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Implementation of deep learning approach to improve fraction material learning outcomes for grade V SD inpres Mapanget Barat

Edfranto Y Tombokan, Roos MS Tuerah, Richard HD Pangkey
Faculty of Education and Psychology, Manado State University, Tondano, Indonesia

Abstract
A study has been conducted on the implementation of the deep learning approach to improve learning outcomes of fractions material for grade V of SD Inpres Mapanget Barat. This research is a classroom action research. The method used is the Deep Learning model approach. The implementation of this research was carried out in four stages, namely: the planning stage, the action stage, the observation stage, and the reflection stage. The technique in collecting research data used observation results, field notes, test results and documentation. In this study, the data was analyzed descriptively qualitatively and quantitatively. The results showed that teacher activity in the learning process increased due to improvements in deficiencies during the learning process. Student activity during the learning process increased due to deficiencies or errors that could be adequately corrected in the learning process. The increase in learning outcomes during the learning process shows that the Deep Learning learning approach model in the mathematics subject of fractions material can improve the learning outcomes of students at SD Inpres Mapanget Barat.

Keywords: Deep learning approach, learning outcomes, classroom action research

Introduction

Education plays an important role in the context of making the nation's life more intelligent. Law No. 20 of 2003, Article 1 states that education is a conscious and planned effort to realize learning and the learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state. Education in elementary schools includes various subjects, one of which is mathematics. According to Syafaruddin, 2015:50 (Tuerah, R. M. S., & Tuerah, J. (2023) [23] educational efforts that are full of ideal goals for the formation of the personality of the younger generation who are knowledgeable, faithful and pious in their behavior must be carried out in good management methods.

The world of education has an important role in creating quality human resources for the future. In achieving these educational goals, dynamic, democratic, and open education is needed which requires the ability to solve problems, think logically, think creatively, be able to create new ideas or concepts, and be skilled. One of the subjects that can support the achievement of these educational goals is mathematics. One of them is by studying mathematics, a person is accustomed to thinking systematically, scientifically, logically, critically, and can increase creativity. Given the importance of mathematics in all aspects of life, mathematics is very important to be studied and understood by all levels of society (Siti Nabilah, 2023) [19].

According to Tri F (2023;) [24] education in Indonesia is one of the critical aspects in national development. Although there have been many progress, there are still a number of problems that require serious attention, including 1) limited access to education 2) teacher quality 3) irrelevant curriculum 4) educational gaps between regions 5) lack of educational facilities 6) student financial problems 7) poverty and dropping out of school 8) gender inequality 9) lack of parental involvement 10) high unemployment rates after graduation. This is also not spared when a child is undergoing an educational learning process at a school that is not efficient for the child himself.

The learning process can take place because there are students, teachers, curriculum, one with another related or interconnected. Students can learn well if the facilities and infrastructure for learning are adequate, the learning model is interesting, students actively participate in the learning process so that students do not feel bored or bored when participating in learning in class. So far in the learning process, teachers have been more authoritarian and instructive. As a result, many students tend to feel bored when doing learning activities, by applying learning methods and approaches to students that are not only in one method or approach, students will be more active in receiving material so that cognitive, affective, and psychomotor assessment aspects will be absorbed by students and will be proven by the learning outcomes to be achieved.

The learning outcomes of A.S. Dakhi (AS Dakhi) are [2] changes in attitudes and behavior that occur in a person after the teaching and learning process. Learning outcomes can be measured and reported as student academic achievement. Aspects of learning outcomes that can be measured are: cognitive domain, namely the knowledge aspect, affective domain, namely the emotional aspect such as feelings, interests, and attitudes, psychomotor domain, namely the skill aspect. These three aspects are used as guidelines for assessing the level of success of students in receiving learning. The success of learning is determined by many factors, including the teacher factor in carrying out the teaching and learning process. Because teachers can directly influence, foster and improve the intelligence and skills of students. Therefore, an effort is needed to improve education and teaching by choosing strategies or ways and methods in delivering lesson materials in order to obtain an increase in student learning outcomes, especially mathematics lessons.

