

Research Article

Index Card Match as an Interactive Strategy to Improve Elementary School Students' Science Learning Activeness

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Abstract: This study aimed to explore whether the Index Card Match learning model could boost student engagement in science lessons for fourth-grade pupils at UPT SDN 83 Mangindara. We took a descriptive qualitative approach, focusing on how the model was applied and its impact on student activities. The research happened at UPT SDN 83 Mangindara in Takalar Regency during the 2024/2025 school year, involving 22 fourth-grade students 7 girls and 15 boys. Data came from observations, tests, and documentation, analyzed through qualitative descriptive methods. The findings showed that using the Index Card Match model in science classes did enhance student learning activities at UPT SDN 83 Mangindara. In Cycle I, activities were low in the first meeting (categorized as "Less" or K) and stayed that way in the second. But by Cycle II, things improved: the first meeting hit "Enough" (C), and the second reached "Good" (B). Meanwhile, the teacher's performance was solid from the start, rated "Good" (B) in both meetings of Cycle I, and it held steady at that level through both meetings in Cycle II.

Keywords: Cycle I; Cycle II; Index Card Match; Science Learning; Student Learning Activeness.

1. Introduction

Learning is a dynamic process of changing individual behavior, which occurs as a consequence of experience and interaction with the environment, involving cognitive, emotional, and psychometric elements. In other words, learning is a process in which attitudes and abilities are applied and further developed. Learning is a change in behavior through practical activities and experiences. There are two things that influence the learning process: genetic and environmental factors. Genetic factors are something innate, such as talent and intelligence, while environmental influences include people around, such as teachers and parents, who play a role in creating a learning atmosphere. Physical aspects are also important factors in this. Changes that can be made in the learning process by teachers include utilizing their creativity and knowledge. However, in practice, natural science teaching often seems to lack innovation and creativity during the learning process. Current learning still focuses more on the active role of teachers in the learning process, known as the teacher-centered approach. Furthermore, the lack of teachers' ability to bring innovation or creativity to the learning process, which relies more on traditional methods, makes science learning less interesting. It is better, during science learning, the needs, rights, and development of children are more considered, so that the learning atmosphere is more enjoyable.

Science learning involves the interplay of different educational components through activities designed to meet specific learning goals. The main job of science teachers is to oversee this learning process, which breaks down into three key phases: planning the lessons, carrying out the teaching, and assessing the results. With that in mind, it's important for teachers to adapt things as needed to make science education more engaging and successful, aligning with the core principles of how science is best taught.

From initial observations, it was apparent that there was a failure in the learning process, where several students had not achieved the Minimum Completion Criteria (KKM) set by the Upt SDN 83 Mangindara for the 2023/2024 academic year, which was 75. However, after

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conducting direct observations and discussions with class teachers, it was discovered that many students received scores below the KKM. Of the 22 students in grade IV, only a small portion achieved scores according to the KKM. Of the 22 students in grade IV, only a few students obtained scores according to the KKM. Where the learning activity expected by the teachers of Upt Sdn 83 Mangindara for science subjects is still very far from the specified KKM. As individuals with a crucial role, teachers should continuously improve their social science knowledge and how they manage the teaching and learning process. The goal is to ensure students learn science effectively and correctly, enabling them to keep pace with advances in science and technology and apply these skills to their daily lives

2. Preliminaries or Related Work or Literature Review

Index Card Match learning is a form of learning used to overcome learning problems by matching or finding pairs of cards containing questions and answers. According to Silberman (2009:239) Index Card Match is a fun and active learning model for reviewing previously or subsequently taught learning materials that are characterized by a card game by finding pairs using pieces of paper containing questions and answers.

Student learning activity is a fundamental element essential for success in the learning process. According to the Great Dictionary of the Indonesian Language, "activity comes from the root word active, which means vigorous. Activeness itself can be interpreted as the state or state of someone being active." Activeness is both physical and mental activity, namely doing and thinking as an inseparable series (Sardiman, 2001:98).

Active learning lets teachers step into the role of facilitators, mainly focused on helping students learn. Students get hands-on and take an active part in the process, while teachers offer guidance and steer the direction and pace of learning. Building on this, the researcher aims to investigate if applying the index card match learning model can boost student engagement in science lessons for fourth-grade students at UPT SDN 83 Mangindara.

