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Mathematics Learning Innovation for Student Mathematics Process Skills in Higher Grade of Elementary Schools

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ABSTRAK

Pendekatan keterampilan proses dapat meningkatkan kemampuan koneksi matematis siswa, karena menuntut siswa untuk aktif dan kreatif dalam mengetahui hubungan antar konsep matematika dengan kehisupan sehari-hari. Jika siswa tidak memiliki keterampilan proses dalam belajar matematika, maka akan kesulitan memahami dan mengerjakan permasalahan matematika tersebut. Tujuan penelitian ini adalah untuk menganalisis perbedaan keterampilan pemrosesan pada pembelajaran matematika kelas 4 pada materi kelipatan dan faktor bilangan di sekolah dasar. Metode penelitian yang digunakan adalah metode campuran (mix method). Penelitian ini dilakukan pada kelas 4 Sekolah Dasar. Sampel yang digunakan dalam penelitian ini berjumlah 18 siswa yang dipilih menggunakan teknik purposive sampling. Instrumen yang digunakan adalah observasi, wawancara dan angket. Teknik analisis data menggunakan statistik deskriptif dan inferensial. Statistik deskriptif untuk menentukan nilai minimum, nilai maksimum, mean, median, dan modus serta statistik inferensial untuk menguji asumsi dan menguji hipotesis. Adapun dengan adanya keterampilan proses yang dilakukan dalam penelitian ini dapat meningkatkan kemampuan koneksi matematis siswa karena siswa dituntut aktif dan kreatif sehingga dapat mengetahui hubungan konsep dalam matematika dan penerapannya dalam kehidupan sehari-hari.

ABSTRACT

The process skills approach can improve students' mathematical connection abilities, because it requires students to be active and creative in knowing the relationship between mathematical concepts and everyday life. If students do not have process skills in learning mathematics, they will have difficulty understanding and working on mathematical problems. The purpose of this research is to analyze processing skills differ in grade 4 mathematics learning on multiples and number factors in elementary school. The research method used is a mixed method. This research was conducted in class 4 of elementary school. The sample used in this research was 18 students selected using purposive sampling technique. The instruments used were observation, interviews and questionnaires. Data analysis techniques use descriptive and inferential statistics. Descriptive statistics to determine minimum values, maximum values, mean, median, and mode as well as inferential statistics to test assumptions and test hypotheses. Meanwhile, the process skills carried out in this research can improve students' mathematical connection abilities because students are required to be active and creative so they can understand the relationship between concepts in mathematics and their application in everyday life.

1. INTRODUCTION

Mathematics learning is an effort to help students build mathematical concepts with their own abilities through an interaction process. Learning mathematics cannot be separated from counting activities (Fuadi et al., 2017; Siregar et al., 2021). In elementary school level education units, counting activities are still relatively easy to learn, because they still learn the basics of mathematics (Pang & Sunwoo, 2022; Saleh et al., 2018). The subject of multiples and factors of a number is one of the topics in mathematics learning in grade 4. Where in mathematics learning the learning outcomes are about students' abilities in calculating

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or solving problems mathematically. Mathematics is one of the important areas of education to study. Learning mathematics cannot be separated from counting activities (Bouzid et al., 2021; Irhandayaningsih, 2020). In elementary school level education units, counting activities are still relatively easy to learn, because they still learn the basics of mathematics. The subject of multiples and factors of a number is one of the topics in mathematics learning in grade 4 (Bosica et al., 2021; Wardani & Setyadi, 2020). Therefore, learning mathematics and activities or calculation skills cannot be separated.

Process skills are an approach that is considered appropriate for implementing learning in schools in the face of rapidly developing science. Student process skills are an important effort to obtain optimal student learning success. It can be said that in this process skills approach it is not only learning outcomes that will be achieved, but about how to obtain the expected learning outcomes (Meyer, 2020; Sulasmi, 2022). The process skills approach can improve students' abilities but also mathematical connection abilities, because this learning model requires students to be active and creative so they can understand the relationships between concepts in mathematics and apply them in everyday life (Muslimahayati et al., 2020; Roza et al., 2018). This can be interpreted that process skills are really needed by students in learning mathematics.

Science process skills have an impact on science education because they help students develop intellectual skills, manual skills and social skills. Science process skills function as effective competencies for studying science and technology, problem solving, individual and social development (Chorunnisa et al., 2018; Elvanisi et al., 2018). It is appropriate for educators to develop students' science process skills as a support in developing mastery of mathematical concepts so that in the end it will provide the best learning results. This has an impact on students' cognitive achievement, namely students with high science processing skills will have better cognitive achievement than students with low science processing skills.

