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# EFFORTS TO IMPROVE JUNIOR HIGH SCHOOL STUDENT LEARNING OUTCOMES BY USING PRODUCTS

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**ABSTRACT**
This research aims to improve students' mathematics learning outcomes through the use of teaching aids and to find out whether the use of teaching aids can improve student learning outcomes in fractional number teaching material. The subjects in this research were 25 class VII students of SMP Muhammadiyah 1 Medan and the object of this research was the use of teaching aids to improve student learning outcomes. From the learning outcomes tests carried out in cycle I, the average percentage of students' classical ability was 64.6% and in cycle II it was 82.2%. From these results, it can be concluded that the application of teaching aids can increase students' ability to solve problems in class VII SMP Muhammadiyah 1 Medan by 70%.
**Keywords: Learning Outcomes, Teaching Aids**

## INTRODUCTION

Nowadays, the development of science and technology is experiencing very rapid development. One of the challenges of education today is building skills in information and communication technology, critical thinking skills, problem-solving skills, effective communication skills, and collaboration skills (Vera & Primasari, 2022). Thus, improving the quality of education is felt to be a need for a nation that wants to progress, with the belief that quality education can support quality in all fields. Therefore, education needs to receive great attention to catch up in the fields of science and technology. (Ujeng et al., 2016). Education is a process of helping humans develop themselves, so that they can face all changes and problems with an open and creative attitude without losing their identity (Suwardi et al., 2014). As stated in the objectives of National Education, the contents of which are to develop abilities and form character, as well as a dignified national civilization to educate the life of the nation, aims to develop the potential of students to become human beings who believe in and are devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens (Indonesia, 2003). In line with the goals of National Education, mathematics learning is a lesson that not only provides various knowledge and skills, but also encourages students to develop an understanding and appreciation of principles, values, and processes, and foster reasoning power, think logically, systematically, critically, creative, open, and curious. (Suwardi et al., 2014).

Mathematics is one of the subjects that plays an important role in education. This can be seen from the fact that there are more school hours compared to other subjects. Mathematics lessons in the implementation of education are given to all levels of education from elementary to high school and even at universities. However, the reality shows that many students do not like mathematics, because it is considered the most difficult and boring subject. Based on the results of observations made, it is known that many students do not understand mathematics subject matter, so students are less interested in studying mathematics and this results in low student learning outcomes. To overcome the problem of mathematics learning difficulties, which means improving learning outcomes, teachers as an important factor in education are given responsibility. Teachers must encourage, guide, and provide learning facilities for students to achieve learning goals. So, the main task of a mathematics teacher is to convey the information or knowledge they have in the right way so that it does not cause failure in teaching, which means low student learning outcomes in mathematics lessons. One of the causes of low student mathematics learning outcomes is the application of inappropriate learning models or still using conventional learning models, such as lectures, giving assignments, and learning that is dominated by teachers and involves few students, so that interaction between students during learning is very minimal. Learning outcomes are changes in individual behavior from unbiased to capable which includes three aspects, namely cognitive, affective, and psychomotor (Muslimah, 2021). According to Erawati (2022), learning outcomes can be interpreted as the results of the learning process, both cognitive, affective, and psychomotor with assessments that are by the learning curriculum. In simple terms, student learning outcomes are the abilities that students gain after going through learning activities (Arviana et al., 2020). According to Nana Sudjana (1989): "Learning results are not only useful for knowing whether or not instructional objectives have been achieved but also as feedback for efforts to improve the teaching and learning process. Meanwhile, according to Batubara & Ammy (2018), learning outcomes are the abilities that a person has after receiving their learning experience. The learning outcome to be achieved is understanding concepts so that in the learning process, it is hoped that teachers can transfer the concepts they have to students.

In understanding mathematical concepts, students need to be given a series of real, logical learning activities, so that learning aids are needed in mathematics learning, such as mathematics teaching aids (Permatasari et al., 2021). Thus, teaching aids are one of the efforts to improve learning outcomes in mathematics, namely by using teaching aids as aids in the learning process. The use of teaching aids in mathematics learning is a series of knowledge, skills, concepts, principles, or rules that are given to students step by step. Moh. Uzer Usman (1994) said: "Effective learning must start with direct experience or concrete experience and lead to direct experience or learning will be more effective if assisted by teaching aids than without being assisted by teaching aids." The use of teaching aids in learning will improve learning outcomes. Teaching aids are teaching media that contain or convey the characteristics of the concept being studied. According to Dahniar (2022), teaching aids are tools that can help the teaching and learning process so that the communication process can be successful and effective, as well as making it easier to provide understanding to students in following the learning process. Meanwhile, according to

Suryani et al., (2023), props are manipulative objects that will help teachers when explaining lesson material and make it easier for students to understand lesson material.

