Application of Meaningful Learning Model to Improve Student's Learning Outcomes

Topanus Tulak[(✉)], Sefrin Siang Tangkearung, Harmelia Tulak,
and Erlin Wersetya Paseno

Universitas Kristen Indonesia Toraja, Tana Toraja, South Sulawesi, Indonesia
topan@ukitoraja.ac.id

Abstract. Creating effective teaching and learning activities is the duty and obligation of the teacher. One of the factors that is often used as a benchmark for the success of education is to see the success of the teaching-learning process in achieving its goals. Choosing the right learning model will have a positive impact on student learning outcomes. The learning model is a particular learning process approach, including its goals, steps, and management system. The purpose of this study is to improve student learning outcomes by using the Meaningful Learning model. This research is classroom action research and was conducted in two cycles, each cycle consisting of six meetings. The subjects of the study were 20 fifth grade students of the State Elementary School 145 Randanan, Tana Toraja, 7 male students and 13 female students. Data collection is done by observation, interviews, documentation and tests. The activity process consists of planning, implementation, observation and reflection stages. Data on student learning outcomes were obtained from the testing activities of cycle I and cycle II. In the first cycle, the presentation of the results of learning abilities that did not meet the requirements had not reached the expected success aspect, so that the results of students' learning abilities who met the requirements were used to run the second cycle. Based on the findings in two cycles, it is concluded that the application of the Meaningful Learning model can improve the learning outcomes of fifth grade students of the State Elementary School 145 Randanan, Tana Toraja.

Keywords: Application · Learning Outcomes · Meaningful Learning Model

1 Introduction

Learning is knowing changes in behavior based on experience and learning practices [1, 2]. According to [3], learning is acquiring knowledge process. Thus learning is the process of acquiring knowledge with the aim of changing both knowledge, skills, and attitudes, namely from ignorance to knowing. The concept of learning outcomes in general is a change in behavior and general skills possessed by students after learning in the form of cognitive, emotional, and psychomotor skills caused by experience [4]. According to [5, 6], learning outcomes are cognitive, emotional, and psychomotor changes that occur in children as a result of learning psychomotor skills as a form of performance and

behavior formation. Thus, learning outcomes are the level of knowledge achieved by students regarding the material received when participating in and working on assignments and learning activities.

One of the factors that is often used as a benchmark for teacher success is to see the success of the teaching-learning process which is marked by student learning outcomes. Choosing the right learning model will have a positive impact on student learning outcomes [7, 8]. The meaningful learning model is one of the learning models that can be applied by teachers in learning to improve student learning outcomes [9–11].

The learning model is a conceptual framework that describes a systematic procedure for organizing learning experiences to achieve certain learning goals, and serves as a guide for lesson designers and teachers in planning and implementing teaching and learning activities [5, 12]. The use of learning models can help expedite the teaching and learning process and achieve learning goals. Of course, choosing the right learning model will have a positive impact on student learning outcomes [6, 13, 14].

Meaningful Learning is a learning concept in which the teacher presents real-world situations to the classroom and encourages students to make connections between the knowledge they have and its application in their lives [15, 16]. The teacher's task in Meaningful Learning is to provide easy learning to students, by providing various means and adequate learning resources [14, 17]. The teacher does not only convey learning material in the form of memorization, but regulates the environment and learning strategies that allow students to learn. Here students have the opportunity to gain direct experience in implementing their ideas, this is an opportunity for students to discover and apply their own ideas.

Based on observations at fifth grade students of the State Elementary School 145 Randanan, it is evident that the learning pattern developed by the teacher is more textbook-oriented. Moreover, such learning patterns make students bored. Meanwhile, thematic learning should emphasize student involvement in learning. Not to mention, with the limitation of face-to-face time which only lasts two to three hours, it makes students less optimal in learning and makes lessons meaningless for students because of the wide scope of thematic learning. Students feel bored with learning because there is a lot of material that must be memorized which results in poor reasoning, memory, and concentration. In addition, students' boredom in thematic learning makes them not focus on learning. When students are bored, they prefer to do what they enjoy, such as telling stories with friends or enthusiastically doodling in books. This affects the subject's proficiency. If there is no motivation to learn, students will not understand the material explained by the teacher.