Students who do not have process skills in learning mathematics will experience difficulties in participating in mathematics learning at school or when studying independently at home. Lack of student process skills makes students quickly forget mathematical concepts (Manfra, 2019; Siregar et al., 2021; Yantoro et al., 2021). If students do not have process skills in learning mathematics, then students will have difficulty understanding and working on mathematical problems, one of which is questions about multiples and number factors. Due to lack of skill in practicing multiplication and number factor problems, students will forget or even not understand the concept and how to do it. Because according to previous study the concepts that have been developed and studied are useful for supporting the further development of students' abilities (Suryawati & Osman, 2018).

Based on previous research, learning with process skills has a high influence on students' mathematics learning outcomes regarding fold symmetry and rotational symmetry in flat shapes in class V elementary school (Minarti et al., 2020). Then according to other study process skills in students' mathematics learning in elementary schools can affect student learning outcomes (Bouzid et al., 2021). By knowing these facts, this process skill is stated to be very important for success in students' mathematics learning in elementary schools. As for the novelty of this research, it is based on previous research that these process skills influence learning outcomes, so in this research we will analyze further the process skills and mathematics learning of upper grade students in elementary schools on different material, namely multiples and number factors in grade 4.

2. METHOD

The research method used is mixed methods, namely an approach that combines quantitative and qualitative methods into one study in order to provide a broader and more complete vision of a problem. Mixed methods is an accepted approach as a statistical paradigm to inform our thinking about new concepts of interactive strategies that include those specific studies, thereby bringing methodological discussion and practice closer together (John W. Creswell et al., 2002). The sample used in this research was 18 students selected using purposive sampling technique. Purposive sampling, also known as judgment sampling, is a sampling technique by selecting a sample from among the population according to what the researcher wants (objectives/problems in the study), so that the sample can represent the characteristics of the population that have been known before. So by using purposive sampling, researchers have determined the characteristics that are in accordance with the research. The research instrument is a tool used by researchers in collecting data so that their work is easier and the results are better, in the sense that it is more accurate, complete and systematic so that it is easier to process. The instruments used were observation, interviews and questionnaires as well as data analysis using descriptive and inferential statistics. Descriptive statistics to determine the minimum value, maximum value, mean, median, and mode. The lattice of mathematical process skills in mathematics is show in Table 1.

Table 1. Lattice Instrument Character of Mathematical Process Skills in Mathematics in First Cycle

Variable	Indicator	Statement Item Number
Mathematical Process Skills	Observation	1,2,3,4,5,6,7
	Communication	8,9,10,11,12,13,14
	Measure	15,16,17,18,19,20,21
	Build tables	22,23,24,25,26
	Conclusion	27,28,29,30

The grid of mathematical process skills instruments is show in Table 2. Then, the guidelines for interviewing teachers with mathematical process skills are show in Table 3.

Table 2. Categories of Mathematical Process Skills Indicators

Category	Communication	Measure	Laying Tables	Conclusion
Not very good	7-12.25	7-12.25	5-8.75	4-7
Not good	12.26-17.5	12.26-17.5	8.76-12.5	8-10
Well	17.6-22.75	17.6-22.75	12.6-16.25	11-13
Very good	22.76-28	22.76-28	16.26-20	14-16

Table 3. Grid of Interview Guidelines for Mathematics Process Skills Teachers

Variable	Indicator	Sub-Indicators
Mathematical Process Skills	Observation	- Ability to understand the examples given. - The ability to connect examples with objects / circumstances around.
	Communication	- The ability to write down what is known and asked according to the questions/problems. - Ability to write answers according to the purpose of the questions. - Ability to create images that are relevant to the problem. - Ability to write mathematical symbols.
	Measure	- The ability to find the factors of a number. - Ability to calculate multiples of a number. - Ability to distinguish and calculate KPK and FPB.
	Laying Tables	- Ability to make tables of factors and multiples of a number.
	Conclusion	- The ability to make a summary of tasks or learning in writing or orally using their own language.

Data analysis starts from data input with the help of Microsoft Excel software, then the input data is processed using SPSS. The tests carried out on the data consist of a normal test, a linearity test as a prerequisite for conducting a t-test.

3. RESULT AND DISCUSSION

Result

The following is an explanation of the results of descriptive statistics. Where are the results obtained from the distribution of observation sheets. A description of the classification of indicators of mathematical process skills can be seen in Table 4.