Props are one of the learning facilities that can be used to attract students' attention or progress in learning. E. T. Rusefendi (1993) said that: "In doing mathematics we must try so that children understand more and participate in mathematics lessons more. Children will be more interested in mathematics if the lesson is presented well and interestingly. By using teaching aids, children will be more interested in mathematics." Furthermore, E. T. Rusefendi (1993) said that: "Children have difficulty imagining geometric shapes. This is because the talents and abilities possessed by children depend entirely on their ears, eyes, and the movement of objects. Teaching aids will help children in learning mathematics because they are through pictures and real objects." Many models or learning aids have been developed to overcome problems in education that occur in the field. To improve learning outcomes, a different learning attitude is needed, more open and challenged to play a role, and actively providing as many ideas as possible. Results from several mathematics education experts show that teachers are unable to use a variety of teaching aids or learning models, are reluctant to change teaching aids that are already considered correct and effective, and do not pay attention to the need to develop logical, critical and creative thinking patterns in learning mathematics. Many mathematics failures in schools are caused by the use of teaching aids or methods that are not suitable for students' learning methods. Mathematical teaching aids are a set of concrete objects that are made, designed, arranged, and used to help instill concepts or principles in mathematics. Through teaching aids, abstract concepts can be presented in model form, so that students can more easily understand mathematics.

## METHOD

Classroom Action Research (PTK) which includes planned research procedures including Planning, Action, Observation, and Reflection activities. This research process uses a cycle where the cycle will continue until the search index is successfully filled. Indicators of research success must be achieved so that the cycle does not continue. The criteria for assessing students' mathematical critical thinking abilities are said to be successful if they achieve 75% classical success.

1. Planning: This planning includes asking permission from the school, namely the principal, and consulting with the mathematics teacher, then preparing learning facilities by making lesson plans, teaching aids, questions, and observation sheets.
2. Action: The activities carried out at this stage are carrying out learning as arranged in the learning plan. Meanwhile, the mathematics teacher observes ongoing activities.
3. Observation: At this stage, observations are made of the implementation of the activities carried out based on the learning plan, given a test of 5 (five) essay questions to determine student learning outcomes.
4. Reflection: This stage is carried out to analyze and give meaning to the data obtained so that conclusions can be drawn from the actions that have been taken. The results of this reflection are used as a basis for preparing plans for the next cycle if the results of the actions taken by the researcher do not achieve the desired results.

According to Elfrianto & Lesmana (2022), data collection instruments are tools used in research or research to collect various types of information that are processed quantitatively and arranged systematically. To obtain this research data, researchers will use the following instruments:

1. Test: Learning outcomes tests are carried out to find out whether all the learning material that is classified as important has been mastered as well as possible by students. Before the test is tested, its validity and reliability will first be recognized.
2. Observation: Observation is an observation activity on research subjects that will be carried out to determine student activities during learning activities. The observations carried out are structured observations. According to Nurkancana Wayan (1986) said that: "Structured observation is where all the activities of the observation officer have been determined based on a framework that contains factors that have been categorized.
3. Interview: Interviews are carried out orally in individual face-to-face meetings which focus on the problems that have been detailed regarding the student's learning outcomes.

## RESULTS

This research was carried out in 4 meetings, by the learning plan that had been made. The research subjects were students of Muhammadiyah 1 Medan Middle School Class VII. Where the research subjects chosen were Class VII Integrated II, totaling 25 students, consisting of 15 male students and 10 female students. In this research, the object of research is the use of teaching aids in class VII fractional number teaching materials at SMP Muhammadiyah 1 Medan as an effort to improve student learning outcomes. To find out the problem, this can be done by giving an initial test to the research subjects. This initial test aims to determine students' initial abilities and to get an idea of the difficulties students experience in solving fraction number problems. From the data obtained from the initial test at meeting I, it can be concluded that students' initial ability to understand the prerequisite material for fractions is still very low. This can be seen from the initial test carried out on students, it was found that only 3 students out of 25 students achieved complete learning (score $\geq 70$) while the other 22 students had not yet completed it. The class average score obtained from 25 students on this initial test was 36.8. Complete results can be seen in the following table:

**Table 1.** Description of Student Learning Outcome Levels in the Preliminary Test

| No | Levels of Understanding | Category | Many Students | Percentage |
|---|---|---|---|---|
| 1 | 90% – 100% | Very high | 0 | 0% |
| 2 | 80% – 89% | High | 2 | 8% |
| 3 | 65% – 79% | Enough | 1 | 4% |
| 4 | 55% – 64% | Low | 8 | 32% |
| 5 | 0% – 54% | Very Low | 14 | 56% |
| | Amount | | 25 Students | 100% |

Based on the results of the initial test, the problem is that there are still students who do not understand the basic concept of fractions, there are still students who are not careful in carrying out arithmetic operations and there are still students who have difficulty in sorting and making number lines. Given the problems above, a solution to the problem is designed which is also an action plan, namely:

1. The teacher plans learning strategies using teaching aids
2. The teacher prepares learning facilities that support the implementation of this research action.
3. Prepare questions.

**Cycle I Learning Results**

The learning process carried out at the second meeting in cycle I by applying teaching aids was carried out in the following stages:

- The teacher informs that the material to be studied is fractions and gives several examples.
- Teachers motivate students to be more active in the learning process by informing them of initial tests.
- The teacher allows students to ask the teacher about material they do not understand.
- The teacher gives questions in the form of tests regarding fractions.
- The teacher makes observations and interviews with students.

Determination of the learning stages carried out is to determine the increase in student learning outcomes in mathematics lessons

**Table 2.** Description of Student Learning Outcome Levels in Cycle I

| No | Levels of Understanding | Category | Many Students | Percentage |
|---|---|---|---|---|
| 1 | 90% – 100% | Very high | 0 | 0% |
| 2 | 80% – 89% | High | 0 | 0% |
| 3 | 65% – 79% | Enough | 10 | 40% |
| 4 | 55% – 64% | Low | 10 | 40% |
| 5 | 0% – 54% | Very Low | 5 | 20% |
| | Amount | | 25 Students | 100% |

From the table above, it can be seen that the average value of learning outcomes obtained from 25 students in cycle I was 64.6% and this data shows that learning outcomes are not by the set target, namely 70%, so it is necessarily carried out in the next cycle.

**Observation Results**

At the time of acting, the researcher was observed by the Mathematics Study Teacher of Class VII Integrated II. The teacher observed the researcher's actions in carrying out learning with teaching aids to improve student learning outcomes in fractional number teaching material. Based on the results of observations, it was found that the researcher was

not optimal in carrying out teaching and learning activities using teaching aids. The delivery of material by the researcher is by the teaching plan that has been made. However, researchers are still nervous or awkward in implementing learning with teaching aids. Researchers in motivating students are also less than optimal in being active in learning activities. Researchers in guiding students are still not optimal in solving problems given when students ask questions.

**Reflection**

The problems that occurred in the implementation of cycle I actions were:

- Students have difficulty understanding the questions, so they cannot solve the questions using various solution methods.
- Students run out of ideas for solving problems, this can be seen from the lack of students looking for alternative solutions to solve the same problem.
- Lack of student initiative, this can be seen from students not being able to respond by making their conclusions and not being able to respond to the teacher's explanation by proposing relevant examples.

To fix problems and increase the success achieved in cycle I, activities were held before cycle II, namely:

- The teacher explains material that students do not understand and gives examples of questions that require student learning outcomes using teaching aids.
- the teacher makes questions as exercises to be done by all students and asks one of the students to do it on the blackboard.

**Cycle II Learning Results**

In cycle II, the learning process was held in 2 meetings, namely meetings III and IV. The learning process is carried out after applying teaching aids as learning media with the following stages:

- The teacher informs that the material to be studied is from everyday problems that involve or use fractions
- Teachers motivate students to be more active in the learning process by informing them of previous test results.
- The teacher gives several examples of questions related to everyday life
- The teacher supervises and pays attention to the progress of the learning process carried out by students
- The teacher allows students to ask the teacher about material they do not understand.

Determination of the learning stages carried out is to determine the increase in student learning outcomes in mathematics lessons.