The low learning outcomes of students in thematic learning are also caused by the lack of teaching models used by educators as a result affecting children's learning outcomes in cognitive aspects that do not meet the predetermined Minimum Completeness criteria (KKM). According to initial observations at fifth grade students of the State Elementary School 145 Randanan, only 10 students out of a total of 24 students in class V scored more than the KKM and 14 students did not reach the KKM for all students in class V. This indicates that mastery of thematic learning has not been maximized.

Based on these problems, it is necessary to create creative and useful learning for students. The model that can be used to make learning more meaningful is the meaningful

learning model. Ausubel said that the meaningful learning model is learning that is easy for students to understand and learn because of the teacher's ability to provide comfort that allows students to easily reflect on the experience and knowledge that already exists in their minds as well as a bridge to what students learn, so that students easily understand the material [1, 12, 15].

2   Methods

In this classroom action research, qualitative descriptive analysis is used, which describes the facts from the data obtained to understand students' reactions to the activities of the learning process. The use of a qualitative approach, in which problems that occur in the environment can be studied and can interact directly with the subject. The research used is a classroom action research method that examines learning activities in the form of consciously organized behavior in the classroom [18, 19].

The focus of this classroom action observation (CAR) is the focus of the process and the focus of the results. The study was conducted at SDN 145 Randanan, Tana Toraja. The subjects of this study were fifth grade students of SDN 145 Randanan, the number of 24 students in Tana Toraja district. The procedures in the research are (1) planning, (2) implementation, (3) observation, (4) reflection. Techniques and Procedures The data collection carried out is observation (observation), tests, interviews as well as documentation. The data analysis technique went through several stages, namely: data analysis, reduction, presentation and conclusion.

3   Result and Discussion

Result

Prior to conducting the research, a visit was made to the research location or place at fifth grade students of the State Elementary School 145 Randanan. The purpose of the visit was to coordinate with the principal in conducting research at the school which was fostered by the principal. At the meeting, the principal allowed the research and asked to speak directly to the 5th grade teacher.

1. Test Results of Cycle I

a) Observation Result Data.

1) The Results of the observations of teaching activities in the first cycle meetings 1, 2, 3, 4, 5 and 6

From the results of observations of teacher teaching activities in the 1st meeting, it shows that of the 15 indicators that must be achieved, there are 3 indicators that are not carried out because the researcher does not use the time, there are 3 less good, 7 quite good, and 2 very good. At this meeting, only 23 scores out of 45 maximum scores were obtained with an achievement level of 51.11% in the less category. Meeting 2 showed that of the 15 indicators that must be achieved, namely there was 1 indicator that was not carried out because the researchers did not use the time, there were 4 indicators that were carried out poorly, 7 were carried out quite well, and 3 were carried out very well. At this

meeting, only 27 scores were obtained from 45 maximum scores with an achievement level of 60% in the sufficient category. At meeting 3 showed 15 indicators that must be achieved, there are 3 indicators that are done poorly, 8 indicators that are implemented quite well, and 4 indicators that are implemented very well. At this meeting, only 31 scores were obtained from 45 maximum scores with an achievement level of 68.88% in the sufficient category. At the 4th meeting showed 15 indicators to be achieved, there were 2 indicators that were carried out poorly, 8 indicators that were implemented quite well, and 5 indicators that were implemented very well. At this meeting, only 33 scores were obtained from 45 maximum scores with an achievement level of 73.33% in the good category. At the 5th meeting showed 15 indicators to be achieved, there were 2 indicators that were carried out poorly, 8 indicators that were implemented quite well, and 5 indicators that were implemented very well. At this meeting, only 33 scores were obtained from 45 maximum scores with an achievement level of 73.33% in the good category. At the 6th meeting it was shown that 15 indicators had to be achieved, there were 2 indicators that were carried out poorly, 8 indicators that were implemented quite well, and 5 indicators that were implemented very well. At this meeting, only 33 scores were obtained from 45 maximum scores with an achievement level of 73.33% in the good category.

