

PROFILE OF STUDENT LEARNING OUTCOMES ON THE CONCEPT OF SORTING NUMBERS WITH A REALISTIC MATHEMATICS EDUCATION

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Abstract. This study aims to determine the profile of student learning outcomes on the concept of sequencing numbers with a Realistic Mathematics Education in grade I SD Muhammadiyah Ambon. The type of research used in this study is Descriptive Quantitative, which is research that aims to obtain data and describe the profile of student learning outcomes. The subjects of this study were all grade I students of SD Muhammadiyah Ambon, totaling 30 people. The variable used in this study is a single variable, namely the profile of student learning outcomes. The instruments used in data collection are test questions and observation guidelines. Data analysis is carried out descriptively, namely calculating the average score and percentage of completion of learning students. The results of the analysis show that it can be concluded that, on average, learning outcomes using the Realistic Mathematics Education achieved quite maximum student learning outcomes. Based on the results of the analysis of students' initial test scores, the average score was 58.33 with a percentage of completion as much as (26.67%) and increased in the final test results to 88.33 with a complete percentage of 93.33%. The number of students who achieved a minimum completion score on the initial test amounted to 8 students and increased in the final test by 28 students.

Keywords: Realistic Mathematical Approach, Learning Outcomes, Sequencing Numbers

Abstrak. Penelitian ini bertujuan untuk mengetahui profil hasil belajar siswa pada konsep mengurutkan bilangan dengan Pendekatan Matematika Realistik kelas I SD Muhammadiyah Ambon. Jenis penelitian yang digunakan dalam penelitian ini adalah Deskriptif kuantitatif, yaitu penelitian yang bertujuan untuk memperoleh data dan mendeskripsikan tentang profil hasil belajar siswa. Subjek penelitian ini adalah seluruh siswa kelas I SD Muhammadiyah Ambon yang berjumlah 30 orang. Variabel yang digunakan dalam penelitian ini adalah variabel tunggal, yaitu profil hasil belajar siswa. Instrumen yang digunakan dalam pengumpulan data yaitu soal tes dan pedoman observasi. Analisis data dilakukan secara deskriptif yaitu menghitung nilai rata-rata dan persentase ketuntasan siswa pembelajaran. Hasil analisis menunjukkan bahwa dapat disimpulkan bahwa, rata-rata hasil belajar dengan menggunakan Pendekatan Matematika Realistik mencapai hasil belajar siswa yang cukup maksimal. Berdasarkan hasil analisis nilai tes awal siswa, nilai rata-ratanya adalah 58,33 dengan presentase ketuntasan sebanyak (26,67%) dan meningkat pada hasil tes akhir menjadi 88,33 dengan presentase ketuntasan 93,33%. Jumlah siswa yang mencapai nilai ketuntasan minimal pada tes awal berjumlah 8 siswa dan meningkat pada tes akhir sebanyak 28 siswa.

Kata Kunci: Pendekatan Matematika Realistik, Hasil Belajar, Mengurutkan Bilangan

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INTRODUCTION

The rapid advancement of science and technology demands quality resources (Rusydi et al., 2018). The improvement of human resources is a condition for achieving development. One of the vehicles to improve human resources is the improvement of quality education (Nurwijayanti et al., 2019). As a determining factor for the success of development, the quality of human resources must be improved through various educational programs that are carried out systematically and directed based on interests that refer to the advancement of science and technology (Black & Yasukawa, 2016). Education is a stage of institutional activity used to perfect individual development in mastering knowledge, habits, attitudes, and so on. Teaching and learning is an activity of educational value, coloring the interaction between educators and students (Hudiyono, 2001). Interactions of educational value due to the teaching and learning activities carried out are directed to achieve certain goals formulated before teaching is carried out (Lembke et al., 2016).

In educational interaction, students do not always have to be given or trained; they can search, determine, solve problems and train themselves. Applying some principles of classroom management is another effort that cannot be ignored casually (Mustika & Kinanti, 2018). The teacher carries out the chosen approach to support classroom management. Good classroom management will also birth good teaching and learning interactions. The function of education helps develop all potential skills and characteristics of students, both intellectual, social, affective, and physical aspects of motor (Afacan & Gürel, 2019). The educational process occurs in an educational environment, namely the family, school, and community (Azizah et al., 2018).