**Table 3.** Description of Student Learning Outcome Levels in Cycle II

| No | Levels of Understanding | Category | Many Students | Percentage |
|---|---|---|---|---|
| 1 | 90% – 100% | Very high | 7 | 28% |
| 2 | 80% – 89% | High | 9 | 36% |
| 3 | 65% – 79% | Enough | 9 | 36% |
| 4 | 55% – 64% | Low | 0 | 0% |
| 5 | 0% – 54% | Very Low | 0 | 0% |
| | Amount | | 25 Students | 100% |

From the learning outcomes data above, it can be seen that the average value of student learning outcomes is 82.2% and this data shows that the learning outcomes are by the target that has been set, namely 70%, so there is no need for the next cycle.

**Observation Results**

At the time of acting, the researcher was observed by the Mathematics Study Teacher of Class VII Integrated II. The teacher observed the researcher's actions in carrying out learning with teaching aids to improve student learning outcomes in fractional number teaching material. Based on the results of observations at the third meeting, it was found that the researcher was quite good at carrying out teaching and learning activities using visual aids, and at the fourth meeting, it was found that the researcher had been optimal in carrying out teaching and learning activities using teaching aids. The delivery of lesson material is clear and systematic in the teaching plan. Researchers are more focused on guiding the activities of students who have difficulty solving the problems in the questions. Researchers provide opportunities for students to ask questions and other learning activities and researchers are better at motivating students.

**Reflection**

In general, the implementation in cycle II went well and was conducive. Classical learning completeness has been achieved by using teaching aids. Thus, it was found that by providing learning with teaching aids, students' mathematics learning outcomes increased. This can be seen from the analysis of test results carried out after the end of cycle II.

**DISCUSSION**

This research describes efforts to improve students' mathematics learning outcomes by using teaching aids in fractional number teaching material in Class VII of SMP Muhammadiyah 1 Medan. Judging from the increase in pre-test and final test scores as well as student interactions in learning, it can be concluded that student learning outcomes have increased. Through learning with teaching aids combined with methods of explanation (expository), question and answer, and practice, students are more active in expressing their ideas, rich in initiative, and putting forward their opinions without fear, which can improve mathematics learning outcomes. In this way, students' absorption of lesson material will be

more optimal, so students will be more creative. Based on the results of observations made at each meeting, initially, the use of time was less effective and classroom conditioning was still lacking, because students were not yet accustomed to the learning being carried out. Apart from that, there is a tendency for junior high school students to think that mathematics and other exact sciences do not need to be studied in depth, resulting in them not learning optimally. Other things that were important to note during the observation included that students were not used to doing class percentages, so they became somewhat awkward in expressing their creative ideas, students' learning resources were very lacking, and students were used to solving routine questions. However, after experiencing the learning process several times, students began to enjoy learning using teaching aids. This indicates that student activity during the learning process has increased.

**Table 4.** Description of Student Ability Levels for Each Cycle

| Mastery Percentage | Ability Levels | Initial Test | Cycle I | Cycle II |
|---|---|---|---|---|
| **90% – 100%** | Very high | 0 | 0 | 7 |
| **80% – 89%** | High | 2 | 0 | 9 |
| **65% – 79%** | Enough | 1 | 10 | 9 |
| **55% – 64%** | Low | 8 | 10 | 0 |
| **0% – 54%** | Very Low | 14 | 5 | 0 |
| ∑ | | 25 | 25 | 25 |
| **Class Average** | | 36,8% | 64,6% | 82,2% |
| **Classical Completion Percentage** | | 12% | 40% | 100% |
| **Incomplete Percentage** | | 88% | 60% | 0% |

## CONCLUSION

Research conducted by providing the application of fractional number theory using teaching aids aimed at improving students' mathematics learning outcomes concluded that: The average value of students' mathematics learning outcomes before applying fractional number theory using teaching aids was 36.8% with the criteria for learning outcomes still being insufficient. After applying fractional number theory using teaching aids in cycle I, the average value of students' mathematics learning outcomes was 64.6% with medium criteria. So the researchers continued in the next cycle. In cycle II the average score of students' mathematics learning outcomes was 82.2% with good criteria. This means that the average value obtained has reached the desired target, namely 70%. So the researcher did not continue to the next cycle. Teachers have been able to improve the implementation of teaching and learning activities by applying teaching aids as shown by the results of student learning observations, namely 56.26% in cycle I, increasing to 82.4% in cycle II.