2) The results of the observation of student learning activities in the first cycle meetings 1, 2, 3, 4, 5 and 6

The results of observations at meeting 1 showed that of the 15 indicators that had to be implemented, only 1 was implemented very well, 5 was implemented quite well, 6 was implemented poorly, and there were 3 indicators that were not implemented. Of all these indicators, a maximum score of 45 was obtained but the score obtained was only 19. So that the total success reached 42.22% in the less category. Meeting 2 showed that of the 15 indicators that had to be implemented, only 2 were implemented very well, there were 5 implemented quite well, 5 were implemented poorly, and there were 3 indicators that were not implemented. From all these indicators, a maximum score of 45 was obtained but the score obtained was only 21. So that the total success reached 46.66% in the less category. Meeting 3 showed that of the 15 indicators that had to be implemented, only 1 indicator was implemented very well, 6 was implemented quite well, 5 was implemented poorly, and there were 3 indicators that were not implemented. From all these indicators, a maximum score of 45 was obtained but the score obtained was only 23. So that the total success reached 51.11% in the less category. The meeting at the 4th meeting showed that of the 15 indicators that had to be implemented, only 3 were implemented very well, 6 were implemented quite well, 5 were implemented poorly, and there was 1 indicator that was not implemented. From all these indicators, a maximum score of 45 was obtained but the score obtained was only 26. So that the total success reached 57.77% in the sufficient category. At the meeting at meeting 5, it was shown that of the 15 indicators that had to be implemented, only 4 indicators were implemented very well, 6 were implemented quite well, 5 were implemented poorly. From all these indicators, a maximum score of 45 was obtained but the score obtained was only 29. So the total success reached 64.44% in the sufficient category. At the 6th meeting, it was shown that of the 15 indicators that had to be implemented, only 5 indicators were

Table 1. Test Results of Cycle I

Number	Score	Qqualification	Frequency	Percentage
1	85–100	Very good	4	20%
2	71–84	Well	7	35%
3	56–70	Enough	6	30%
4	45–55	Not enough	3	15%
5	0–44	Very less	-	-

implemented very well, 7 were implemented quite well, 3 were implemented poorly. From all these indicators, a maximum score of 45 was obtained but the score obtained was only 32. So that the total success reached 71.11% in the good category (Table 1).

b) Test Data of Cycle I.

In the implementation of cycle 1 was attended by 20 students, where students who scored 85–100 there were 4 (20%) students who scored 71–84 there were 7 students (35%), students who scored 56–70 were 6 people. Students (30%) and students who scored 45–55 there were 3 students (15%). Overall, the completeness of student learning outcomes is 55% from the implementation of actions and observations, increasing learning outcomes using the meaningful learning model for 5th graders at SDN 145 Randanan, obtained the completeness value of student learning outcomes is 55% with a sufficient category, but not yet. Achieve success indicators.

c) Reflection.

From the results of data analysis, it was found that there were deficiencies in cycle 1, namely:

1) Teacher aspect
    a. The teacher has not been maximal in opening lessons
    b. The teacher has not been maximal in asking students to pray
    c. The teacher has not been maximal in checking student attendance
    d. The teacher has not been maximal in explaining the activities and learning objectives
    e. The teacher has not been maximal in delivering the material
    f. The teacher has not been maximal in asking questions with students
    g. The teacher has not been maximal in dividing students into study groups
    h. The teacher has not been maximal in giving direction to students
    i. The teacher has not been maximal in associating student experiences with the material
    j. The teacher has not been maximal in guiding the discussion
    k. The teacher does not reflect
    l. The teacher doesn't give a conclusion.
2) Student aspect
    a. Students do not greet
    b. Students have not been maximal in answering attendance when the teacher is absent

   c. Don't pray
   d. Not paying attention to the explanation of the learning objectives
   e. Some students do not read the reading text
   f. Not listening to the teacher's explanation
   g. There are still many students who do not answer the question
   h. Some students don't get together with their group members
   i. Not listening to the teacher's directions
   j There are still very few students who develop knowledge based on their experience
   k. Students do not reflect
   l. Does not answer the feedback provided.

From the results of the reflection above and based on input from the class teacher, there are several steps that need to be improved so that these obstacles can be overcome.