Science is a collection of disciplines with unique traits, focusing on factual natural phenomena whether they're tangible realities, events, or the cause-and-effect links between them (Wisudawati, 2020: 22). It explores these natural occurrences in a structured way, drawing from human experiments and observations (Samatowa, 2019: 2). According to Salmawati (2019: 12), science is essentially a field that investigates nature and its phenomena, organized systematically, and it emerges and grows through scientific methods like observation and experimentation, while demanding attitudes such as curiosity, openness, honesty, and more.

From the opinions of the experts above, it can be concluded that Natural Sciences (IPA) is a science that studies nature and living things which is obtained scientifically through experiments carried out by humans.

3. Research Methods

This study employs a qualitative research approach. Qualitative research is descriptive in nature and often relies on analytical methods. It's also considered a form of narrative research, with a strong focus on processes and meanings. Specifically, this is a classroom action research (CAR) project. As Muhammad Djajadi (2009:1) explains, the term itself reveals its essence it's all about activities happening right in the classroom.

The research will be carried out by aspiring researchers at UPT SDN 83 Mangindara in Takalar Regency. The participants are 22 fourth-grade students, made up of 7 girls and 15 boys. The choice of this location stems from the fact that student engagement in science lessons remains quite low there..

The research process in this study unfolds step by step, kicking off with an initial learning phase or pre-cycle where we introduce the Index Card Match model to boost student engagement. In the first cycle, we'll cover science topics on changes in the Earth's appearance, and in the second cycle, we'll dive into alterations in the planet's physical environment. For gathering data, we rely on observation techniques, involving a methodical, reasoned, and somewhat subjective collection of insights tied to the teaching process. Tests help track progress and assess learning achievements after each cycle. Plus, we use documentation to back up the Index Card Match model's implementation, includi

4. Results and Discussion

Implementation of Cycle I, Meetings I and II

Cycle I, Meeting I

This study followed the CAR method, which includes four key steps: planning, carrying out the action, observing the results, and reflecting on them. It happened in two rounds during the first semester of the 2024/2025 school year, focusing on fourth-grade kids at UPT SDN 83 Mangindara in Takalar Regency. The whole thing ran from February 8, 2025, to March 5, 2025. In the process, I took on the role of the teacher handling the lessons, while the regular fourth-grade teacher watched and noted what was going on.

The study's findings include observational data on students' science learning activities and teachers' teaching methods, collected via observation sheets, as well as data from learning outcomes based on final tests in Cycle I and Cycle II. These data were analyzed by calculating frequencies and percentages to support a descriptive breakdown.

The action was implemented in four meetings: two for Cycle I and two for Cycle II, using the index card match learning model. In Cycle I, the first meeting discussed changes in the Earth's appearance, while the second meeting discussed changes in the appearance of celestial objects. In Cycle II, the first and second meetings discussed changes in the Earth's physical environment. The discussion for each cycle is described as follows:

Learning activities carried out in the science subject by applying the Index Card Match learning model. The implementation of cycle I, meeting I, was carried out on Saturday, February 8, 2025, at 09:15-11:00 with a time allocation of 2x35 minutes discussing changes in the appearance of the earth. There is one observer who will help observe the course of the learning process. Before the class begins, the researcher as the implementer (teacher) of this learning model explains to all students about the research being carried out.



Figure 1. Implementation of Index Card Match Learning in Cycle I.

a. Results of Observations of Student Learning Activities

The observations from science lessons using the Index Card Match model with fourth-grade students at Upt Sdn 83 Mangindara in Takalar Regency were divided into three categories: Good (B), Sufficient (C), and Less (K), depending on the aspects being assessed. In the first session with 22 students, just one of them met the observation criteria, which worked out to a percentage of 4.54%, landing it in the "Less" category. By the assessment standards, that was below 40%. Most of the kids didn't really jump in actively or hit the main points we were looking for during the class. This could be a solid takeaway for making things better in upcoming sessions.

b. Results of Observations of Teacher Activities

During the initial session, the observer evaluated the researcher acting as the teacher scoring them at 22 out of 27 indicators, which translated to an 81.4% success rate in the learning activities. This outcome earned a "Good" rating, equivalent to a B grade. The bulk of the indicators were handled effectively, demonstrating that the teacher successfully delivered the lesson in line with the prepared teaching plan.

Cycle I meeting II

The second session of Cycle I is scheduled for Wednesday, February 2, 2025, running from 9:15 AM to 11:00 AM WITA, with a total time breakdown of two 35-minute slots. The focus will be on exploring shifts in how celestial bodies appear. Just like the last session, we'll have one observer on hand to help monitor the learning activities.



