Proceedings of International Conference on Teacher Profession Education
Yogyakarta, 29 July 2023

ISSN: 3025-020X

Application of Mind Mapping through Project Based Learning Models to Improve Learning Outcomes Content of Natural Sciences Elementary School

Rakhmat Subarkah[1], Dewi Anggreini[2], Qomariah Binti Zulaihah[3]

[1-2]*Universitas Sarjanawiyata Tamansiswa, Indonesia*
[3]*SD Negeri Karangmulyo, Indonesia*
**Corresponding Author e-mail:* rssjkm@Gmail.com

1. Abstract

The research background is the low learning outcomes of fifth grade students in Natural Science content. The purpose of this research is to improve the learning outcomes of fifth grade students in Natural Science content by applying Mind Mapping through the Project Based Learning model in elementary schools. The type of research used in this study was Collaborative Classroom Action Research (PTKK) with the Kemmis and Mc Taggart model in two cycles. The research subjects were 19 class V students. This research was conducted in the even semester of the 2022/2023 academic year. Data collection is done by observation, documentation and tests. The data analysis technique used is quantitative. The results of this study indicate that the application of Mind Mapping through the Project Based Learning model improves student learning outcomes in the fifth grade Natural Science content. This can be shown from the learning outcomes of students who experience an increase starting from the pre-cycle stage to cycle 2 where initially the average learning outcomes of students are in the pre-cycle of 47.36%, then the first cycle is 63.15% and the second cycle is 84.21%.

Keywords: *Learning Outcomes, Mind Mapping, Natural Science, Project Based Learning.*

2. Introduction

In implementing the general guideline curriculum for learning to achieve the quality designed in the curriculum, learning activities need to use the principles of: (1) student-centered, (2) develop student creativity, (3) create fun and challenging

ISSN: 3025-020X

conditions, (4) contain values, ethics, aesthetics, logic, and kinesthetics, and (5) provide diverse learning experiences through the application of various fun, contextual, effective, efficient and meaningful learning strategies and methods.

Student-centered means involving students actively, creatively, fun so that students are eager to learn and learning objectives can be achieved. Salasiah (2012: 148) states that participatory teaching and learning methods carried out by teachers will bring students to a more conducive situation because students are more involved, open, sensitive, and sympathetic. Here students more easily accept new ideas and are more creative while at the same time developing humane relationships so that innovations that arise are more easily accepted.

Creative students will always be curious and ask questions and be involved in every lesson and easily express ideas and innovate. Creativity can come from talent, can also be obtained from practice, and frequent interaction with books or friends. So far, at school students have never been directly involved in learning, the orientation of learning only activates children's cognitive so that children cannot express their ideas properly which results in children not being able to think critically. Nisa (2011: 38) that a creative learning process needs to be supported by (1) space to create creativity. Formation of creativity requires learning support factors that are physically and conceptually able to develop students' creativity. For example in the form of procuring computers, books that are of interest to students. While conceptually, such as the procurement of learning materials oriented to arts and crafts. (2) creative teaching. Teachers must be able to read situations and monitor and evaluate events and be able to take risks to innovate in the teaching process.

One way to create creativity is by writing because writing can be a medium for conveying information. Karnadi (2011) states that all written communication is effective

ISSN: 3025-020X

and effective if the writer knows (1) the main issues, (2) how to structure his ideas, and (3) how to express himself well.

However, what happens is that learning is like the pouring of teacher-centered science. So that the teaching and learning process is unpleasant, not memorable and monotonous so that students are not creative and have an impact on learning outcomes. Rahmida (2011: 101) in learning the process of delivering material takes place in a pouring manner where learning tends to be teacher-centered and monotonous, with a class atmosphere that seems stiff. Interaction in learning between teachers and students, moreover between fellow students is not good or less interactive. This results in students becoming less active, less enthusiastic, losing concentration, getting bored quickly, not being independent and even doing negative things during learning activities. During the first five to ten minutes of learning students take the lesson seriously. Afterward, they got bored when the students didn't pay attention to the teacher's explanation in front of the class, they were engrossed in their own activities, chatting with friends, lying down, and disturbing their friends.