The teacher's learning process must place students as learning subjects. Thus, in implementing the learning process in the classroom, teachers need to activate students optimally. In teaching and learning activities, especially in the classroom, it is manifested in various forms of activities such as listening, discussing, producing something, compiling reports, solving problems and so on. Some of the students' activeness can be directly observed, such as doing assignments, discussing, collecting data and so on; but there are also those that cannot be observed, such as listening and paying attention. The learning process is not only determined by physical activity alone, but also by non-physical activities such as mental, intellectual and emotional. Therefore, in fact, only students know for sure whether students are active or not in learning. We cannot be sure that students who are silent listening to explanations do not mean passive, and vice versa, students who are physically active do not necessarily have high levels of mental activity. (Sofyan A, 2023) [21]. Teaching quality is a critical factor in exploring the causes of learning problems.

Quality teaching requires teachers who have good pedagogical skills, a deep understanding of the subject matter, and the ability to apply teaching methods that are appropriate to the needs and learning styles of students, adequate resources, such as textbooks, teaching aids, and educational technology, are the basis for an effective learning process, Lack of motivation and interest is one of the main causes of learning problems that need to be explored carefully. Unmotivated students tend to show disinterest in attending lessons, doing assignments, and participating in class activities, poor classroom management can lead to an unconducive learning atmosphere, where student behavior is uncontrolled and noise levels are high, disrupting the concentration and focus of other students teachers who are unable to enforce discipline or set clear rules often face difficulties in maintaining class order. This can result in reduced effective learning time, because teachers have to spend more time dealing with behavioral problems than teaching. Failure to implement a teaching strategy is not the end for teachers, but is a process of finding the most appropriate strategy. By implementing one of the deep learning approaches that will be more efficient in overcoming problems encountered in the learning process.

The concept of deep learning in education refers to in-depth and meaningful learning, which aims for deep understanding and effective application of knowledge in real life (Jaja Jamaludin, 2024) [13]. In Deep Learning, students are encouraged to actively engage in the learning process and dive into the topic being studied, so that they can explore more deeply and enjoy the panoramic beauty of the topic. The Deep Learning learning approach is the contrast of the Surface Learning learning approach which tries to discuss a lot of material broadly at the expense of the process of understanding and improving the competence of students. Students are ultimately forced to memorize many things without being able to interpret, own, and enjoy the learning process (Dianawuri L, Jo B, Yulaika Ramadhani, 2024) [8]. When applied in learning methods, the meaning of deep learning is a curriculum that combines three main elements, namely Mindful Learning, Meaningful Learning, and Joyfull Learning (Maksum Rangkuti, 2024) [14]. Each element is designed to create a learning atmosphere that not only prioritizes knowledge, but also meaningful experiences for students.

Method

This type of research, the researcher uses classroom action research. Akbar (2010:28) [4] states that "PTK is a controlled research activity to find and solve learning problems in the classroom, problem-solving activities are carried out cyclically, with the aim of improving critical thinking skills and the learning process". This research was chosen because it has characteristics that are in accordance with the objectives of the research, namely to improve students' critical thinking skills in the mathematics learning process in class V of SD Inpres Mapanget Barat.

This research was conducted at SD Inpres Mapanget Barat, Mapanget District, Manado City. This location was chosen because it considered several things, namely the following: 1) Students who are heterogeneous, both in terms of ability and gender. 2) The teacher council is very supportive if research is conducted at SD Inpres Mapanget Barat by implementing the Deep Learning learning model approach. 3) In Mathematics lessons, teachers at the elementary school have never In Mathematics lessons, many still use the lecture method so that students tend to get bored and do not understand what the teacher is saying. 4) In Mathematics lessons, many students' scores are still below the KKTP. 5) Implementing the Deep Learning model approach.