1) Teacher aspect
   a. The teacher must be maximal in opening lessons
   b. The teacher must be maximal in asking students to pray
   c. The teacher must be maximal in checking student attendance
   d. The teacher must be maximal in explaining the activities and learning objectives
   e. The teacher must be maximal in delivering the material
   f. The teacher must be maximal in asking questions with students
   g. The teacher must be maximal in dividing students into study groups
   h. The teacher must be maximal in giving direction to students
   i. The teacher must be maximal in associating students' experiences with the material
   j. The teacher must be maximal in guiding the discussion
   k. The teacher must be maximal in doing reflection
   l. The teacher must give a conclusion
2) Student aspect
   a. Should have greeted the teacher
   b. Students should answer that they are present when the teacher is absent
   c. All students should pray
   d. Students should answer that they are present when the teacher is absent
   e. All students should read the reading text
   f. All students should listen to the teacher's explanation
   g. All students should answer the questions asked by the teacher
   h. All students should gather with their group members
   i. All students should listen to the direction of the teacher
   j. All students should develop their knowledge based on their experience
   k. All students should work together with their group members
   l. Students should reflect
   m. Students should answer the feedback given.

From the results of observations of the implementation of the first cycle of action, it was explained that the learning carried out had not yet reached the success indicator, namely 85% of students reached the specified KKM, which was 70, then the learning would continue in the second cycle even though it had increased compared to the previous learning.

2. **Test Results of Cycle II**

a. Observation Result Data.
1) The Results of the observations of teaching activities in the second cycle meetings 1, 2, 3, 4, 5 and 6.

The results of observations on the activities of educators at meeting 1 showed that of the 15 indicators that must be achieved, 10 were implemented quite well, and 5 indicators were implemented very well. At this meeting, only 35 scores out of 45 maximum scores were obtained with a level of achievement of 72.91% in the good category. Meeting 2 showed that of the 15 indicators that must be achieved, 9 were quite good, and 6 indicators were implemented very well. At this meeting, only 36 scores were obtained from 45 maximum scores with a level of achievement of 80% in the good category. Meeting 3 showed that of the 15 indicators that must be achieved, 8 were quite good, and 7 indicators were implemented very well. At this meeting, only 37 scores were obtained from 45 maximum scores with an achievement level of 82.22% in the good category. Meeting 4 showed that of the 16 indicators, of which 7 were very well implemented and only 8 were quite good. With the total score obtained 93.33% in the very good category. At the 5th meeting, it was shown that of the 16 indicators planned, all of them were implemented with the description of 13 very good indicators, and 3 quite good. From all the indicators implemented, 45 of the maximum scores were obtained, namely 48 with a success rate of 93.75% very good success. At the 6th meeting, it was shown that of the 16 indicators, of which 7 were very well implemented and only 8 were quite good. With the total score obtained 93.33% in the very good category.

2) The results of the observation of student learning activities in the second cycle meetings 1, 2, 3, 4, 5 and 6.

The results of the first meeting of observations showed that of the 15 indicators that must be achieved, 11 were quite good, and 4 indicators were implemented very well. At this meeting only 34 scores were obtained from 45 maximum scores with an achievement level of 75.55% in the good category. Meeting 2 showed that of the 15 indicators that had to be achieved, 11 were quite good, and 4 indicators were implemented very well. At this meeting only 34 scores were obtained from 45 maximum scores with an achievement level of 75.55% in the good category. Meeting 3 showed that of the 15 indicators that must be achieved, 11 were quite good, and 4 indicators were implemented very well. At this meeting only 34 scores were obtained from 45 maximum scores with an achievement level of 75.55% in the good category. Meeting 4 showed that of the 16 indicators planned, all of them were implemented. With the description 12 were very good, and 4 were quite good. From all indicators carried out, 44 of the maximum scores were obtained, namely 48 with a success rate of 91.66% with a very good success category. At the 5th meeting, it was shown that of the 16 indicators, of which 9 were very well implemented and only 6 were quite good. With the total score obtained 93.33% in the very good category. Meeting 6 showed that of the 16 indicators planned, all of them were implemented. With the elaboration of 14 indicators performed very well, and 2 quite well. From all the indicators implemented, 46 of the maximum scores were obtained, namely 48 with a success rate of 95.83% with a very good success category.

b. Test Data of Cycle II.