Figure 2. Implementation of Index Card Match Learning in Cycle I Meeting II.

a. Results of Observations of Student Learning Activities

Observations were carried out to check how much students were meeting the key parts of the learning tasks. In the second meeting of cycle I, held on Wednesday, February 12, 2025, at Upt Sdn 83 Mangindara in Takalar Regency, out of 22 students, just 4 managed to hit the observation criteria. That worked out to an achievement rate of 18.18%. According to the set standards, if between 0% and 39% of students meet these aspects, it's rated as Poor "K". Overall, the students' level of involvement and participation in the learning activities remains really low and hasn't made it to the good level yet.

b. Results of observations of teacher activities

The results of the observer's observations of the researcher (teacher) at the second meeting showed a score of 23 out of 27 indicators, indicating success. The learning achievement percentage was 85.18%. With this achievement percentage, the researcher (teacher)'s implementation of learning activities falls into the Good "B" category. This indicates that most learning indicators were implemented as planned.

c. Implementation of the Final Test of Cycle I

At the end of cycle I, student learning outcomes were assessed using two types of questions: 10 multiple-choice questions and 5 essay questions. Each correct answer on the multiple-choice questions received a score of 1, while the essay questions received a score of 0-3, depending on the accuracy of the student's answer. The maximum total score was 21, which was then converted into a final grade on a scale of 100. Twenty-two students took the test.

The total score of all students was 1680.88 with a final average score of 76.40. A total of 10 students achieved a score of ≥ 75 and were declared to have completed the course, while 11 other students obtained a score of ≤ 75 and were declared to have failed. The highest scores were obtained by several students who achieved a score of 100, namely students FM, HQ, MR, MR, MK, S, NI. While the lowest score was obtained by a student with the initials FL with a score of 42.85. This indicates that more than half of the students have not achieved learning completion, so improvements are needed in the learning process in the next cycle.

Cycle II Meeting I

Learning activities continued in cycle II, because in cycle I there were still many students who had not met the learning success aspects. Implementation of cycle II meeting I on Wednesday, February 19, 2025 at 9:15-11:00 WITA with a time allocation of 2x35 minutes which discussed changes in the earth's physical environment, there were 2 observers at this meeting I. Before the learning began, the researcher opened the lesson by saying hello, greeting and asking how the students were. The researcher also directed students to pray before learning. After praying, the researcher checked student attendance. The researcher conducted apperception as the beginning of communication before carrying out the core learning, then the researcher conveyed the learning objectives.



Figure 3. Implementation of Index Card Match Learning in Cycle II, Meeting I.

a. Results of Observations of Student Learning Activities

On February 19, 2025, observations took place at Mangindara Elementary School (UPT) 83 in Takalar Regency. The goal was to check how well the students were hitting the learning success benchmarks. Out of 22 students, 13 of them that's about 59% actually met those standards. According to the criteria we used, this performance lands in the "C" category. Overall, it shows a noticeable uptick in student engagement with their studies compared to the last round.

b. Results of Observations of Teacher Activities

In cycle II, meeting I, the results obtained by the observer were a score of 25 out of 27 indicators, so that the percentage of learning indicator achievement reached 92.59% which is included in the good category "b". The researcher demonstrated good class management skills and carried out each stage of learning according to the steps in the lesson plan. The researcher provided clear directions to students in carrying out the index card match activity.

Cycle II Meeting II

Cycle II meeting II was held on March 5, 2025 at 09.00- At 11:00, the 2 x 35-minute session discussed changes in the Earth's physical environment. This second session included two observers.



Figure 4. Implementation of Index Card Match Learning in Cycle II, Meeting II.

a. Results of Observations of Student Learning Activities

From what I saw during the student learning activities in the second cycle, second meeting, kids were getting way more involved in the class. Out of the 22 students, 13 of them that's about 59% really stepped up and showed active participation in the key observation points we set. This uptick in their engagement suggests the teaching approach we're using is doing a better job at getting them excited and fully into the learning process.

b. Results of Observations of Teacher Activities

Based on the results of observations of teacher activities in cycle II, meeting II, a score of 25 was obtained out of a total of 27 indicators. This means that the researcher's (teacher's) learning achievement level reached 92.59%. This percentage falls into the good category, indicating that most of the observed indicators were implemented well. The researcher (teacher) implemented them optimally, as seen from the provision of instructions,

Effective classroom management, along with giving students specific tasks and wrapping up lessons with clear summaries, plays a big role in boosting student involvement and comprehension throughout the learning experience.