This classroom action research was conducted in the 2024/2025 academic year at SD Inpres Mapanget in the fifth grade mathematics subject on fractions with 32 students. This research was conducted in two cycles. Each cycle consists of two lessons or two meetings. According to Arikunto (2013) [1], there are four stages that are commonly passed, namely the first is planning, the second is implementation, the third is observation and the fourth is reflection. The implementation of this research was carried out in four stages, namely: the planning stage, the action stage, the observation stage, and the reflection stage. The technique in collecting research data used observation results, field notes, test results and documentation. In this study, the data was analyzed descriptively qualitatively and quantitatively. Quantitative data is data from observations of teacher teaching activities and student learning activities, quantitative data is data on student learning outcomes. Furthermore, the results of the data analysis obtained both qualitatively and quantitatively are used to identify effectiveness and success.

Results and Discussion

Results

1. Cycle 1

The stages carried out by the researcher in cycle 1 are: planning stage, implementation stage, observation stage and reflection stage.

a. Planning stage

In the planning stage, there are several things that the researcher needs to prepare, namely choosing a theme, sub-theme, learning, subjects, materials and compiling Teaching Module I, Student Worksheets (LKPD), teacher activity observation sheet instruments I, student activity observation sheets I which were directly observed by observers during learning.

b. Action Implementation Stage

The action implementation stage in cycle I was carried out on March 17, 2025 using Teaching Module I with Fraction material. This activity involved grade V students of SD Inpres Mapanget Barat, consisting of 32 students (20 boys and 12 girls). In carrying out the research, the researcher was assisted by the Principal and teacher Nurul Afni, the homeroom teacher for grade V, to observe teacher activities, and teacher Charla Liuw, a grade IV teacher who was in charge of observing student activities.

In the preparation stage, the teacher begins the lesson with a greeting as a form of warm greeting to the students, followed by a prayer together. After that, the teacher takes attendance to ensure student attendance. Next, the teacher explains the learning identity, including the theme, sub-theme, subjects, and materials to be discussed. The teacher also provides apperception to connect the material with the students' experiences and conveys motivation. To support the learning process, the teacher explains the objectives and steps of the activity as well as the benefits of the Deep Learning learning model approach.

In the core activity stage, learning consists of five main steps, namely:

1. Orienting students to the problem: The teacher divides students into six groups, each consisting of 6-7 people. Students are asked to observe the pictures of the ecosystem contained in the Student Worksheet.
2. Organizing students to learn: The teacher asks students to observe pictures of objects that are divided into several parts as exploration material.
3. Guiding individual and group investigations: The teacher accompanies discussions between group members regarding pictures in everyday life that are divided into several parts.
4. Developing and presenting the results of the work: Students are asked to attach pictures of pieces of several objects that have been separated as a representation of their understanding of the fraction material.
5. Analyzing and evaluating the problem-solving process: The teacher directs the presentation of the results of the group discussion in front of the class. Other groups are asked to provide responses to the ongoing presentation. The teacher gives appreciation in the form of praise to each group to increase student motivation.

In the closing stage, the teacher asks students to conclude the learning outcomes as a form of reflection on the material that has been understood. The teacher also provides reinforcement for the day's learning, accompanied by moral messages and motivation for students. In closing, the teacher conveys an outline of the material that will be studied at the next meeting. Learning ends with gratitude and farewell greetings.

c. Observation Stage

The observation stage of cycle I is carried out during learning, namely there is an observation of teacher activities and student activities. For observation of teacher activities using the teacher activity observation sheet instrument observed by the homeroom teacher V, namely Nurul Afni, for observation of student activities using the Student Activity Observation Sheet Instrument observed by fellow researchers, namely Charla Liuw.

1. Observation of Teacher Activities Cycle I

Overall, the teacher's activities in the preliminary activities, core activities and closing activities in learning using the Deep Learning approach on fraction material obtained a value that was included in the good category. However, in each activity there were several shortcomings so that improvements were needed in the next cycle.

2. Observation of Student Activities in Cycle I

Students in the preliminary activities, core activities, and closing activities in the learning process using the Deep Learning learning approach model on fraction material obtained a percentage score of 69.31% which is included in the good category. However, in each activity there are still some shortcomings so that improvements are needed in the next cycle.