In learning activities students only read the textbooks they have. In general, students do not like to read or repeat lessons at school or at home because their writing is uncreative and boring. This was revealed by Olivia (2014) that the routine of students reading textbooks was very boring because generally black and white was rarely colored and there were only a few illustrations so it did not attract students' interest. Other activities during the lesson students are not directly involved in the learning process because of the learning model used by conventional teachers, they are only good listeners and no students ask questions because they do not understand the material being studied.

ISSN: 3025-020X

The role of the teacher in using the right learning model greatly determines the motivation and success of student learning, so that students can achieve high learning achievement and are able to develop the potential stored within themselves. The learning model that can make the learning atmosphere interesting and fun so that it can increase students' understanding and creativity when studying material is the Project Based Learning model with the help of Mind Mapping.

The project based learning learning model is a learning process that directly involves students to produce a project. Basically this learning model develops more solving skills in working on a project that can produce something. The syntax in the project based learning learning model includes determining fundamental questions, compiling project plans, compiling schedules, monitoring, testing results, and evaluating observations (Widiarso, 2016; Sari & Angreni, 2018; Utami & Nisa, 2023). The project based learning learning model is an option to be able to increase the creativity of students in the learning process.

Mind mapping is a way of grouping several ideas in the form of a structured framework to help remember or analyze a problem. As revealed by Tony Buzan (2011) learning using the Mind Mapping method will increase students' memorization and strong learning motivation, and students will become more creative. In addition to teaching and learning activities will be more interesting, students will also be more motivated by learning. So that by applying the Mind Mapping learning model in learning, it is hoped that it can increase student learning motivation. Besides that, science material is quite heavy for students, this is a challenge for teachers to develop learning strategies and approaches that are appropriate to students' abilities. Firdaus (2011) the process of learning science in the classroom is more directed at the ability to memorize information, students' brains are forced to remember and accumulate various information without

ISSN: 3025-020X

being required to understand the information they remember. Learning is an activity carried out by someone intentionally and consciously to acquire a concept, understanding or knowledge, skills and attitudes that are relatively constant and lasting. To achieve maximum learning outcomes, a learning model or learning approach is needed that is directed, planned and fun for students.

Based on the description above, in an effort to achieve the objectives of this research, namely to improve learning outcomes, the authors conducted a class action research with the research title "Application of Mind Mapping through the Project Based Learning Model to Improve Learning Outcomes of Elementary School Natural Science Content.

3. Methods

3.1. Participants and context

This type of research is Collaborative Classroom Action Research (PTKK). Collaborative classroom action research using the Kemmis and McTaggart models. The work procedure in this study is a cycle of activities that will be carried out for two cycles, each cycle of two meetings. According to Arikunto (2013: 132), there are four stages used which include planning, action, observation, and reflection. The research subjects were fifth grade students, with a total of 19 students consisting of 10 male students and 9 female students. This research was carried out in the second semester of the 2022/2023 school year. The research phase up to the reporting of research results was carried out for approximately 3 months, namely from April 2023 to June 2023.

ISSN: 3025-020X

3.2. Material

Data collection techniques used in this study are observation, documentation and tests. Observation techniques are carried out by observing student activities in the classroom during the learning process. Documentation techniques through recording in the form of data from natural science tests. Technical tests are collected by giving pre-tests and post-tests in the form of multiple choice questions and descriptions.

3.3. Data Collection and analysis

The data analysis technique used in this research is descriptive quantitative. Quantitative data collected in the form of tests. Data on natural science learning outcomes is obtained by finding the average, so that it can be seen the increase in students' natural science learning outcomes.

a. To measure student learning outcomes scores can be used the following formula:

   Result score = $\frac{Score\ obtained}{Maximum\ Total\ skor}$

b. To find out the average value, the following formula can be used

   $$X = \frac{\sum X}{N}$$

   Keterangan :

   X = Average

   ∑x = The total number scores

   N = The number of students

c. For the percentage of students who achieve KKM, the following formula can be used: P = $\frac{\sum achiefing\ students\ KKM}{\sum overall\ students}$ X 100 %

   Information :

   P = Percentage of learning completeness

ISSN: 3025-020X

∑ = the totalnumberof students

(Suharsimi Arikunto, 2013:3018).