To determine the success of learning, the teacher gives a test with a total of 5 questions, to measure the extent to which learning success uses a meaningful learning model (Table 2).

Based on the data obtained, it is known that the learning in cycle II has succeeded in achieving the target that has been set, which is more or equal to 70% of all students who take part in learning activities to get a minimum score of 70.

c. Reflection.

Based on the data obtained, it is known that Cycle II learning has succeeded in achieving the goals that have been set. This means that more than 70% of all students who take part in learning activities achieve a minimum score of 70. Observations and interviews with the State Elementary School 145 Randanan show that teachers and students of class V show that the second cycle of learning is consistent with meaningful learning and is satisfied with the learning model. Because all students are still able to answer the questions asked. What teachers need to pay attention to is the need to intensify teaching and improve fluency in the classroom (Fig. 1).

d. Interview Result.

1) Student Interview.

Table 2. Success rate of Cycle II

Number	Score	Qqualification	Frequency	Percentage
1	85–100	Very good	9	45%
2	71–84	Well	8	40%
3	56–70	Enough	1	5%
4	45–55	Not enough	2	10%
5	0–44	Very less	-	-
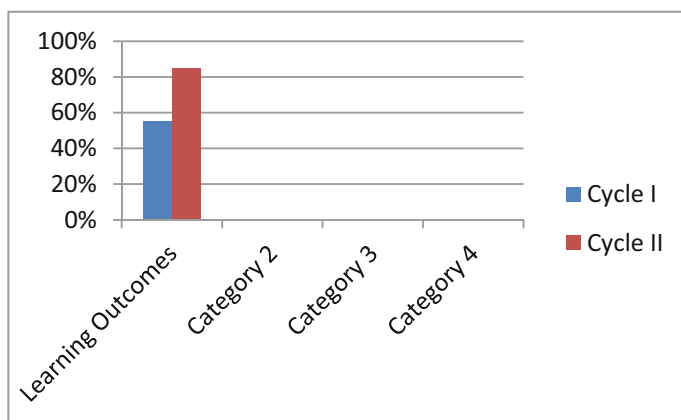
Fig. 1. Comparison Diagram of Student Learning Outcomes in Cycle I and Cycle II

The results of the Student1 interview show the use of meaningful learning. Meaningful and well received by students. There are also no obstacles encountered in using the meaningful learning model. Then the results of interviews from student 2 said that students were not bored in learning and easier to understand in learning. Students also said that they enjoyed using the meaningful learning model.

2) Teacher Interview.

The results of teacher interviews, it is said that the use of meaningful learning models when teaching is very good because it invites students to be more active. The classroom teacher also said that by using this meaningful learning model, it was easier for educators to convey material because educators and students could apply directly to teaching and learning activities so that it was more memorable for students, and also this learning model could be easily applied and used for a long time.

Discussion.

1. Application of the Meaningful Learning Model in Thematic Learning.

The meaningful learning model is used in learning that prioritizes the meaningfulness and creativity of students in order to improve learning outcomes. During the process of using meaningful learning at SDN 145 Randanan, the researcher realized that the key factor influencing student learning was what students mastered. Learning is more meaningful when new notices that should be given by educators are related to children's understanding. In accordance with what David Ausubel said, an educational psychologist said that the material learned must be meaningful, meaning how to connect new notifications with relevant designs in cognitive structures. According to Ausubel, meaningful learning is a design in which new information or material is associated with concepts in the cognitive structure [15, 20].

Learning occurs more easily when new, more specific designs are linked to older and more general ideas that already exist in the child's cognitive structure [3, 21, 22]. The results of the study are in accordance with this opinion where students' understanding is easier in the lesson because the material being studied is actually a concept that already exists and is often encountered by students in the surrounding environment. So that when students learn the material with a meaningful learning model, it will make the lesson more meaningful.

According to Rogers, in the learning process educators must know the principles of teaching and learning. 1) Having the right learning capacity or not needing to learn something meaningless. 2) Students learn what it means to them. Organizing new materials and ideas for student learning. 3) Meaningful learning means learning about the process.

