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Application of The Make A Match Cooperative Learning Model to Improve Student Learning Outcomes on The Circulatory System Topic

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Abstract: This study is a classroom action research (CAR) aimed at improving student learning outcomes on the circulatory system topic through the application of the Make A Match cooperative learning model. The study was conducted at SMA Negeri 5 Mataram with Grade XI students as research subjects. It was carried out in two cycles, each comprising the stages of planning, action implementation, observation, and reflection. The research data covered the implementation of learning using the Make A Match model and student learning outcomes. Data were collected through teacher and student activity observation sheets and learning outcome tests in the form of quizzes and written assignments. Data analysis was conducted descriptively to describe improvements in the learning process and outcomes across each cycle. The results indicated that the application of the Make A Match cooperative learning model was effective in enhancing student learning activity and improving learning outcomes on the circulatory system topic. Therefore, the Make A Match model can be recommended as an alternative biology learning method to support active and meaningful learning.

Keywords: Make A Match, CAR, Cooperative Learning, Learning Outcomes, Circulatory System

***Abstrak**: Penelitian ini merupakan penelitian tindakan kelas (CAR) yang bertujuan untuk meningkatkan hasil belajar siswa pada mata pelajaran sistem peredaran darah melalui penerapan model pembelajaran kooperatif Make A Match. Penelitian ini dilakukan di SMA Negeri 5 Mataram dengan subjek penelitian siswa kelas XI. Penelitian tindakan kelas ini dilaksanakan dalam dua siklus, masing-masing siklus meliputi tahap perencanaan, pelaksanaan tindakan, pengamatan, dan refleksi. Data penelitian meliputi implementasi pembelajaran menggunakan model Make A Match dan hasil belajar siswa. Data dikumpulkan melalui lembar observasi aktivitas guru dan siswa serta ujian hasil belajar berupa kuis dan tugas tertulis. Analisis data dilakukan secara deskriptif untuk menggambarkan peningkatan proses dan hasil belajar pada setiap siklus. Hasil menunjukkan bahwa penerapan model pembelajaran kooperatif Make A Match dapat meningkatkan aktivitas siswa dalam belajar dan meningkatkan hasil belajar pada materi sistem peredaran darah. Oleh karena itu, model Make A Match dapat digunakan sebagai metode pembelajaran biologi alternatif untuk mendukung pembelajaran aktif dan bermakna.*

***Kata Kunci:** Make A Match, PTK, Pembelajaran Kooperatif, Hasil Pembelajaran, Sistem Peredaran Darah*

INTRODUCTION

Education plays a strategic role in shaping students' thinking skills, attitudes, and character so that they are capable of adapting to advances in science and technology. Education is understood as a conscious and planned process of developing students' potential through quality learning (Habsy et al., 2024). Quality learning emphasizes a balance between achieving learning outcomes and fostering meaningful learning experiences (Angga et al., 2022). Meaningful learning experiences contribute to the development of students' critical thinking skills and sense of responsibility toward their own learning (Ritonga, 2023).

Biology learning requires students to understand concepts, processes, and the interrelationships among various life phenomena. The complexity of biology subject matter demands active student engagement in the learning process so that students not only memorize content but are also able to reason and logically connect concepts (Gaghunting & Bermuli, 2023). Such active engagement enables students to construct knowledge through direct learning experiences, including observation, experimentation, and discussion. Through this process, students can build their own understanding, resulting in deeper, more meaningful, and more sustainable comprehension (Subudi, 2021).

The human circulatory system is one biology topic that requires both conceptual understanding and comprehension of the relationship between organ structure and function. Students frequently find this material difficult because the processes involved are abstract and cannot be observed directly (Maryam et al., 2025). Instruction still dominated by the lecture method results in low levels of student engagement in the learning process, which in turn leads to poor conceptual understanding and weak learning outcomes.

Reflections from the teaching practicum program indicated that biology instruction in the classroom had not yet fully engaged students in an active manner. Students tended to be passive and waited for explanations from the teacher throughout the learning process. The lack of variety in learning models caused learning interactions to remain one-directional and reduced student participation (Wahyuni & Isnaini, 2022). These conditions highlight the need for instructional innovations that encourage greater student activity.

Make A Match is a cooperative learning model that functions as an alternative instructional method emphasizing collaboration and learning activity through educational games. The model prompts students to actively match question cards with answer cards, thereby creating interaction and discussion among students (Huda, 2017). Game-based learning activities can create an enjoyable and meaningful learning environment (Shoimin, 2019). Accordingly, the application of the Make A Match cooperative learning model is expected to improve student learning outcomes in the circulatory system topic.