The school environment as one of the educational institutions plays an essential role in preparing the next generation. The educational process at school is carried out through teaching and learning (Prasasti et al., 2019). The effectiveness of students' absorption of difficult and complicated learning materials with the help of tools, mathematics is taught not only to know and understand what is contained in mathematics itself, but mathematics is taught aims to help train the mindset of all students in order to be able to solve problems critically, logically, meticulously and precisely (Kusumah et al., 2020). In addition, it is also so that students form their personalities and are skilled in using their mathematics in everyday life. This is to the objectives of learning mathematics in schools, namely putting pressure on the arrangement of reason and the formation of student attitudes and skills in applying mathematics (Andayani & Amir, 2019).

Students' cognitive abilities can be seen from the effectiveness of students and students' independence and ability to learn. It is not easy to carry out teaching and learning activities to improve students' cognitive abilities (Sujarwanto et al., 2014). A great many students were found who scored low in several subjects. Some get high scores in some subjects, but they can still not apply well in knowledge, skills, and other attitudes and situations (Jumroh et al., 2018).

Based on the observations and experiences that researchers as a class teacher found several things that became problems with mathematics learning in elementary schools, especially in grade I, including low student learning motivation, students played more than paying attention to the teacher's explanation when asked by the teacher no one wanted to answer. However, they answered simultaneously so that the voice was not clear, and Students sometimes made noise when the teacher explained or taught. The learning approach model used is less varied; the lack of use of learning tools or media such as the form of number images or other objects in the learning process.

Based on the above problems, one of the approaches considered quite effective is the Realistic Mathematics Education (RME). Realistic Mathematics Education is an approach or way of learning mathematics based on ideas that are explored and developed (Febriyanti & Irawan, 2017; Wahyuni, 2016), wherein the learning process students are faced with the real world (Gravemeijer & Terwel, 2000; Kamsurya, 2019), which later the process can increase the activity and insight into student thinking (Budinski & Milinkovic, 2017; Setyaningsih et al., 2019; Yetim Karaca & Özkaya, 2017). This study aims to determine the profile of student learning outcomes on the concept of sequencing numbers with a Realistic Mathematics Education in grade I SD Muhammadiyah Ambon.

METHOD

The type of research used in this study is Descriptive Quantitative, which is research that aims to obtain data and describe the profile of student learning outcomes. The subjects of this study were all 30 students in the first grade of SD Muhammadiyah Ambon. The variable used in this study is a single variable is the profile of student learning outcomes with a Realistic Mathematics Education. Instruments in the form of test questions and observation guidelines were used (Sugiyono, 2014). Tests are used to determine student learning outcomes, and observation guidelines are used to determine student learning activities (Arikunto, 2012).

Two observers carried out observations by observing various activities and activities carried out by students during the learning process in class using a realistic mathematical

approach in grade I students of SD Muhammadiyah Ambon to know the interest in learning, attention to participation, and the student presentation process. Pre-tests are carried out on students before learning using a realistic mathematical approach to know the initial ability of students in learning. The final test is carried out after learning using a realistic mathematical approach to know the final ability of students after the learning process.

To find out the improvement of mathematics learning outcomes, the concept of sequencing numbers with the Realistic Mathematics Education (RME) approach, the author uses the formula:

1. Determining the Average Value

$$\bar{x} = \frac{\sum x_i}{N}$$

2. Determining the Percentage of Learning Outcomes

$$\% \text{ Ketuntasan} = \frac{\sum x}{N} \times 100\%$$

RESULTS

Learning with a Realistic Mathematics Education

The implementation of learning carried out by applying a realistic mathematical approach in the classroom is very significant compared to the learning process that takes place classically used by teachers in general. The learning process classically tends to be monotonous. Teachers dominate the learning process more, so students use less ability to solve various problems during the learning process. The implementation of learning that occurs classically based on observations made by researchers, almost all students just sit, stand still, and listen to explanations made by the teacher. The completion of the questions the teacher gives is carried out only by certain people and no more than five students who seem to be classically active in the learning process. The worst situation occurred in students who had not previously taken the Kindergarten route. In these students, until the investigator carried out this study, several students did not know the numbers 1 to 20 correctly.

Different things happen when researchers carry out learning using a realistic mathematical approach. When researchers carry out learning, students seem motivated to participate in learning activities. Students seem to be very active and happy to participate in learning activities, especially when the researcher asks students to tell their birthday activities. Students are told to be enthusiastic, and other students listen carefully.

Based on the observations made by observer I and observer II, interest in learning, attention, participation, and the presentation process was significantly increased compared to

the classical learning process. This is reflected in the activities carried out by students during the learning process. In the learning process, students' interest in learning can be seen in their enthusiasm of students in learning. Students are so excited when learning mathematics using a realistic mathematical approach. This is accompanied by the attention of students when researchers start learning activities and begin to bring students' thoughts into things that are tangible in learning. Almost all students showed a high attitude of enthusiasm and attention, even when asked to solve questions on the blackboard or simply answer questions submitted by researchers orally.

