 points	+9 points
Classical Mastery Increase	–	+48%	+40%

Table 5 clearly illustrates a consistent and progressive improvement trajectory across each stage of the research. The class score increased continuously from 65 (pre-cycle) to 70 (Cycle I) and reached 79 (Cycle II). Cumulatively, there was an increase in the class mean score of 14 points from the initial condition to the end of the study. Even more impressive was the rate of improvement in classical mastery, which rose sharply from only 12% in the pre-cycle phase to 60% in Cycle I and ultimately reached 100% in Cycle II. In total, over the course of two research cycles, the cumulative increase in classical mastery was 88 percentage points.

The summary data also demonstrates that the rate of improvement across domains proceeded in tandem. The highest score increased from 81 (pre-cycle) to 79 (Cycle I), a slight decrease reflecting the beginning of a more equalized score distribution before jumping to 89 in Cycle II. The lowest score also showed a meaningful increase, rising from 59 (pre-cycle) to 65 (Cycle I) and 69 (Cycle II), indicating that no student was left behind in this process of improvement. This uniform pattern of improvement confirms that the Make a Match cooperative learning model not only benefited high-achieving students but also effectively helped students who were initially in the lower group to improve their performance.

Discussion

This discussion aims to interpret the findings of classroom action research at Elementary School 2 Tiakur, which empirically proves that the Make a Match

cooperative model is effective in improving science learning outcomes in the Natural Resources topic. This success is reflected in the progressive increase in the average class score and classical completion level from the pre-cycle stage to Cycle II. Furthermore, the significance of each stage of improvement will be explained through a synthesis with a theoretical framework and relevant previous research results.

Initial Learning Outcome Conditions (Pre-Cycle)

The initial results of student learning outcomes before implementing the Make a Match cooperative model revealed serious problems in fourth-grade science learning, with the classical completion rate only reaching 12% with an average score of 65. This phenomenon confirms initial observations that the learning process remains conventional and teacher centered. The dominance of the lecture method limits the space for students to actively engage, resulting in passive learning and a lack of stimulation in constructing their own understanding of the material.

This low achievement in the cognitive and psychomotor domains can be explained through the theory of meaningful learning, which emphasizes the importance of activating students' full potential. In line with the analysis of Fauhah and Rosy (2020), low learning outcomes are often a direct consequence of the use of models that fail to simultaneously integrate cognitive, affective, and psychomotor dimensions. Pedagogically, referring to Piaget's concrete operational stage, elementary school-aged students require the manipulation of physical objects and direct experience to understand abstract concepts such as Natural Resources (Aini et al., 2025). This mismatch between the verbalistic method and students' developmental characteristics formed the empirical basis for selecting the Make a Match model as an improvement intervention in Cycle I.

Learning Outcome Improvements in Cycle I

The implementation of the Make a Match cooperative learning model in Cycle I successfully recorded significant improvements, with the average class score increasing from 65 to 70 and a 48 percent increase in classical completion rate, from 12% to 60%. These results strongly indicate that the model has had a real positive impact on student active engagement and learning motivation. This achievement aligns with the findings of Zega and Zega (2023), who demonstrated that structured card game mechanics can stimulate student activity in the process of finding card matches, ultimately contributing to improved conceptual understanding. Furthermore, Utami and Helsa (2025) also confirmed that this model consistently increased teacher and student activity in each cycle, accompanied by significant increases in learning outcomes.

Despite showing positive progress, Cycle I was unable to help all students reach the minimum completion threshold, with 40% still falling below the minimum completion rate due to weaknesses in the cognitive and psychomotor domains. Based on reflective analysis, the main obstacles lay in limited time management, the complexity of the wording of the questions on the cards, and the lack of individual guidance. This is relevant to the study by Latif et al. (2024), which stated that the effectiveness of the

Make a Match model is highly dependent on the quality of the instructional design, including the appropriateness of the card difficulty level to the average student's ability and the efficiency of the game duration.

Given that the classical completion rate of 60% was still below the research success indicator of 80%, the research continued to Cycle II with a series of strategic refinements. This step aligns with the basic principle of Classroom Action Research (CAR) as a cycle of continuous improvement, where each phase provides crucial feedback for optimizing actions in the next stage. By simplifying the card instrument and adjusting the time allocation, it is hoped that all obstacles identified in Cycle I can be overcome to achieve the set completion target.

Learning Outcome Improvements in Cycle II

Cycle II was a crucial phase that demonstrated the full effectiveness of the Make a Match cooperative learning model in teaching science on natural resources at Elementary School 2 Tiakur. Through various strategic improvements—such as simplifying the wording of questions on cards, expanding the time allocated for games, providing more intensive individual guidance for students who had not yet mastered the material, and reinforcing concepts through post-session class discussions, student learning outcomes experienced a remarkable surge. The average class score increased significantly from 70 in Cycle I to 79 in Cycle II, with the most impressive achievement being a 100% absolute classical mastery score for all 25 students.