The opinions of these experts are in accordance with research conducted at fifth grade students of the State Elementary School 145 Randanan, it is proven that the application of the meaningful learning model can improve learning outcomes as expected. In addition, a lot of progress is experienced by students including, students understand the material explained because of the connection between students' experiences with the material being studied and also dare to come forward, cooperation between groups is well established where students are more active and enthusiastic because they can practice well. Group members, students are more enthusiastic in participating in learning. However, the learning of the meaningful learning model requires the teacher's ability

to be more creative in shaping the atmosphere of the teaching and learning process in a meaningful way.

2. Improved Learning Outcomes by using *Meaningful Learning.*

According to [4, 20], learning outcomes are skills that exist in students after completing a learning experience. This is proven in the research conducted and the results achieved by children can increase from Cycle I to Cycle II. This success is because the teacher succeeded in carrying out the learning steps. The success of learning has reached the desired target. Where during the learning process where all students are able to do group assignments and student learning outcomes meet the specified target, 85% of students achieve a value of 70 according to the specified KKM.

From the results achieved, we can see that the meaningful learning model in its application according to [2, 6], learning is a process in which behavior is induced or modified through practice or experience. This opinion is proven in research where teachers carry out learning activities that can give the impression of meaningful learning in the learning process activities with students' experiences then analyze student experiences and student concepts.

Looking at the indicators of success above, it can be concluded that the use of the meaningful learning model in thematic learning improves the learning outcomes of 5th grade students in Tana Toraja, State Elementary School 145 Randanan. The second cycle research was stopped because of the successful performance results, the hypothesis proposed by the researcher was that using a meaningful learning model could improve learning outcomes as expected.

4   Conclusion

The learning outcomes obtained in the implementation of the meaningful learning model can improve the learning outcomes of fifth grade students of the State Elementary School 145 Randanan, Tana Toraja. Based on the formulation of the problem that has been designed, the researcher concludes that using a meaningful learning model can improve the learning outcomes of fifth grade students of the State Elementary School 145 Randanan, Tana Toraja district by paying attention to meaningful learning steps correctly.

References

1. T. Keskitalo, E. Pyykko, and H. Ruokamo, "Exploring the Meaningful Learning of Students in Second Life," *Journal of Educational Technology & Society*, vol. 14, no. 1, pp. 16–26, 2011.
2. D. A. Kolb, *Experiental Learning: Experience as The Source of Learning and Development*. Englewood Cliffs, NJ: Prentice Hall, 2006. [Online]. Available: http://www.learningfromexperience.com/images/uploads/process-of-experiential-learning.pdf
3. A. S. Dakhi, "Improving Student Learning Outcomes," *Jurnal Education and Development*, vol. 8, no. 2, pp. 468–470, 2020.
4. M. Murtonen, H. Gruber, and E. Lehtinen, "The return of behaviourist epistemology: A review of learning outcomes studies," *Educational Research Review*, vol. 22, pp. 114–128, Nov. 2017, doi: https://doi.org/10.1016/j.edurev.2017.08.001.

5. D. M. E. Hoque, "Three Domains of Learning: Cognitive, Affective and Psychomotor," *JEFLER*, vol. 2, no. 2, p. 8, 2016.

6. V. Sönmez, "Association of Cognitive, Affective, Psychomotor and Intuitive Domains in Education, Sönmez Model," *ujer*, vol. 5, no. 3, pp. 347–356, Mar. 2017, doi: https://doi.org/10.13189/ujer.2017.050307.

7. S. V. N. Rante, T. Tulak, and H. Mantung, "Analysis of Teacher Difficulties in Implementing Thematic Learning during the Covid-19 Pandemic in Class IV of SDN 274 Inpres Tanete, Tana Toraja Regency," in *Transformasi Nilai-Nilai Kearifan Lokal Berbasis Teknologi*, Makale, 2022, vol. 1, p. 7. [Online]. Available: file:///C:/Users/dg/Downloads/1544-Article%20Text-4982–1–10–20220527.pdf

8. T. Tulak, S. S. Tangkearung, and R. Selin, "Analysis of Students' Higher Order Thinking Ability in Mathematics," in *Transformasi Nilai-Nilai Kearifan Lokal Berbasis Teknologi*, Makale, 2022, vol. 1, p. 10. [Online]. Available: https://journals.ukitoraja.ac.id/index.php/PROSDING/article/view/1550/1151

9. G. Agra, N. S. Formiga, P. S. de Oliveira, M. M. L. Costa, M. das G. M. Fernandes, and M. M. L. da Nóbrega, "Analysis of the concept of Meaningful Learning in light of the Ausubel's Theory," *Rev. Bras. Enferm.*, vol. 72, no. 1, pp. 248–255, Feb. 2019, doi: https://doi.org/10.1590/0034-7167-2017-0691.

