



MODIFICATION OF THE ALPEN IN INCREASING STUDENTS' LEARNING OUTCOMES ON FRACTIONS LESSONS IN CLASS IV SDN 28 TIBAWA

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Article history:	Abstract:
Received: 7 th September 2021	This study aims to improve student learning outcomes for fractions and increase students' motivation to learn mathematics in grade IV SDN 28 Tibawa. This innovative work was carried out on fourth grade students of SDN 28 Tibawa with a total of 14 students consisting of 9 boys and 5 girls. To improve student learning outcomes, researchers modified the use of ALPEN teaching aids in learning. From the data obtained in accordance with the results of initial observations of student learning outcomes on the same material in the previous school year, it shows that student learning outcomes are low. This can be seen from the average score of students who only reached 67 (below the KKM 70) with a completeness of only 29%. After the learning was carried out by modifying the use of ALPEN teaching aids, there was an increase in student motivation and learning outcomes. Students' learning motivation increases as seen from student learning activities which generally reach 80%. The increase in student learning outcomes can be seen from the acquisition of an average score of 80 with a classical completeness of 86%. From these data, it can be concluded that the use of modified ALPEN can improve students' motivation and learning outcomes on fractions material in grade IV SDN 28 Tibawa.
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INTRODUCTION

The results of the 2018 PISA study released by the OECD (Organization for Economic CO-operation and Development) show that Indonesian students' mathematical abilities are still below average. Indonesia was only able to rank 72 out of 78 countries that took the test. The math score obtained only reached 379 with an OECD average score of 487 (a difference of 108 points). When compared with the results obtained in 2015, there was a decline in the mathematical ability of Indonesian students where in 2015 the score obtained was 386 from the OECD average score of 490 (a difference of 104 points). Even in the rankings, Indonesia was not able to get out of the bottom 10 from 2009 to 2018. Of course this is an alarm for all stakeholders, be it the government, teachers and parents, to be able to work together to improve the quality of education. Moreover, in welcoming the XXI century, students are required to have skills so that they can compete not only locally or regionally but more globally. Skills that must be possessed in the XXI century include skills in critical thinking (Critical Thinking) and problem solving (Problem Solving), so one of the basic skills is mathematical ability.

In mathematics, understanding concepts is the most important. The mathematical concept is of course abstract, so the task of the teacher is to change and package it into concrete so that it can be transferred to students according to their thinking characteristics. In an effort to instill mathematical concepts to students, it can be done through the development of learning aids. Especially in the fractional material, the development of learning aids becomes very important considering that the fractional material has a very high level of urgency.

In this study, the authors developed a teaching aid called ALPEN on fractional materials. This teaching aid has been used previously by researchers in 2015 so that in this study it will be further developed and maximized its use in learning by modifying the teaching aids that are integrated with the application of three stages of learning according to Brunner, namely Enactive, Iconic, and Symbolic. The learning stages are carried out sequentially from the concrete to the abstract with the aim that students can understand the concept of fractions well based on contextual experience.

As a consideration in carrying out study work, the author explores several studies that are relevant to the problem under study including:

1. Suparman Pilomonu (Ideal Mathedu Journal 2015) "The Use of ALPEN (Fraction Game Tool) in Mathematics

Learning with Fractional Numbers to Improve Student Learning Outcomes in Class IV Even Semester 2014/2015 Academic Year at SDN 28 Tibawa Kab. Gorontalo". The results showed that students were more active and learning outcomes also increased from the initial average score of only 55 students, then in the first cycle it became 86, and in the second cycle it rose to 94.

2. Hardiatmo Detuage (2017 Thesis) "Improving student learning outcomes adding common fractions using ALPEN (fraction game tool) in grade IV SDN 15 Limboto, Gorontalo Regency". The results showed an increase in learning outcomes from the first cycle the average score of students only reached 62.70, in the second cycle it rose to 78.66.

ALPEN before being modified consisted of two parts, namely the ALPEN Box and the Pen. The ALPEN box is a rectangular part that has an area in the middle as a fraction indicator and two empty places as a Pen addition and subtraction area (fraction). The pens themselves are pieces that represent fractional numbers.

After being modified, improvements were focused on the operation of counting fractions by separating the arithmetic operation area (Area A) from the area indicating the result of the arithmetic operation (Area B).