Table 4. Categories of Indicators of Mathematical Process Skills (Observation)

School	Category	intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	7-12.25	3	16.67	16.8	17	9	13
School 34	Not good	12.26-17.5	10	55.55	[illegible]			
Batanghari	Well	17.6-22.75	5	27.78				
	Very good	22.76-28	3	16.67				
Elementary	Not very good	7-12.25	0	0	19	19	16	24
School 64 Muara	Not good	12.26-17.5	6	33.33				
Bulian	Well	17.6-22.75	17	94.44				
	Very good	22.76-28	1	5.55				

School	Category	intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	7-12.25	0	0	21.3	21	17	27
School 14 Sungai	Not good	12.26-17.5	1	5.55				
Baung	Well	17.6-22.75	13	72.22				
	Very good	22.76-28	18	100				
Elementary	Not very good	7-12.25	1	5.55	18.5	18	10	25
School 80 Muara	Not good	12.26-17.5	6	33.33				
Bulian	Well	17.6-22.75	14	77.78				
	Very good	22.76-28	4	22.22				

Based on Table 4 of indicators of students' mathematical processing skills in elementary schools, on the observation indicators, Elementary School 14 Sungai Baung obtained the mean, median, mode and maximum values of more superior to the others. Namely obtained a mean of 21, median of 21, mode of 17 and max of 27. Furthermore, the description of the Communication indicators is shown in Table 5.

Table 5. Categories of Indicators of Mathematical Process Skills (Communication)

School	Category	Intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	7-12.25	2	11.11	17.6	18	8	26
School 34	Not good	12.26-17.5	7	38.89				
Batanghari	Well	17.6-22.75	17	94.44				
	Very good	22.76-28	1	5.55				
Elementary	Not very good	7-12.25	4	22.22	17.2	18.5	7	23
School 64	Not good	12.26-17.5	8	44.44				
Muara	Well	17.6-22.75	16	88.89				
Bulian	Very good	22.76-28	2	11.11				
Elementary	Not very good	7-12.25	1	5.55	17.3	16.5	11	23
School 14	Not good	12.26-17.5	10	55.55				
Sungai	Well	17.6-22.75	17	94.44				
Baung	Very good	22.76-28	1	5.55				
Elementary	Not very good	7-12.25	4	22.22	15.4	16	7	23
school 80	Not good	12.26-17.5	10	55.55				
Muara	Well	17.6-22.75	17	94.44				
Bulian	Very good	22.76-28	1	5.55				

Based on Table 5 on communication indicators, the highest average was 17.5 at Elementary School 34 Batanghari, the highest median was 18.5 at Elementary School 64 Muara Bulian and the highest Modus was 11 at Elementary School 14 Sungai Baung, while the maximum gain was 26 at Elementary School 34 Batanghari**.** Furthermore, a description of the Measuring indicators is shown in Table 6.

Table 6. Categories of Indicators of Mathematical Process Skills (Measuring)

School	Category	Intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	7-12.25	5	27.78	17.2	18.5	7	23
School 34	Not good	12.26-17.5	8	44.44				
Batanghari	Well	17.6-22.75	16	88.89				
	Very good	22.76-28	2	11.11				
Elementary	Not very good	7-12.25	1	5.55	18.1	18	11	24
School 64	Not good	12.26-17.5	7	38.89				
Muara	Well	17.6-22.75	16	88.89				
Bulian	Very good	22.76-28	2	11.11				
Elementary	Not very good	7-12.25	3	16.67	16.3	16	9	22
School 14	Not good	12.26-17.5	11	61.11				
Sungai	Well	17.6-22.75	7	38.89				
Baung	Very good	22.76-28	0	0				
Elementary	Not very good	7-12.25	3	16.67	16.6	18	7	23
school 80	Not good	12.26-17.5	5	27.78				
Muara	Well	17.6-22.75	9	50				
Bulian	Very good	22.76-28	1	5.55				

Based on Table 6, the measuring indicators obtained the highest mean of 18 at Elementary School 64 Muara Bulian, the highest median was 18.5 at Elementary School 34 Batanghari , the highest Mode was 11 at Elementary School 64 Muara Bulian and the maximum gain is 24 at Muara Bulian Elementary School 64. Furthermore, the description of the indicators for compiling tables is shown in Table 7.