METHODS

This study is a descriptive study employing a classroom action research approach, conducted at SMA Negeri 5 Mataram in Class XI.12, which comprised 40 students (22 male and 18 female). The study was carried out in two cycles on the topic of the circulatory system, with the objective of improving the learning process through the application of the Make A Match cooperative learning model. The data collected included the implementation of the learning model measured through observation sheets recording teacher and student activities during instruction and student learning outcomes obtained through game-based evaluations administered at the end of each cycle. Analysis of implementation data was carried out by scoring each learning stage according to the criteria on the observation sheet, calculating the implementation percentage using the formula (Total implementation score / Maximum implementation score) × 100, and classifying the percentage results based on the applicable performance criteria (Arikunto, 2015). Analysis of learning outcomes was performed by scoring each content aspect according to the established assessment criteria, calculating each student's total score, computing the learning outcome percentage using the formula (Student score / Maximum score) × 100, and classifying those percentages according to the applicable learning outcome criteria (Arikunto, 2015).

RESULTS AND DISCUSSION

This study was conducted in two cycles by applying the Make A Match cooperative learning model to the circulatory system topic. The study focused on two main aspects: the implementation of the learning process and student learning outcomes. Learning implementation was analyzed through teacher and student activity observation sheets completed during instructional activities, while learning outcomes were obtained from game-based evaluation tests administered at the end

of each cycle. All data were subsequently analyzed descriptively to identify changes and improvements from Cycle I to Cycle II.

The observation results in Cycle I indicated that the application of the Make A Match learning model had not yet run optimally. Teacher activity in Cycle I achieved a percentage of 78%, classified as good, while student activity reached 72%, classified as fairly good. In this cycle, the teacher had implemented most of the learning stages in accordance with the Make A Match syntax, such as communicating the learning objectives, distributing question and answer cards, and organizing students into groups. Nevertheless, several obstacles were still encountered, including ineffective time management, incomplete student understanding of the game rules, and uneven student participation. A complete summary of the learning implementation data for Cycles I and II is presented in Table 1.

Table 1. Implementation of the Make A Match Learning Model

Cycle	Teacher Activity (%)	Criteria	Student Activity (%)	Criteria
I	78	Good	72	Fairly Good
II	90	Very Good	88	Good

The data in Table 1 show an increase in learning implementation from Cycle I to Cycle II, in terms of both teacher and student activity. With respect to student activity, the score of 72% in Cycle I indicates that students were still in the adjustment phase toward the applied learning model. Several students appeared hesitant when searching for the matching cards and had not yet demonstrated optimal group cooperation. In addition, some students tended to be passive and waited for direction from the teacher or their group members. This situation indicates that students had not yet fully adapted to active learning that demands interaction and collaboration, which are the defining characteristics of the Make A Match model.

The implementation of learning in Cycle II showed a notably significant improvement. Teacher activity increased to 90%, classified as very good, while student activity rose to 88%, classified as good, as shown in Table 1. The improvement in teacher activity resulted from instructional refinements made based on the reflections from Cycle I, including clearer delivery of game instructions, a more structured allocation of time, and a more effective teacher role as facilitator and motivator throughout the learning process.

The improvement in teacher activity in Cycle II was accompanied by an increase in student engagement. Students appeared more enthusiastic and confident in participating in the Make A Match activities. Interactions among students were more intense, both during the card-matching activity and in discussions aimed at verifying the correctness of answers. Group cooperation also visibly improved, and almost all students were actively involved in the learning process. This demonstrates that students had grasped the flow of the activity and were able to adapt to the applied cooperative learning model.

These improvements in the learning process had a direct impact on student learning outcomes. Based on the evaluation test results at the end of Cycle I, the mean student learning outcome score was 68%, classified as fairly good. This finding suggests that students' understanding of the circulatory system topic remained at a moderate level, with some students still experiencing difficulty grasping certain concepts, such as the circulatory pathways and the functions of the organs involved. The student learning outcome data for each cycle are presented in detail in Table 2.

Table 2. Student Learning Outcomes

Cycle	Mean Score (%)	Criteria
I	68	Fairly Good
II	82	Good

In Cycle II, the mean student learning outcome score increased to 82%, classified as good, as shown in Table 2. This improvement demonstrates that the application of the Make A Match

learning model effectively helped students understand the circulatory system topic more thoroughly. Learning delivered in a game-based format encouraged students to engage actively, enjoyably, and meaningfully, thereby facilitating deeper retention and comprehension of the material.

Overall, the results of this study indicate that the Make A Match cooperative learning model was effective in improving both the quality of the learning process and student learning outcomes on the circulatory system topic. Improvements in teacher and student activity during instruction contributed positively to students' enhanced understanding. Accordingly, the Make A Match model can be recommended as an effective alternative learning model for improving the quality of biology instruction in terms of both process and outcomes.

Discussion

The application of the Make A Match cooperative learning model to the circulatory system topic demonstrated a significant improvement in the quality of the learning process from Cycle I to Cycle II. This improvement was reflected not only in the increased levels of teacher and student activity but also in the increasingly optimal student engagement at each stage of the learning process. These findings affirm that Make A Match does not merely function as a game-based learning strategy; rather, it serves as a cooperative learning approach capable of shifting the instructional dynamic from teacher-centered to student-centered, activity-oriented learning.