RESEARCH METHOD

This research is the best practice of researchers in educational units where researchers work with the aim of being able to describe the success achieved in learning. This best practice was carried out in class IV at SDN 28 Tibawa by starting with initial observations on the results of learning mathematics. then the researcher identified the problem and conducted a literature review. The researcher then designed the learning by making modifications to the ALPEN teaching aid which was integrated with the Bruner learning stages. In the implementation of learning using the incorporation of mathematics learning stages according to Brunner, namely Enactive, Iconic, and Symbolic which are carried out sequentially to lead students to understand mathematical concepts from the concrete to the abstract. Learning begins with raising daily problems related to the subject matter. Then students are invited to observe and ask questions about the issues raised. At this stage students have entered the Enactive stage. The contextual problems were then explored and transformed into semi-concrete forms such as images and animations. At this stage students enter the iconic stage. Furthermore, students are invited to be able to transform their understanding into number symbols. At this stage students enter the symbolic stage, but have not been introduced to mathematical formulas. The Iconic and Symbolic stages are carried out repeatedly until students really understand the concept being taught by the teacher. The learning technique using Brunner's learning stages is carried out with a cycle system so that if students are not yet capable at certain stages, the learning can be repeated from the initial stage.

RESULTS AND DISCUSSION

In order for learning using ALPEN teaching aids to be carried out properly, it is necessary to do good planning. The planning includes the preparation of lesson plans using a combination of several methods, namely demonstration, experiment and discovery. To convey the subject matter the author uses learning techniques according to Brunner's learning stages where students understand the concept of lessons from the concrete to the abstract. To support student learning activities, worksheets are made which will be done both in groups and individually. RPP is also prepared with an evaluation or assessment consisting of attitudes, knowledge, and skills.

Learning mathematics on fractions after using modified ALPEN teaching aids obtained the following results:

1. Student Learning Motivation Increases

During the learning process, students showed high enthusiasm from the start of the lesson. This can be seen from the concentration of students' attention to the teacher's very good explanation at the beginning of the lesson. All students paid close attention when the teacher was explaining the concept of fractions through a piece of cake which was divided into several parts. When the teacher begins to explain the concept of fractions through ALPEN. It looks like the students are curious about the props and want to try it themselves immediately. So that students can understand the concept of adding and subtracting fractions through ALPEN, students are explained beforehand about how to use ALPEN. After understanding how to use ALPEN, then students take turns demonstrating addition and subtraction of fractions using ALPEN. Students are very interested in the teaching aids used because it makes it easier for them to understand the lesson. Students are active in asking things that are not yet known and discussing in groups. Even in working on the questions, students look very happy and not burdened so that this can build problem solving skills.

2. Student Learning Outcomes Increase

High student motivation has a positive impact on improving learning outcomes. This is due to the use of ALPEN teaching aids which make it easier for students to understand the material. Though the fraction material itself is a material that is very difficult for students to understand. However, by using ALPEN students learn fractional material contextually and then slowly the contextual experience is transformed into the concept of fractions.

DISCUSSION

The use of ALPEN teaching aids in mathematics learning, especially fractions, has an impact on increasing students' learning motivation. As shown in table 3.2 above, in the aspect of student readiness to receive subject matter, the percentage is 100%. This means that all students have an interest in the material to be taught. In the aspect of student activity in solving problems, students begin to be able to solve problems and actively ask questions about things that are known. The percentage obtained in this aspect is 80%. In the aspect of student activity doing exercises, the percentage is 73%. It can be said that in general students are actively working on the given practice questions. In the

aspect of participation in closing the activity, it appears that students can make conclusions from the material, improve or add to the conclusions of their friends who are still lacking and record conclusions or summaries of the material provided. This is indicated by the percentage that reaches 80%.

The use of ALPEN teaching aids has also improved student learning outcomes. As shown in table 3.2, as many as 12 students managed to exceed the KKM 70 with an average score of 80.14 students. If the percentage of classical learning completeness reaches 86%. This improvement in learning outcomes cannot be separated from the effect of using the ALPEN demonstration on the fraction material. Even though it is known that fractional material is material that is difficult for students to understand. However, with the use of ALPEN, the difficulty can be reduced because by using ALPEN teaching aids, it will be easier for students to understand the lesson.

Based on the discussion above, supported by existing factual data, it can be concluded that the use of ALPEN can increase student motivation and learning outcomes.

CONCLUSION

Embedding concepts in mathematics, especially in fractions, is very important. Failure to understand the concept of fractions will make it difficult for children to understand the development of fractional material in higher grades. Through the use of ALPEN teaching aids in mathematics learning, it can help children understand the concepts of fractions, equivalent fractions, fraction comparisons, and addition and subtraction of fractions. With a good understanding of the concept it will improve student learning outcomes and can make it easier for them to understand the next lessons.

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