Table 7. Categories of Mathematical Process Skills Indicators (Compiling Tables)

School	Category	intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	5-8.75	0	0	13.9	13.5	9	19
School 34	Not good	8.76-12.5	5	27.78				
Batanghari	Well	12.6-16.25	10	55.55				
	Very good	16.26-20	3	16.67				
Elementary	Not very good	5-8.75	2	11.11	12	13	5	17
School 64	Not good	8.76-12.5	6	33.33				
Muara	Well	12.6-16.25	9	50				
Bulian	Very good	16.26-20	1	5.55				
Elementary	Not very good	5-8.75	4	22.22	12.4	13	5	20
School 14	Not good	8.76-12.5	4	22.22				
Sungai	Well	12.6-16.25	6	33.33				
Baung	Very good	16.26-20	4	22.22				
Elementary	Not very good	5-8.75	1	5.55	14.1	14	8	17
school 80	Not good	8.76-12.5	3	16.67				
Muara	Well	12.6-16.25	10	55.55				
Bulian	Very good	16.26-20	4	22.22				

Based on Table 7, the indicator for compiling tables, the highest mean and median acquisition is 14 in Muara Bulian Elementary School, the highest mode is 9 in Elementary School 34 Muara Bulian, and a maximum gain of 20 at Elementary School 14 Sungai Baung. Furthermore, the description of the Conclusion indicator is shown in Table 8.

Table 8. Categories of Mathematical Process Skill Indicators (Conclusion)

School	Category	intervals	F	%	Me	med	Mo	Max
Elementary	Not very good	4-7	5	27.78	8. 9	9	6	14
School 34	Not good	8-10	9	50				
Batanghari	Well	11-13	3	16.67				
	Very good	14-16	1	5.55				
Elementary	Not very good	4-7	5	27.78	9.2	10	4	13
School 64	Not good	8-10	6	33.33				
Muara Bulian	Well	11-13	7	38.89				
	Very good	14-16	0	0				
Elementary	Not very good	4-7	6	33.33	8.4	9	4	12
School 14	Not good	8-10	7	38.89				
Sungai Baung	Well	11-13	5	27.78				
	Very good	14-16	0	0				
Elementary	Not very good	4-7	3	16.67	10.6	11	6	15
school 80	Not good	8-10	5	27.78				
Muara Bulian	Well	11-13	7	38.89				
	Very good	14-16	3	16.67				

Based on Table 8, the highest mean and median with scores of 10 and 11 were obtained by Muara Bulian 80 Elementary School, the highest mode of 6 was obtained by Batanghari 34 Elementary School and Muara Bulian 80 Elementary School, for a maximum gain of 14 at Batanghari 34 Elementary School. Of the five indicators, the highest average gain is in observation activities, while the lowest average is in concluding activities. In analyzing a data, the distribution of data used is first tested by testing assumptions and hypotheses. Before entering into hypothesis testing, a data is first checked whether it has a normal distribution and has the same variance. The results and discussion obtained is show in Table 9.

Table 9 . Normality test

Variables	School	Sig	distribution
Mathematical process skills	Base 34 Batanghari	0.66	Normal
	Elementary School 64 Muara Bulian	0.05	Normal
	Elementary School 14 Sungai Baung	0.07	Normal
	Elementary school 80 Muara Bulian	0.08	Normal

Based on Table 9 results it can be concluded that the data is normally distributed, the normality test obtained a significance value of > 0.05. Furthermore, the homogeneity test of mathematical process skills is shown in Table 10.

Table 10 . Homogeneity Test

Variables	School	Sig	Distribution
Mathematical process skills	Elementary School 34 Batanghari	0.04	Homogeneous
	Elementary School 64 Muara Bulian	0.02	Homogeneous
	Elementary School 14 Sungai Baung	0.02	Homogeneous
	Elementary school 80 Muara Bulian	0.02	Homogeneous

Considering the homogeneity test findings as show in Table 10, it can be concluded that the data is homogeneous. Because the significance value obtained is <0.05 which means it is homogeneous. Furthermore, the linearity test of mathematical process skills is shown in Table 11.

Table 11 . Linearity Test

Variables	School	Sig	Distribution
Mathematical process skills	Base 34 Batanghari	0.30	linear
	Elementary School 64 Muara Bulian	0.20	linear
	Elementary School 14 Sungai Baung	0.25	linear
	Elementary school 80 Muara Bulian	0.27	linear

Based on Table 11 from the linearity test table, it can be concluded that the data is linear. Because the significance value obtained is > 0.05, which means the data is linear.