10. W. Murtini, "The Effectiveness of The Scientific Approach to Improve Student Learning Outcomes," p. 6, 2018.

11. I. Supena, A. Darmuki, IKIP PGRI Bojonegoro, Indonesia, agus_darmuki@yahoo.co.id, A. Hariyadi, and IKIP PGRI Bojonegoro, Indonesia, ahmadhariyadi86@gmail.com, "The Influence of 4C (Constructive, Critical, Creativity, Collaborative) Learning Model on Students' Learning Outcomes," *INT J INSTRUCTION*, vol. 14, no. 3, pp. 873–892, Jul. 2021, doi: https://doi.org/10.29333/iji.2021.14351a.

12. D. H. Jonassen and J. Strobel, "Modeling for Meaningful Learning," in *Engaged Learning with Emerging Technologies*, D. Hung and M. S. Khine, Eds. Berlin/Heidelberg: Springer-Verlag, 2006, pp. 1–27. doi: https://doi.org/10.1007/1-4020-3669-8_1.

13. R. Anderson, "Creative Engagement: Embodied Metaphor, the Affective Brain, and Meaningful Learning," *Jurnal: MBE*, pp. 1–10, 2018.

14. T. Byers, M. Mahat, K. Liu, A. Knock, and W. Imms, *A systematic review of the effects of learning envrionments on student learning outcomes.* Melbourne: Innovative Learning Environments and Teacher Change, 2018.

15. S. Mystakidis, "Deep Meaningful Learning," *Encyclopedia*, vol. 1, no. 3, pp. 988–997, Sep. 2021, doi: https://doi.org/10.3390/encyclopedia1030075.

16. P. Sunasuan and U. Songserm, "Using Advance Organizer Model to Influence the Meaningful Learning of New Concepts for ESL Learners in a Collaborative Classroom," *AWEJ*, vol. 12, no. 3, pp. 129–143, Sep. 2021, doi: https://doi.org/10.24093/awej/vol12no3.9.

17. O. S. Tan, *Problem-based learning innovation: using problems to power learning in the 21st century.* Singapore: Cengage Learning, 2010.

18. C. Rofiah and B. Bungin, "Qualitative Methods: Simple Research with Triangulation Theory Design," *Develop.*, vol. 5, no. 1, pp. 18–28, Apr. 2021, doi: https://doi.org/10.25139/dev.v5i1.3690.

19. Sugiyono, *Quantitative, Qualitative, and Action Research Methods (19th ed.)*, 19th ed. CV. Alfabeta, 2013.

20. P. Baque G. C., M. Cevallos A. M., Z. Natasha B. M., and M. Lino M. B., "The Contribution of Connectivism in Learning by Competencies to Improve Meaningful Learning," *International Research Journal of Management, IT & Social Sciences*, vol. 7, no. 6, pp. 1–8, doi: https://doi.org/10.21744/irjmis.v7n6.1002.

21. O. Siburian, A. D. Corebima, . I., and M. Saptasari, "The Correlation Between Critical and Creative Thinking Skills on Cognitive Learning Results," *EJER*, vol. 19, no. 81, pp. 1–16, May 2019, doi: https://doi.org/10.14689/ejer.2019.81.6.

22. T. Tulak, W. Rianto, V. Stevania, and Rubianus, "Analysis of Misconception of Elementary School Teacher Study Program UKI Toraja Lectures about Fraction," *Edumaspul: Jurnal Pendidikan*, vol. 6, no. 2, p. 8, 2022, doi: https://doi.org/10.33487/edumaspul.v6i2.4139.