4. Result dan Discussion

Result

Based on the results of observations, student learning outcomes have increased from pre-cycle, cycle 1, and cycle 2 as shown in Table 1.

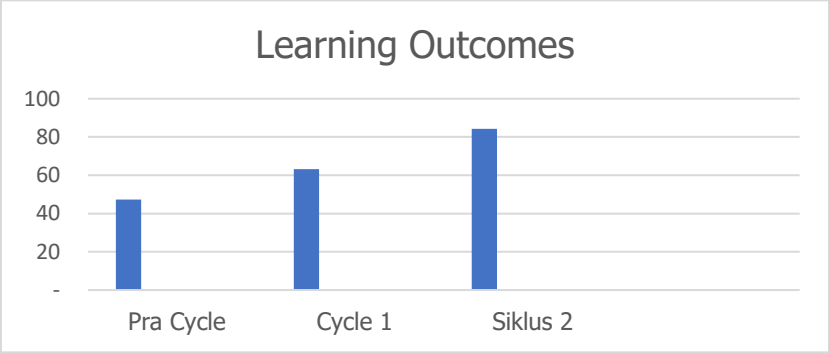
Tabel 1. Data Analysis of critical reasoning dimensions

cycle	Learning Outcomes
Pra-cycle	47,36%
Cycle 1	63,15%
Cycle 2	84,21%

Based on the table above, it can be seen that student learning outcomes in the pre-cycle show an average of 47.36% in low qualifications. The percentage score of 47.36% is in the percentage interval of 25% - 49% in low qualification. In cycle 1, it showed an increase from the pre-cycle, which was 63.15% in the moderate category, at intervals of 50% -74%, then it increased again in cycle II, which was 84.21%, in the high category, at intervals of 75% - 100%.

Chart 1. Analysis of learning outcomes data

ISSN: 3025-020X



In graph 1. It can be seen the percentage comparison and percentage increase in student learning outcomes from the pre-cycle stage to cycle 2. In the pre-cycle stage leading to cycle 1 the percentage increased by 15.79%, in cycle 1 towards cycle 2 the percentage increased by 21 .06%.

Discussion

The application of Mind Mapping through the Project Based Learning model in Natural Science content in class V is carried out in two cycles. Each cycle consists of two meetings, and each meeting lasts 2 x 35 minutes or two hours of lessons. The learning carried out consists of 6 steps namely: 1. Fundamental questions, 2. Compile project planning, 3. Arrange schedules, 4. Monitoring, 5. Test results, and 6. Evaluation of observations

In cycle I, learning has been carried out well but not optimal. At the fundamental question stage, the teacher conducts questions and answers related to learning material. However, there are still many students who tend to be silent and only a few students answer questions from the teacher. At the stage of preparing project planning students still felt confused because it was the first time using a model like this. Furthermore, at the monitoring stage, the teacher forms students into heterogeneous groups. The division of groups is based on the initial assessment carried out by the teacher. When the division

ISSN: 3025-020X

of student groups looks rowdy, besides that the teacher is not optimal in providing guidance to each group. There are still some students who play alone and disturb other groups. The stage of testing the work, students presenting the work is clear, but there are groups who are not ready to present it even though it has exceeded the allotted time. When students were called on as group representatives to convey their work, students were not confident and delivered in a low voice. In the analysis and evaluation phase of the problem-solving process, the teacher and students carry out an analysis of the presentation of the work presented, but students have not yet expressed their opinions on the work of other groups in detail.