## REFERENCES

Arviana, A., Syahrilfuddin, & Antosa, Z. (2020). Analisis Penyebab Rendah Hasil Belajar Siswa Pada Mata Pelajaran Matematika Kelas IVB SD Negeri 147 Pekanbaru. *Prosiding Seminar Nasional Pendidikan Guru Sekolah Dasar Fakultas*, 28–34. https://unimuda.e-journal.id/jurnalbahasaindonesia/article/download/952/582

Batubara, I. H., & Ammy, P. M. (2018). Pengaruh Model Pembelajaran Berbasis Masalah Terhadap Hasil Belajar Mahasiswa. *Biblio Couns: Jurnal Kajian Konseling Dan Pendidikan*, *1*(2), 43–53. https://doi.org/10.56393/lentera.v2i1.1155

Dahniar. (2022). Penggunaan Alat Peraga Dalam Pembelajaran. *Azkia: Jurnal Aktualisasi Pendidikan Islam*, *19*(2), 20–32.

Elfrianto, P. D. H., & Lesmana, G. (2022). *Metodologi Penelitian Pendidikan*.

Erawati, D. (2022). Meningkatkan Motivasi dan Hasil Belajar Peserta Didik Melalui Penerapan Model Pembelajaran Problem Based Learning Pada Mata Pelajaran Matematika Kelas 1 SD Negeri 6 Pajar Bulan. *SHEs: Conference Series*, *5*(5), 1086–1093. https://jurnal.uns.ac.id/shes

Indonesia, U.-U. R. (2003). *UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 20 TAHUN 2003 TENTANG SISTEM PENDIDIKAN NASIONAL DENGAN RAHMAT TUHAN YANG MAHA ESA PRESIDEN REPUBLIK INDONESIA*.

Kemp, Jerrol E., (1997), *Proses Perancangan Pengajaran*, Bandung: ITB.

Muslimah, U. (2021). Peningkatan Hasil Belajar Matematika dengan Menggunakan Model Problem Based Learning pada Siswa Kelas V Sekolah Dasar. *Kalam Cendekia: Jurnal Ilmiah Kependidikan*, *9*(1), 444–450. https://doi.org/10.20961/jkc.v9i1.53869

Permatasari, K. T., Apriyani, E., & Fitriyana, Z. N. (2021). Pengembangan Media Pembelajaran Matematika Berupa Alat Peraga Jam Sudut. *Jurnal Pendidikan Matematika Dan Sains*, *9*(2), 83–88. https://doi.org/10.21831/jpms.v9i2.25823

Rusefendi, E.T., (1993), *Pendidikan Matematika*, Jakarta: Depdikbud.

Sudjana, Nana, (1989), *Penilaian Hasil Belajar Mengajar*, Bandung: Remaja Rosdakarya.

Suryani, R. M., Sutisnawati, A., & Maula, L. H. (2023). Peningkatan Hasil Belajar Matematika Melalui Penggunaan Alat Peraga Benda Manipulatif Sekolah Dasar. *Jurnal Didika : Wahana Ilmiah Pendidikan Dasar*, *9*(1), 163–176. https://doi.org/10.29408/didika.v9i1.18738

Suwardi, S., Firmiana, M. E., & Rohayati, R. (2014). Pengaruh Penggunaan Alat Peraga Terhadap Hasil Pembelajaran Matematika pada Anak Usia Dini. *JURNAL Al-AZHAR INDONESIA SERI HUMANIORA*, *2*(4), 297–305. https://doi.org/10.36722/sh.v2i4.177

Ujeng, Husain, S. N., & Paudi, R. I. (2016). Peningkatan Hasil Belajar Siswa Dengan Menggunakan Alat Peraga IPA Kelas IV SD Inpres 1 Siney. *Jurnal Kreatif Tadulako*, *4*(6), 186–203. https://doi.org/10.31949/jee.v1i1.803

Usman, Moh. Uzer, (1994), *Menjadi Guru Profesional*, Bandung: Pt. Remaja Rosdakarya.

Vera, I. C., & Primasari, M. (2022). Analisis Effect Size: Pengaruh Penggunaan Alat Peraga dalam Pembelajaran IPA SMP Terhadap Hasil Belajar Siswa. *Natural Science: Jurnal Penelitian Bidang IPA Dan Pendidikan IPA*, *8*(2), 163–168.

Wayan, Nurkancana dan Sumartana, (1986), *Evaluasi Pendidikan*, Surabaya: Usaha Nasional.