3. Learning Outcomes of Cycle I

After the teaching and learning process of cycle I took place, the teacher gave a test question to determine the students' abilities after the Deep Learning learning approach model was applied, followed by 32 students, with a minimum completion criterion of 75. The list of student learning test scores for cycle I in table 4.4 above, it is known that 17 students (53.33%) completed the test and 15 students (46.66%) did not complete the test. From here it can be said that learning in cycle I has not been completed.

d. Reflection Stage

At this reflection stage, there are several things that need improvement in the learning process using the Deep Learning learning approach model, namely in teacher activities, student activities. 15 students have not completed their learning outcomes. This is because they face several difficulties. That is, they do not have the courage to ask questions that are not understood, have not been able to conclude the material, etc. Learning has not been achieved in cycle I, because some students do not understand the material properly. Therefore, the researcher must conduct cycle II to improve the shortcomings of cycle I.

2. Cycle II

Cycle II was implemented to address several deficiencies identified in cycle I. Similar to cycle I, cycle II has four stages in classroom action research, namely the planning stage, implementation stage, observation stage and reflection stage.

a. Planning Stage

During the planning stage of cycle II, there are several things that researchers need to prepare, namely, determining the theme, sub-theme, learning, subjects and materials, and compiling Teaching Module II, Student Worksheets (LKPD), Teacher Activity Observation Sheet Instrument II, Student Activity Observation Sheet II for direct observation by observers during learning.

b. Action Implementation Stage

The action implementation stage in cycle II was implemented on March 21, 2025 using the Teaching Module for the Fractions with the Same Denominator material, Grade V students of SD Inpres Mapanget Barat participated in the learning, with a total of 32 students consisting of 12 male students and 30 female students. In this cycle II

research, the researcher was assisted by Mrs. Nurul Afni as the homeroom teacher of class V who helped to observe the assessment of teacher activities, and Charla Liuw who helped the researcher to observe student activities. Learning activities in this study were divided into three stages, namely the preliminary stage, the core activity stage and the closing activity stage. In the preliminary stage, the teacher started the learning with greetings and reading prayers. The teacher checked student attendance and explained the learning identity including the theme, sub-theme of the subject and material. The teacher inspired and motivated the students. The teacher then explained the learning objectives and applied the Deep Learning learning approach model.

c. Observation Stage

The observation stage of cycle II is carried out during the learning process, namely there is an observation of teacher activities and student activities. For the observation of teacher activities using the teacher activity observation sheet instrument observed by the homeroom teacher V, namely Mrs. Nurul Afni, for the observation of student activities using the Student Activity Observation Sheet Instrument observed by fellow researchers, namely Charla Liuw.

1. Observation of Teacher Activities Cycle II

The results of the observation of teacher activities in cycle II above, it can be seen that the teacher's ability to manage learning in cycle II has increased. In cycle II, the teacher's ability is in the very good category (86.67%), it is clear that the teacher's ability to manage the class is as expected. This is because the teacher has improved or reflected after the learning process.

2. Observation of Student Activities in cycle II

Student activities in learning have exceeded the figures in cycle I. At this stage, student activities reach the very good category (87.47%). This is because the teacher is more skilled in mastering the class, so students are also more active in the learning process so that student learning activities increase.

3. Learning Outcomes of Cycle II

After the teaching and learning process in cycle II, the teacher gave a test question to determine the students' abilities after using the Deep Learning learning approach model followed by 32 students, with a minimum completion criterion of 75.

d. Reflection Stage

At this reflection stage, there are several things that need to be improved in the learning process using the Deep Learning learning approach model, namely teacher activities, student activities. During the learning process, students are active in asking questions about something that students do not understand, their interest in learning is also getting better. The teacher's activity in managing the class is also getting better. Based on the data in cycle II, it can be seen that 27 students have completed learning with a percentage of 86.66% and 5 other students have not completed with a percentage of 13.33%. In cycle I, student completion (53.33%) and students who did not complete (46.66%) and increased in cycle II, student completion became (86.66%) while students who did not complete (13.33%). So it can be concluded that by using the Deep Learning learning approach model, there was an increase in student learning outcomes and student learning completeness was finally achieved in cycle II.