During Cycle I, the application of the Make A Match model had not yet produced optimal results. This was evidenced by the presence of students who remained passive, lacked confidence in searching for matching cards, and were unable to collaborate effectively within their groups. These conditions suggest that students were still in the adjustment phase toward the newly applied learning model. Halizah and Dwiyanti (2020) state that in the initial phase of implementing Make A Match, students need time to understand the game rules, the role of each member, and the interaction patterns expected in cooperative learning. The student activity outcomes in Cycle I can therefore be understood as part of the adaptation process toward more active and participatory learning.

The improvements made in Cycle II produced a tangible impact on the quality of learning implementation. These improvements were especially evident in more structured classroom management, clearer instruction delivery, and more effective organization of learning groups. At this stage, the teacher did not merely serve as a content deliverer but also as a facilitator guiding the course of the activity and ensuring the engagement of all students. Arikunto et al. (2015) assert that ongoing reflection and improvement at each cycle is a critical element in enhancing learning quality within classroom action research. The increase in student activity in Cycle II therefore reflects both the improved student understanding of the Make A Match mechanism and the more effective role of the teacher in managing the learning process.

The increase in student activity in Cycle II demonstrates that educational game-based learning is capable of creating a more engaging, enjoyable, and challenging learning environment. In Make A Match, students are not only required to find the matching card but must also understand its content in order to make an accurate match. This process encourages students to think critically, engage in discussion, and interact with their peers. Rahmawati and Saptono (2020) state that the Make A Match model is effective in increasing student motivation and engagement because learning takes place interactively and provides a learning experience that is distinctly different from conventional instruction.

Beyond improving learning activity and motivation, the application of Make A Match also had a positive impact on the quality of students' social interaction. Throughout the learning process, students were guided to collaborate, communicate, and support one another within their groups. These interactions encouraged students to respect others' perspectives, express their ideas verbally, and take responsibility for group tasks. This is consistent with the principles of cooperative learning, which view learning as a social process rather than a purely individual activity.

These improvements in the quality of the learning process had a direct implication for student learning outcomes. In Cycle I, learning outcomes indicated that students' understanding of the circulatory system topic remained in the fairly good category, suggesting that comprehension was uneven among students and that some understanding was still superficial. The relatively low learning outcomes in Cycle I were associated with suboptimal student engagement and limited ability to connect the concepts being studied.

In Cycle II, student learning outcomes showed significant improvement. This increase demonstrates that active student engagement in the Make A Match activities contributed to better and more integrated conceptual understanding. Through the card-matching activity, students were trained to connect various interrelated concepts, so that the understanding formed was not fragmented. Pratiwi et al. (2018) state that the Make A Match model is effective in improving learning outcomes because it emphasizes conceptual understanding through interaction, discussion, and meaningful learning experiences.

The circulatory system topic is conceptually demanding and relatively abstract, as it involves understanding the structure, function, and working mechanisms of interconnected organs. Instruction oriented solely toward lectures and memorization often makes it difficult for students to grasp the relationships among these concepts. Through Make A Match, students are encouraged to think actively, analyze information, and connect one concept to another. Nurhadi and Senduk (2019) affirm that biology instruction involving concept-matching activities and group discussions can enhance students' conceptual understanding, since students are directly involved in the process of constructing knowledge.

Beyond the cognitive dimension, the application of Make A Match also contributed to the development of students' affective domain, including self-confidence, learning motivation, and interest in biology. The enjoyable learning atmosphere made students more enthusiastic about attending class and less inclined to avoid material they perceived as difficult. This positive attitude toward learning plays a critical role in supporting students' long-term academic success.

Overall, the improvement in both learning implementation quality and student learning outcomes from Cycle I to Cycle II demonstrates that the Make A Match cooperative learning model is effective when applied in biology instruction, particularly for the circulatory system topic. This model is capable of increasing student engagement, improving the quality of learning interaction, and helping students construct deeper and more meaningful conceptual understanding. Therefore, Make A Match is recommended as a relevant and effective alternative learning model for enhancing the quality of both the learning process and student outcomes.

CONCLUSION

The application of the Make A Match cooperative learning model in biology instruction on the circulatory system topic at SMA Negeri 5 Mataram demonstrated measurable improvements across two cycles of classroom action research. In terms of learning implementation, teacher activity increased from 78% (good) in Cycle I to 90% (very good) in Cycle II, while student activity rose from 72% (fairly good) to 88% (good). With respect to student learning outcomes, the mean score improved from 68% (fairly good) in Cycle I to 82% (good) in Cycle II. These results confirm that the Make A Match model effectively shifts instructional dynamics from teacher-centered delivery toward active, student-centered learning. By engaging students in game-based card-matching activities, the model promotes critical thinking, peer interaction, and deeper conceptual understanding. Make A Match is therefore recommended as an effective and engaging alternative cooperative learning model for biology instruction, particularly on abstract topics such as the circulatory system. Future research may explore its implementation across other biology topics or combine it with digital learning media to further optimize student engagement and outcomes.

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