This achievement of classical mastery, which exceeded the success indicator, can be interpreted from various cognitive dimensions. Many students who previously only scored in the 50s now achieved scores of 80 to 90, indicating that repeated card-matching activities have strengthened their mastery of concepts regarding the types, benefits, and conservation of natural resources. This aligns with Karmada's (2023) assertion that the Make a Match model has proven effective in improving elementary school students' thematic learning outcomes because the card game mechanism allows for natural and enjoyable concept reinforcement, without burdening students with monotonous practice activities.

From a psychomotor and affective perspective, improvements in Cycle II reflect a strengthening of students' ability to demonstrate knowledge through the physical activity of finding matching cards. Referring to Sambawarna's (2022) findings, integrating cognitive and psychomotor aspects into one enjoyable activity has been shown to produce deeper and more lasting understanding. Furthermore, students' affective aspects also develop through the creation of a competitive yet collaborative learning atmosphere. Consistent with the conclusions of Salimah and Pritasari (2024), the Make a Match cooperative model not only has a significant positive impact on cognitive achievement but also simultaneously fosters positive character traits such as sportsmanship and cooperation, which are crucial for elementary school student development.

Overall Trajectory Analysis of Improvements

A holistic analysis of the learning outcomes trajectory from the pre-cycle stage to Cycle II reveals a highly consistent and progressive pattern of improvement. The average class score increased continuously from 65 to 70, ending at 79, with a cumulative gain of 14 points. The most significant finding was the surge in the classical completion rate, which skyrocketed from 12% to 60% to 100%, equivalent to a cumulative increase of 88 percent. This systematic growth pattern is a strong indicator that the improvements were not coincidental, but rather the direct impact of the implementation of the Make a Match cooperative model, accompanied by reflection and refinement of actions in each cycle.

This pattern of improvement aligns with Juhji's (2017) view, which argues that the Make a Match model can generate student enthusiasm due to its game-like design, thus firmly embedding material concepts in long-term memory. This finding is reinforced by research by Fauhah and Rosy (2020), which states that this model has a comparative advantage over conventional methods because it simultaneously stimulates cognitive, psychomotor, and affective processes. Furthermore, the surge in scores among lower-group students—such as GM students whose scores increased by 22 points—proves that this model is effective in promoting equity in learning outcomes. This aligns with the fundamental principle of cooperative learning regarding positive social interdependence, where interaction between group members is the primary foundation for helping all students achieve success (Chen, 2023; Ngoc Tuong Nguyen & Thi Kim Oanh, 2025; Suci, 2018).

Implications for the Development of Science Education in Remote Areas

The success of this research has strategic implications for improving the quality of science education, particularly in educational institutions in underdeveloped areas with limited facilities and infrastructure, such as Southwest Maluku Regency. The Make a Match cooperative learning model has been empirically proven to produce significant improvements in learning outcomes without relying on high-tech or expensive teaching aids. The use of simple cards, which teachers can independently create, offers a practical advantage that is highly relevant for implementation in 3T (frontier, outermost, and disadvantaged) areas, demonstrating that impactful learning innovations do not always require significant financial investment.

These findings confirm that the quality of learning is more fundamentally determined by teachers' creativity and commitment to designing meaningful, active, and enjoyable learning experiences. Consistent with the thinking of Khoerunisa and Saputra (2024), the key to the model's success lies in the use of engaging visual design to foster student enthusiasm, as well as teachers' managerial skills in creating an inclusive and interactive classroom climate. The achievement of 100% classical mastery at the end of Cycle II provides concrete evidence that measurable and systematically implemented learning interventions within a CAR framework can bring about tangible changes in the quality of education, even in remote areas.

4. CONCLUSION

The implementation of the Make a Match cooperative learning model has been shown to significantly improve science learning outcomes in the Natural Resources topic. This improvement was observed consistently and progressively at every stage of the study, from the pre-cycle to Cycle II, which included integrated reinforcement of the cognitive, psychomotor, and affective domains. Cumulatively, this study recorded an average increase in class scores of 14 points and a very drastic jump in classical mastery, namely from 12% to 100%. The pattern of improvement that was even for all students—including those who previously had low achievement—confirms that the Make a Match model is not only effective in improving academic performance in general, but also able to realize equity in learning outcomes by helping students who experience learning difficulties achieve the standard of mastery in concrete terms.

As a recommendation, educators are advised to consistently adopt the Make a Match cooperative model as an effective inclusive strategy for simplifying complex material while simultaneously achieving equity in learning outcomes for students with diverse abilities. Schools and policymakers should facilitate the sustainability of this innovation through training in developing creative, card-based media relevant to school contexts with limited digital facilities. Meanwhile, for future researchers, it is recommended to expand the scope of the study to other subjects and explore the integration of digital technology and long-term memory retention analysis to optimize the effectiveness of this model in addressing future educational challenges.

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