Discussion

This research is a type of Classroom Action Research (CAR). It was carried out in two cycles in class V of SD Inpres Mapanget Barat. Cycle I was carried out on Monday, March 17 and Cycle II was carried out on Friday, March 21, 2025. The purpose of the research on mathematics lessons, especially in fractions material, is to describe how teachers use the Deep Learning learning approach model to guide learning and how the Deep Learning learning approach model can be used to find out how students' activities are in the learning process. Specifically in improving student learning outcomes by using the Deep Learning learning approach model in mathematics subjects, especially fractions. Based on research using teacher activity observation sheets and student activity observation sheets, it can be explained as follows.

1. Teacher Activity Analysis

Observation of teacher activities to improve learning outcomes by using the Deep Learning learning approach model in mathematics subjects, fractions, was carried out by the homeroom teacher V, namely Nurul Afni. The percentage score was 69.44% with the category "Good" based on the results of activities carried out in cycle I, indicating that many indicators have not been able to be carried out by teachers in learning. This means that the teacher's ability to guide students individually or in groups in solving problems assigned to them in everyday life is not as expected, but rather affects the previously planned learning activity procedures. Cycle II has increased with a percentage score of 86.67% in the "very good" category. Using the Deep Learning learning approach model can increase teacher activity. This increase is due to improvements in teacher learning disabilities, where teachers are better at providing material, perceptions, and motivation than explaining learning steps using the Deep Learning learning approach model, this is of course because teachers always reflect when the learning process is complete.

2. Analysis of Student Activities

By using the Deep Learning learning approach model in the mathematics subject of fractions, it was carried out by my colleague, Charla Liuw, who observed student actions to improve their learning outcomes. Each cycle experienced an increase based on the results of observations of student activities. This is evident from the score obtained in cycle I of 69.31%. Student activity is still in the good category, because there are things that have not gone well, in asking or responding to questions. This is because students are not actively learning. Therefore, teachers must ensure that students are active during the learning process.

In cycle II, student activity increased with a percentage score of 87.50%, but was in the "very good" category. Teacher activity in cycle II increased compared to cycle I, the increase was due to deficiencies or errors that could be managed well in the learning process, such as easy-to-understand language, teacher assertiveness in conditioning the class, and learning media that are always updated so that students remain involved in learning.

3. Analysis of Learning Outcomes

Learning completion occurs when the value achieved meets the Learning Objective Completion Criteria (KKTP), which is 75 for each individual set by the school. By giving tests in each cycle, researchers can confirm and obtain how students' learning outcomes are in each cycle. The learning outcomes in cycle I are known that 16 students have completed (53.33%) while 14 students have not completed (46.66%). This is because students have not understood the questions or problems given. Learning outcomes increased in cycle II, it is known that there were 27 students who completed (86.66%) while 5 students did not complete (13.33%). The results of the cycle I and cycle II tests show that the Deep Learning learning approach model in the mathematics subject of fractions can improve the learning outcomes of class V SD Inpres Mapanget Barat.

Conclusion

1. Teacher activity in the learning process using the Deep Learning learning approach model in cycle I is categorized as good with a percentage score (69.44%), while in cycle II it is categorized as very good with a percentage score (86.67%) because it has increased. This increase is due to improvements in deficiencies during the learning process.
2. Student activity during the learning process using the Deep Learning learning approach model can be seen in cycle I with a percentage score (69.31%) included in the good category. In cycle II, student activity increased with a percentage score of (87.50%) included in the very good category. This increase is due to deficiencies or errors that can be adequately corrected in the learning process.
3. Improvement in learning outcomes during the learning process, it is known that in cycle I there were 17 students who completed (53.33%) while 15 students did not complete (46.66%). In cycle II, there were 27 students who completed (86.66%), while 5 students did not complete (13.33%). The results of the first and second cycle tests show that the Deep Learning learning approach model in the mathematics subject of fractions can improve the learning outcomes of students at SD Inpres Mapanget Barat.

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