Implementation of the Final Test of Cycle II

The final test for cycle II wrapped up on March 5, 2025, starting at 10:30 and finishing as planned. It took place right in the classroom, with researchers and observers keeping a close eye on things. The scoring followed the same method as cycle I, where the top possible

score of 21 was scaled up to 100. The results showed a clear jump in performance from the first cycle. Out of the 22 students tested, the average score went from 76.40 in cycle I to 87.66 in cycle II. More students hit the passing mark of 75 or higher too from 11 student (47.61%) up to 16 (72.72%) while those who didn't make it dropped from 11 (52.38%) to just 6 (27.27%). The top score stayed at 100 for a few students, and even the lowest scores improved over the previous cycle.

This shows that the learning improvements implemented in cycle II succeeded in improving individual student learning outcomes. This improvement indicates that the learning process has become more effective and is able to help students achieve the expected competencies.

Discussion

This section delves into the findings from a study employing the Index Card Match learning model to boost the learning engagement of fourth-grade students at Upt Sdn 83 Mangindara in Takalar Regency. The research spanned from February 8, 2025, to March 5, 2025. The model, which encourages students to pair up index cards, was designed to spark greater participation in class activities. However, the initial cycle revealed that the model's application didn't go as smoothly as hoped. Observations from the first meeting of cycle I indicated student involvement fell into the "less than" (K) category, with just 4.54% achievement in learning activities. By the second meeting, things hadn't improved student activity remained in the "less than" (K) bracket, showing no progress from before. On the flip side, teacher performance stayed solidly in the "good" (B) category. Test results from cycle I showed that out of 22 fourth-graders, 11 met the Minimum Completion Criteria (KKM), while 10 scored below it. Several factors contributed to these incomplete outcomes, including students' limited grasp of the material, suboptimal delivery of content by teachers, a lack of confidence among students to ask questions, and difficulties in comprehending the final test questions from cycle I.

The observations from the first meeting of cycle II indicate that student engagement in learning improved compared to the initial meeting in cycle I, which was rated as Sufficient

(C). By the second meeting, this engagement continued to grow, evident in both the process success indicators and the measures of student learning outcomes. This improvement elevated the student learning activity to the Good (B) category. Meanwhile, the teacher's instructional performance at the second meeting remained consistent with prior sessions, still classified as good, but with a higher percentage of achievements.

The findings from the second learning cycle revealed improvements in both the quality and quantity of learning. This was evident from the success indicators in student learning activities as well as their test results. Compared to the first cycle, the final test results in cycle II showed considerable progress. The number of students meeting the passing grade (KKM) rose to 16, while those who did not meet the passing grade dropped to 6. These outcomes suggest that the learning process has become more effective and better supports students in reaching the desired competencies.

Several factors contribute to the improvement in both student engagement and learning outcomes, including enhanced teaching efforts by the instructor and increased student participation during lessons. The researchers effectively implemented these activities. According to the lesson plan (RPP), students understood the material thoroughly and were given final tests at the end of each cycle, which matched their developmental stage.

The observations of student learning activities, teacher teaching activities, and the improvement in students' average test scores from the first to the second cycle indicate that using the Index Card Match learning model in science lessons effectively boosts the learning engagement of fourth-grade students at Upt Sdn 83 Mangindara, Takalar Regency.

5. Conclusion

The application of the Index Card Match learning model can improve student learning activity in the science subject of grade IV of UPT SDN 83 Mangindara, Takalar Regency. Student learning activity has increased, in cycle I, meeting 1, student activity is in the Less category (K), meeting 2 is still in the Less category "K", while in the implementation of cycle II, meeting 1 has increased to the Sufficient category "C", meeting 2, student learning activity has increased and is in the Good category "B". Based on the results of the research and discussion that have been described, it can be concluded that the application of the index card match learning model in science subjects can improve the learning activity of grade IV students of UPT SDN 83 Mangindara, Takalar Regency. Teacher teaching activities in cycle

I, meeting 1 is in the Good category "B" and meeting 2 is also in the Good category "B". This Good category "B" persists until cycle II takes place, both at meeting 1 and meeting 2.