The results achieved in learning with a realistic mathematical approach are very maximum, as evidenced by student learning outcomes, of which approximately 90% achieve results when the test obtains a score of 80 or even more. Another thing that is obtained in this learning is that students who previously tended to be passive during classical learning seemed so active and willing to try to solve various problems and questions given by researchers. In the appendix to the documentation, figures 3 and 5 are students who have not studied the numbers 1-20 well, but in this lesson, they have been able to know these numbers and have even been able to sort them.

Student Learning Outcomes with a Realistic Mathematics Education

Based on the explanation of data analysis techniques, to find out the profile of student learning outcomes with a realistic mathematical approach, the concept of sorting numbers is shown in table 1 below.

Table 1. Student Pre-test Result Data

Level Qualification	Frequency	Percentage	Letter Value	Predicate
81 – 100	1	3,33%	A	Excellent
65 – 80	7	23,33%	B	Good
50 – 64	17	56,67%	C	Enough
0 – 49	5	16,67%	D	Less

Source: Student learning outcomes

Based on the table above, at the time of the pre-test, it can be seen that the level of mastery of the material in grade I students of SD Muhammadiyah Ambon, namely 1 person (3.33%) who achieved a very good predicate, 7 people (23.33%) achieved an excellent predicate, 17 (56.67%) people obtained enough predicates, and 5 people (16.67%) achieved less predicates. Meanwhile, to find out the presentation of student learning completion at the time of the pre-test, it can be seen in the following table:

Table 2. Student learning completion in the pre-test

Minimum Completeness Standards	Mastery Level	Number of Students (Frequency)	Percentage (%)
≥ 65	achieved	8	26,67%
< 65	not achieved	22	73,33%

Source: Student learning outcomes

Based on the table above, it can be seen that the level of learning completion is only achieved by eight students from the total number of students, namely 30 people, and the number of students who have not reached the completion of learning is 22 people. This is very much the basis for thinking about improving learning methods or approaches for a teacher.

Table 3. Student final test result data

Level Qualification	Frequency	Percentage	Letter Value	Predicate
81 – 100	20	66,67%	A	Excellent
65 – 80	8	26,66%	B	Good
50 – 64	2	6,67%	C	Enough
0 – 49	0	0%	D	Less

Source: Student learning outcomes

Based on the table above, at the time of the final test after learning with a Realistic Mathematics Education, it can be seen that the level of mastery of the material in grade I students of SD Muhammadiyah Ambon, namely 20 people (66.67%) who achieved a very good predicate, 8 people (26.66%) achieved a good predicate, 2 (6.67%) people obtained enough predicates, and 0 people (0%) achieved less predicates. This can be used as a reference that the Realistic Mathematics Education can be used as an alternative approach in learning for all mathematics teachers to improve student learning outcomes, especially in similar materials.

Table 4. Completion of student learning in the final test

Minimum Completeness Standards	Mastery Level	Number of Students (Frequency)	Percentage (%)
≥ 65	achieved	28	93,33%
< 65	not achieved	2	6,67%

Source: Student learning outcomes

Based on the table above, it can be seen that the level of learning completion is achieved by 28 students from the total number of students, namely 30 people, and the number of students who have not completed the learning completion is two people. Based on the

analysis carried out on the initial and final tests after learning using an RME, shown in the following table, find out the average score of student learning outcomes.

Table 5. Student grade point average

Student Learning Outcomes	Pre-test	Final Test
Average value (\bar{x})	58,33	88,33

Source: Student learning outcomes

Based on the data in table 4, it can be seen that the X test score of student learning outcomes on the pre-test was 58.33 and increased in the final test after learning using the Realistic Mathematics Education (RME) increased to 88.33. Meanwhile, to find out the percentage of completeness of student learning outcomes at the time of the pre-test and in the final test after previously implementing learning using the Realistic Mathematics Education can be shown in the following table.

Table 6. Percentage of completion of student learning outcomes

Student Learning Outcomes	Pre-test	Final Test
% of student completion	26,67 %	93,33 %

Source: Student learning outcomes

Based on the table above, it can be seen that the percentage of student completion results in the pre-test was 26.67% and increased in the final test after learning using the Realistic Mathematics Education (RME) with a percentage of completion of 93.33%.