In cycle II, the implementation of learning and student activities was better than cycle I and experienced an increase. At the fundamental question stage, the teacher conducts question and answer activities and many students are active in answering the questions posed by the teacher. The stage of preparing project plans students are already active in groups to discuss designing projects that will be made by students. The next stage is the preparation of the schedule for the implementation of the project, in carrying out the project the students complete the project according to the time given by the teacher. The teacher provides guidance to each group as a whole. Providing maximum guidance because no students disturb other groups when working on it so that it becomes more conducive, besides that there is also a division of tasks within each group. Students in groups participate in discussions and are responsible for their group answers. Students join in their groups and do not disturb other groups. Students actively ask questions and express their opinions when discussing. The stage of testing the work, students develop the presentation of the work with the group. In conveying the results of their work students are more confident. In the evaluation phase, students express their opinions on the work of other groups. Students and teachers provide conclusions. In cycle II the

ISSN: 3025-020X

teacher integrates learning with technology. The teacher prepares a quizizz to be worked on by students in groups. Quizizz is a student engagement platform that allows teachers to conduct interactive lessons and quizzes with their students. Students are very enthusiastic when completing quizzes using the quizizz platform by discussing with their groups. They are very happy when the answer they choose is correct, answers in a short time and gets a high score.

Overall the learning carried out in cycle II went well and had achieved research performance indicators so that the researcher decided to stop the research. In this study, the researchers concluded that the achievement of learning objectives by applying Mind Mapping through the Project Based Learning Model could improve the learning outcomes of Natural Science content students.

The results of this study are relevant to research conducted by research conducted by Ermi et al (2019) where the results of his research show that the Project Based Learning learning model can improve student learning outcomes in science subjects on the food chain material and its components. In his research there was also a significant increase in student learning outcomes when using the Project Based Learning model. Also supported by research conducted by Richard et al (2019) which in his research explained that the Project Based Learning model improves learning outcomes for 3rd grade students. The Base Learning Project Model can make students more enthusiastic about learning.

The application of Mind Mapping is proven to improve student learning outcomes. In accordance with Rusman's opinion which states that the mind mapping model is very good for planning and managing various things (Aris Shoimin, 2014: 105). Mind Mapping is expected to be able to increase student interest and stimulate student curiosity in participating in learning because students first look for sources to be studied.

ISSN: 3025-020X

By applying the Mind Mapping learning model, students will easily write down ideas, ideas, problems, solutions or whatever comes to mind and burdens the subconscious mind which has been difficult to record (Swadarma, 2013: 2).

5. Conclusion

Based on the results of the study, it can be concluded that the application of Mind Mapping through the Project Based Learning model increased the learning outcomes of students in Natural Science class V. This can be shown from the learning outcomes of students who experienced an increase in cycle I and cycle II, which initially the average learning outcomes of students in cycle I was 63.15% to 84.21% in cycle II. The application of Mind Mapping through the Project Based Learning model is able to improve student learning outcomes in Natural Science content because it includes activities to make a project that can make students more enthusiastic and motivated to learn, besides that mind mapping is also able to increase student interest and stimulate student curiosity in participating in learning.

6. Acknowledgements

Principal, class V teacher, fifth grade students and all school members at SD Negeri Karangmulyo who have given permission, provided information, assisted, and participated in this research. Thanks also go to all those who have helped carry out the research both directly and indirectly.

7. References

Adodo, S.O. (2013) Effect of Mind-Mapping as a Self-Regulated Learning

ISSN: 3025-020X

Strategy on Students'Achievement in Basic Science and Technology. *Mediterranean Journal of Social Sciences Published by MCSER-CEMAS-Sapienza University of Rome Vol 4 No 6 July 2013.*pp 163-172.

Amudha, R. (2015) Perception of Employees' towards Motivation Using Mind Mapping Technique *The International Journal Of Humanities & Social Studies* . Vol.3 No. 5 May 2015.pp.19-22.

Arikunto, S. 2013. *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.

Arsyad, A. 2017. *Media Pembelajaran.* Jakarta: PT. Rajagrafindo Persada.

Asrori, Mohammad. (2009) *Psikologi Pembelajaran seri Pembelajaran Efektif*. Bandung. CV. Wacana Prima.

Asrori, Mohammad. (2009) *Penelitian Tindakan Kelas*. Bandung. CV. Wacana

Buzan, Tony. 2011. Buku *Pintar Mind map.* Jakarta: Gramedia Pustaka Utama.Prima.

Jupriyanto. (2018). Kemampuan Berpikir Kritis Siswa dalam Pembelajaran Ilmu Pengetahuan Alam Kelas IV. Jurnal Ilmiah "Pendidikan Dasar", 5 (2), 105.