References

- Afenda Ratna. (2009). *Index Card Match as an active, creative, effective, and enjoyable learning model*.
- Bima, A. F., & Widodo, W. (2017). Application of Index Card Match learning strategy to improve student learning outcomes in thermodynamics material. *Journal of Physics Learning Research*, 8(1), 26–31. <https://doi.org/10.26877/jp2f.v8i1.1333>
- Djajadi, M. (2019). *Introduction to classroom action research*. Yogyakarta: Arti Bumi Intaran.
- Dwi Rizkiani, A., Hariandi, A., Alirmansyah, A., & Zutha Berliana, T. (2023). Improving student learning activeness through the Index Card Match (ICM) learning model for elementary school science content. *Journal of Elementary Education Milestones: Journal of Elementary Education Theory and Outcome Studies*, 2(2), 112–124. <https://doi.org/10.22437/jtpd.v2i2.28487>
- Fabiana Meijon Fadul. (2019). *Index Card Match*. 10–31.
- Hamruni. (2009). *Learning strategies and models*. Yogyakarta: Faculty of Tarbiyah, UIN Sunan Kalijaga.
- Handoyo, R. (2014). The difference between Index Card Match strategy and crossword puzzle on student learning motivation in social studies learning for grade VIII at MTs Yapi Pakem. *Bachelor of Education Thesis*. Yogyakarta: Yogyakarta State University.
- Istarani. (2014). *Innovative learning methods*. Medan: Media Persada.
- Makkasau, A., Sahabuddin, E. S., Irfan, M., & Lutfi, L. (2020). The nature and model of science learning.
- Mu'alimin, & Hari, R. A. C. (2014). *Classroom action research theory and practice*. Gading, 44(8), 1–87.
- Nugraha, Y. C., Toybah, T., & Yosef, Y. (2022). The Index Card Match model on student activeness and learning outcomes in mathematics learning about flat shapes for grade IV of SD Negeri 140 Palembang. *Elementary School Innovation: Journal of Educational Development Studies*, 9(2), 169–176. <https://doi.org/10.36706/jisd.v9i2.17499>
- Nurfatimah, N., Hamdian Affandi, L., & Syahrul Jiwandono, I. (2020). Analysis of the learning activeness of high-class students at SDN 07 Sila during the Covid-19 pandemic. *Scientific Journal of the Educational Profession*, 5(2), 145–154. <https://doi.org/10.29303/jipp.v5i2.130>
- Rahayu, S., Sahabuddin, E. S., & Syawaluddin, A. (2022). Development of monopoly media in science subjects for grade IV of UPT SPF SD Negeri Sudirman III, Makassar City. *Global Journal Basic Education*, 1, 219–246. <https://jurnal.sainsglobal.com/index.php/gjb>
- Raipartiwi, N. K. (2022). Application of the Index Card Match method (Index Card Match) to improve student activity and learning outcomes. *Indonesian Journal of Educational Development*, 2(4), 589–598. <https://doi.org/10.5281/zenodo.6203533>
- Riswan. (2024). Application of the Index Card Match model to improve student learning activity in science subjects in grade V of SD Negeri 172 Pekanbaru. *Proposal*.
- ROSADI, A. (2019). Improving student activity and learning outcomes with the Index Card Match method in science learning. *Tajdidukasi: Journal of Islamic Education Research and Studies*, 8(2). <https://doi.org/10.47736/tajdidukasi.v8i2.294>
- Rusman. (2014). *Learning models*. Jakarta: PT Rajagrafindo Persada.
- Sardiman, A. M. (2014). *Interaction and motivation in teaching and learning*. Jakarta: Rajawali Pers.
- Silberman, M. L. (2009). *Active learning: 101 ways for active students to learn* (Translated by Raisul Muttaqien). Rev. ed. Bandung: Nusamedia.
- Sudjana, N. (2016). *Assessment of the results of the teaching and learning process*. Bandung: Rosdikarya.
- Suprijono, A. (2009). *Cooperative learning: Paikem theory & application*. Yogyakarta: Pustaka Pelajar.
- Sutanto, L. A. (2016). Application of the Index Card Match learning model in improving science learning outcomes in grade V/A students of SD Inpres Sero, Somba Opu District, Gowa Regency.
- Wulandari, A. E., Sahabuddin, E. S., & Muslan, N. (2024). Application of role playing learning model in improving activeness and mathematics learning outcomes of class V UPT SPF SDN Kompleks IKIP 1 Makassar City. *Lempu PGSD*, 1(3). <https://doi.org/10.70713/lempu.v1i3.4324>