In this test, if the significance value is > 0.05, it can be said that there is no difference in the variable. If the significance value is <0.05 then the variable has a significant difference. The mathematical process skills test is shown in Table 12.

Table 12 . Mathematical Process Skills Test

Variable	Class	Sig. (2-tailed)
Mathematical process skills test	Elementary School 34 Batanghari Elementary School 64 Muara Bulian	0.030
	Elementary School 34 Batanghari Elementary School 14 Sungai Baung	0.040
	Elementary School 64 Muara Bulian Elementary School 14 Sungai Baung	0.035
	Elementary School 64 Muara Bulian Elementary School 80 Muara Bulian	0.042

Based on the t-test as show in Table 12 of students' math processing skills at Batanghari 34 Elementary School, Muara Bulian 64 Elementary School, Sungai Baung 14 Elementary School, and Muara Bulian 80 Elementary School it is known that there are variations in how students process math between students at Batanghari 34 Elementary School and students at Muara Bulian 64 Elementary School who indicated by a two-tailed significance value of 0.030. Furthermore, between Batanghari 34 Elementary School and Sungai Baung 14 Elementary School there were also differences in students' math processing skills as indicated by a two-tailed significance value of 0.040. Furthermore, there is a difference in the math processing skills of students at Muara Bulian 64 Elementary School and Sungai Baung 14 Elementary School which is indicated by a two-tailed significance value of 0.035. And there is a difference in the math processing skills of students at Muara Bulian 64 Elementary School and Muara Bulian 80 Elementary School which is indicated by a two-

tailed significance value of 0.042. Result of teacher interviews regarding students' mathematical processing skills is show in Table 13.

Table 13 . Teacher Interviews Regarding Students' Mathematical Processing Skills

No	Question	Answer
1.	How ability student in understand example the question given during the learning process ?	If given examples and similar questions with example , students capable understand and do it .
2.	is student capable understand examples and relationships with circumstances around ?	Regarding connect with circumstances around , students Still A little difficulty in matter that .
3.	After given question is student capable analyze what is known and asked in about ?	Based on the previous example given , students capable do question with know what is known and asked in matter .
4.	is the answer given student always in accordance with what is asked in about ?	Yes, appropriate with what was asked .
5.	is student capable illustrate A question in question into the form picture ?	Ability student in matter This depends the question what if language the question difficult understood so students are also difficult For describe it .
6.	How ability in write symbol mathematics student in the learning process ?	Student Enough good and correct in write frequent symbols used in learning .
7.	is student understand How find factor from something number ?	Yes, got it .
8.	is student master ability For count multiple from something numbers ?	Some students can. However No fully master .
9.	In the learning process , whether student capable finish question about KPK and FPB?	Yes, able .
10.	is student skilled in make table ?	Yes.
11.	After complete the learning process in One meeting , whether every student capable make summary ?	For level class on For school base only A little a real student summarize what has been learned in every meeting .

Based on Table 13 show interviews with teachers regarding students' mathematical processing skills, it was found that students have strong and varied mathematical processing skills. Students are more inclined to process skills on observation indicators in learning mathematics.

Discussion

Process skills in this research are used to make it easier for students to understand material related to real world problems. Through the process skills approach, students will better understand a problem by using 5 process skills in mathematics learning, namely, observation, communication, measurement, preparing tables, and drawing conclusions (Atiullah et al., 2019; Isro et al., 2021). Learning using process skills is considered good learning because students are involved in finding formulas, not just writing and listening. Where mathematical process skills can be measured during classroom learning with active students (Bhat & Bhat, 2019; López et al., 2021).

Based on data from the results of students' mathematical process skills, it can be said that process skills influence learning outcomes. Having process skills that students have will make it easier for students to carry out learning activities well so as to produce good student learning outcomes. Apart from that, these process skills can not only be applied in the classroom, but can also be used in everyday life to solve problems (Nurkaeti, 2018; Sriwahyuni & Maryati, 2022). In this study, student learning outcomes with a high average were found in observation activities, meaning that the process skills possessed by students in the observation process were good. As previous study argues, high KPS is able to encourage students to carry out experiments well so they can apply concepts and understand the material being taught (López et al., 2021).

Mathematical observations are very important because they help us understand the world in which we live. As the existence of ethnomathematics concepts can make a major contribution to improving mathematics learning because it can connect mathematics with students' experiences in everyday life (Muslimahayati et al., 2020; Pathuddin et al., 2021). Humans use their five senses of sight, hearing, touch, smell and taste to observe objects and nature. The knowledge gained can force further investigation, contemplation, consideration, and study of what the five senses can perceive. In addition, mathematical communication is an important thing that must be achieved in the process of learning mathematics. Because

through mathematical communication students can organize their mathematical thinking both orally and in writing in learning.