Koeswanti, H. D. (2018). Eksperimen Model Kooperatif Learning dalam Pembelajaran Keterampilan Menulis Karya Ilmiah Mahasiswa Ditinjau Dari Kemampuan Berpikir Logis. Satya Wacana Press.

Nisa, A. F. (2020). Pengembangan Model Pembelajaran Inovatif SD di Era Milenial. *Prosiding Seminar Nasional PGSD UST, 1,* 5–11. https://jurnal.ustjogja.ac.id/index.php/sn-pgsd/article/view/8870

Olivia, Femi. (2014) *5-7 Menit Asyik Mind Mapping Pelajaran Sekolah*. Jakarta. PT Elex Media Komputindu

Pardimin,. Nisa, A. F., Hikmah, N. (2022). Need Analysis of Learning Tool Development in Developing 21st Century Skills of Elementary School Students. *PGSD UST*

ISSN: 3025-020X

International Conference on Education, *3*(1), 58–62. https://doi.org/10.30738/icepgsd.v3i1.586

Pardimin,. Nisa, A. F., Hikmah, N. (2023). Learning Design Innovation Based on Tri N and STEAM in Developing 21st Century Skills for Elementary School Students. *Jurnal Ilmiah Sekolah Dasar*, *7*(2), 187–194. https://doi.org/10.23887/jisd.v7i2.52903

Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 22 Tahun 2016 tentang Standar Proses Pendidikan Dasar dan Menengah.

Peraturan Menteri Pendidikan Dan Kebudayaan (2013) *Implementasi Kurikulum Pedoman Umum Pembelajaran nomor 81A*. Jakarta. Depdiknas.

Purwanto. 2016. *Evaluasi Hasil Belajar*. Yogyakarta: Pustaka Belajar

Pusmendik. (2022b). Dimensi, Elemen, dan Subelemen Profil Pelajar Pancasila pada Kurikulum Merdeka. 1–37.

Pusmendik. (2022a). Bahan Ajar Profil Pelajar Pancasila. Kementerian Pendidikan Dan Kebudayaan, 1–108. http://ditpsd.kemdikbud.go.id/hal/profil-pelajar-pancasila

Rahmawati, D. N., Nisa, A. F., Astuti, D., Fajariyani., Suliyanti. (2022). Pemanfaatan Aplikasi Quizizz sebagai Media Penilaian Pembelajaran Ilmu Pengetahuan Alam. *Dawuh Guru Jurnal Pendidikan MI/SD, 2(1)*, 55-66. https://doi.org/https://doi.org/10.35878/guru.v2i1.335

Swadarma, Doni. (2013). *Penerapan Mind Mapping dalam Kurikulum pembelajaran*. Jakarta. PT Elex Media Komputindu

Sugiyono. 2015. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D.* Bandung: Alfabeta.

Uktolseja, N. F., Zulfiati, H. M., Nisa, A.F. (2022). Internalization The Values of Pancasila Students Profiles Through Backpaker Program. *Proceeding International Seminar Commemorating the 100th Anniversary of Tamansiswa Education, Culture and*

ISSN: 3025-020X

Nationalism in New Era. 1(1). 339-343. https://seminar.ustjogja.ac.id/index.php/ISECN/article/view/136/70.

Uktolseja, N. F., Nisa, A. F., Arafik, M., & Wiarsih, N. (2022). Penanaman Nilai-Nilai Profil Pelajar Pancasila Melalui Pembelajaran Tematik Berbasis Project Based Learning Di Sekolah Dasar. *Prosiding Seminar Nasional PGSD UST*, *1*(1), 151–158. Retrieved from https://jurnal.ustjogja.ac.id/index.php/sn-pgsd/article/view/12369

Utami, A. W., Nisa, A.F. (2023). Penerapan Project Based Learning untuk Meningkatkan Motivasi dan Hasil Belajar Siswa Kelas VI SDN Sidomulyo. *Prosiding Dewantara Seminar Nasional Pendidikan Transformasi Pendidikan di Era Society 5.0, 2(1),* 1-8, https://seminar.ustjogja.ac.id/index.php/d-semnasdik/article/view/794