Results of Observation of Student Attitudes and Activities

Based on the observations made by the two observers, each observer made observations on each student activity, and each observer observed 15 students. Based on the calculation results, students' interest in learning obtained an average score of 3.67. This means that the learning process using the RME has very good criteria because it can foster students' interest in learning. Based on the calculation results, students' attention obtained an average score of 3.60. This means that the learning process that takes place using the Realistic Mathematics Education has very good criteria because it can grow students' attention during the learning process.

Student participation based on the calculation results obtained an average score of 3.67. This means that the learning process that takes place using the RME has very good criteria because it can foster student participation during the learning process. Based on the calculation results, presentation process students obtained an average score of 3.70. This

means that the learning process that takes place using the Realistic Mathematics Education has very good criteria because it can grow the student presentation process during the learning process.

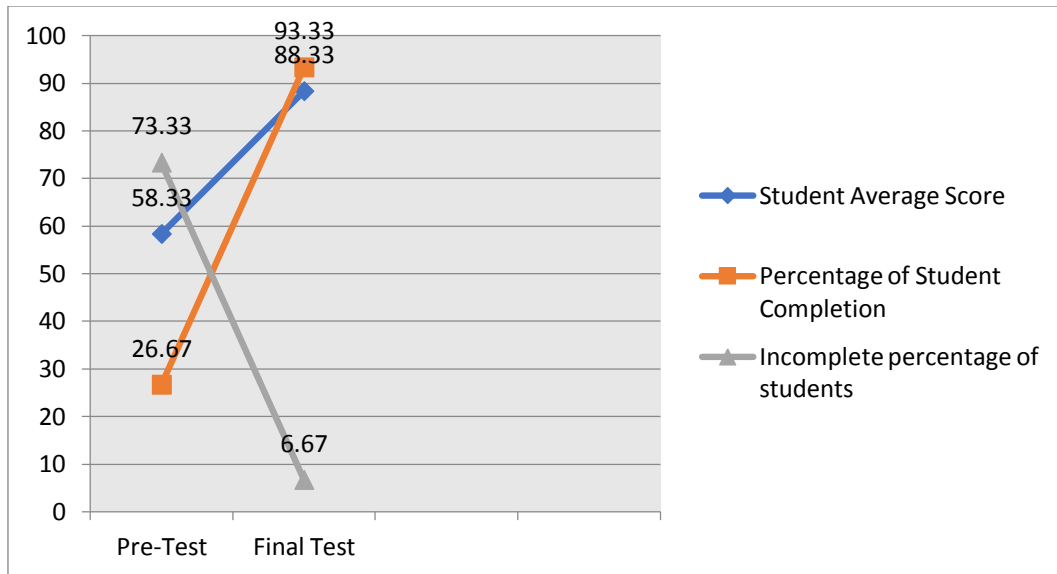


Figure 1. Graph of student learning outcomes

The graph above shows that the average score of students in learning using a Realistic Mathematics Education has increased; namely, the average student learning outcome on the pre-test was 58.33 and increased in the final test to 88.33. The same thing happened in completing student learning outcomes, which experienced an increase in the pre-test. The percentage of student completion was 26.67% and increased in the final test to 93.33%. Meanwhile, students who were not completed experienced a decrease, namely in the pre-test, the percentage of students who were not completed was 73.33 and decreased in the final test to 6.67%.

DISCUSSION

Based on the results of the research above, it can be seen that there is an increase in learning outcomes in the concept of sequencing numbers taught by grade I students with a Realistic Mathematics Education (RME). This shows a significant difference in the increase in learning outcomes in the material sorting numbers using RME in grade I students of SD Muhammadiyah Ambon. This means that students who received treatment with RME obtained higher scores on the final test when compared to the pre-test results (Firmansyah & Septiani, 2019; Jordaan et al., 2017).

The learning process using a mathematical approach is very encouraging for students in the learning process. Students are more motivated in the learning process because they study every problem contained in the learning process. When students tell their birthdays, they are very motivated and happy during the learning process. All the students scrambled to tell the process of their birthdays, and in the end, all sorted the numbers according to the instructions directed by the teacher to sort the various objects contained in the birthday. This is in line with the characteristics of RME, namely using real-world contexts in learning, after which students use the concepts they have to sort various objects around them (Hirza et al., 2014; Rahman et al., 2018; Wibowo, 2017). These ideas naturally come from the results of students' thoughts in solving problems or questions submitted by the teacher.

The real-world context researchers use in this research process is very helpful for students in solving problems that arise because all students understand what needs to be done in learning activities (Sari, 2017; Shandy, 2016). In the learning process, it is very noticeable that students' interest in learning and attention is very visible. This is evidenced by student involvement in learning activities and students' enthusiasm in answering various questions or problems submitted by researchers.

In the results of the pre-test conducted by the researcher before carrying out learning with a Realistic Mathematics Education, the number of students who reached the Minimum Completion criteria per the standards set by the school, namely 65 as many as eight students. With a total percentage of completeness (26.67%). Those who have not reached the completion value are at least 22 people. This is very different from the results obtained in the final test after carrying out learning with a realistic Mathematical Approach. Based on the study results, the number of students who achieved minimum completion in the final test conducted by the researcher was 28 people with a percentage of completion (93.33%), and the number of students who had not reached the minimum completion was two people. The data showed that in the final test, there was a significant increase in student learning outcomes with a total increase (of 66.66%). Learning by using a Realistic Mathematics Education can improve student learning outcomes (D. Azizah, 2013; Putri et al., 2019a). This is because by learning using RME, students can learn mathematics by not feeling the abstractness of mathematics. After all, the learning process is associated with the real world, so students' understanding and memory increase more deeply (Nuraida & Putri, 2019; Oktiningrum et al., 2016). Because learning using RME requires students to play an active role, students try to find ideas from every problem obtained during the learning process (Rasyid & Irawati, 2017).

Learning the concept of sequencing numbers in the initial and final test results after carrying out Mathematics learning using the Realistic Mathematics Education (RME) produces a different Mean. Based on the research results and calculation of the analysis of the learning outcomes test (appendix), the average score was 58.33 at the beginning. Meanwhile, the final test obtained an average score of 88.33. This shows an increase in the average score, which is quite high compared to the pre-test results. This proves that learning using RME can be one of the ways to learn for all mathematics teachers to improve student learning outcomes, especially for Mathematics teachers in elementary schools. Research in this area has produced quite encouraging reports. Students become more interested and happy to learn mathematics and show an increase in learning outcomes that are quite satisfactory. Because the starting point of learning with a realistic mathematical approach uses the real world by the student experience (Herawaty, 2018; Kamsurya, 2019; Riyanto et al., 2019) can involve itself in these learning activities, and the real world can be a tool for concept formation, one example is the use of tables and chairs in the classroom, and students are asked to count the number of these objects and then sort them from the largest to the smallest, and vice versa.

The activities that occur in the learning process look very different. Based on the results of the analysis on the observation sheet. Learning by using RME. Based on the observation sheet analysis, the average student's interest in learning reached the criteria (3.67) in the excellent category, with details of 22 students achieving excellent predicates, six people achieving good predicates, and two people achieving sufficient predicates. In the aspect of student attention, the average student's interest in learning reached the criteria (3.8) in the excellent category, with details of 21 students achieving excellent predicate, six people achieving good predicate, and three people achieving sufficient predicate. In the aspect of participation, students reached the criteria (3.63) in the excellent category, with details of 21 students achieving excellent predicates, eight people achieving good predicates, one person achieving sufficient predicates, And on the presentation of students reaching the criteria (3.7) in the excellent category, with details of 23 students achieving excellent predicates, five people achieving good predicates, two people achieved enough predicate.

The results above show that almost all students are actively involved and have an enthusiastic attitude in the learning process because in the learning process with the RME approach, the teacher does not dominate teaching and learning activities but students who fully play an active role (Putri et al., 2019a). The learning process focuses on student activities; conditions like this enable them to develop all their abilities. Sometimes, the interaction that arises due to this kind of learning process is a two-way interaction. This

interaction pattern can help develop the creativity and development of students' knowledge (Putri et al., 2019b; Saleh et al., 2017).

CONCLUSION

Based on the explanation in the discussion above, it can be concluded that, on average, learning outcomes using the Realistic Mathematics Education achieve quite maximum student learning outcomes. Based on the analysis of students' pre-test scores, the average score was 58.33 with a percentage of completion of as much as (26.67%) and increased in the final test results to 88.33 with a completion percentage of 93.33%. The number of students who achieved a minimum completion score on the pre-test amounted to 8 students and increased in the final test by 28 students. This shows that learning mathematics on the concept of sequencing numbers with a Realistic Mathematics Education obtains good and maximum results. Learning activities using a Realistic Mathematics Education tend to motivate students and make them look more active. This is evidenced by attention, interest in learning achieves excellent results, and student learning outcomes have increased significantly. Compared to classical learning used in general, learning using a realistic mathematical approach has proven to be much better.

RECOMMENDATIONS

Based on the conclusions above, the researcher conveyed several suggestions, namely (1) considering that learning using a realistic Mathematical Approach can improve student learning outcomes, it is hoped that teachers will be able to apply a similar learning process, and (2) teachers should provide reinforcement when giving material so that students understand the material being taught.

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