Then the most crucial step in carrying out quantitative observations, categorization, and comparison of everything around us is measurement, and communicating accurately and effectively to other people. Therefore, this measuring skill has an impact in the short term, namely that students can compare what is being measured with certain units of measurement that have been determined in mathematics learning (Payu et al., 2022; Prahmana & D'Ambrosio, 2020; Widiyanti et al., 2020). Meanwhile, the impact in the long term is that it can make it easier to measure line lengths, measure angles and so on in everyday life. The skill of arranging tables in process skills is also no less important in learning mathematics. The skill of making tables can be interpreted as the ability to present the data needed in research. In this case, of course, is the skill of students in making tables in learning mathematics (Minarti et al., 2020; Ramlee et al., 2019). Therefore, the skill of compiling tables has an impact in the short term, namely that students are able to present data or information clearly, concisely but concisely in mathematics learning. While the long-term impact is to facilitate the generalization of information and facts obtained in everyday life.

Determining the state of an object or event based on known facts, concepts and principles is what is meant by inferring skills. This summarizing skill has a short-term impact, namely students have the courage to make decisions on what has been mutually agreed upon in the group in accordance with theoretical studies when discussing the results of observations that have been made. The short-term impact of having mathematical process skills is that students learn to discover learning independently, starting with observation activities to concluding activities, thereby providing a different learning experience (Ramlee et al., 2019; Yilmaz & Topal, 2014). The impact of having mathematical process skills is that students have initial knowledge such as when carrying out observation activities or observations in learning mathematics on factors and numbers. According to previous study students' prior knowledge will have a positive impact on students, namely that students will further strengthen these concepts in their long-term memory (Irhandayaningsih, 2020). Students will also become familiar with the skills that will be attached to them which can be applied to every subject or to every mathematics subject matter.

This learning innovation can increase students' interest in learning mathematics. When students feel engaged and challenged by engaging learning, they tend to be more eager to learn and develop their math skills. The results of this research can inspire the development of new learning models or improvements to existing models. This may mean refining existing approaches or even developing new approaches that better suit students' current needs. However, this research has limited generalization because it was conducted only in certain elementary schools or with certain groups of students. The results may not be directly applicable to all elementary schools or the broader student population.

4. CONCLUSION

Based on the explanation above, it can be concluded that process skills are an approach that is considered appropriate for the implementation of learning in the face of rapidly growing knowledge. Students must also have these process skills when studying mathematics, which are called mathematical process skills. The existence of these process skills can improve students' mathematical connection abilities because students are required to be active and creative so that they can find out the relationship between concepts in mathematics and their application in everyday life. Based on research conducted using 5 indicators of process skills namely observation, communication, measurement, compiling tables, and drawing conclusions on elementary school students.

5. REFERENCES

Atiullah, K., Wuli Fitriati, S., & Rukmini, D. (2019). Using Revised Blooms Taxonomy to Evaluate Higher Order Thinking Skills (Hots) in Reading Comprehension Questions of English Textbook for Year X of High School. *English Education Journal*, *9*(4), 428–436. https://doi.org/10.15294/eej.v9i4.31794.

Bhat, B. A., & Bhat, G. J. (2019). Formative and summative evaluation techniques for improvement of learning process. ,. *European Journal of Business & Social Sciences*, *7*(5), 776–785. https://www.researchgate.net/profile/Bilal-Bhat-6/publication/333633265.

Bosica, J., Pyper, J. S., & MacGregor, S. (2021). Incorporating problem-based learning in a secondary school mathematics preservice teacher education course. *Teaching and Teacher Education*, *102*, 103335. https://doi.org/10.1016/j.tate.2021.103335.

Bouzid, T., Kaddari, F., Darhmaoui, H., & Bouzid, E. G. (2021). Enhancing math-class experience throughout

digital game-based learning, the case of moroccan elementary public schools. *International Journal of Modern Education and Computer Science*, *13*(5), 1–13. https://doi.org/10.5815/ijmecs.2021.05.01.

Chorunnisa, N. L., Prabowo, P., & Suryanti, S. (2018). Improving Science Process Skills for Primary School Students Through 5E Instructional Model- Based Learning Improving Science Process Skills for Primary School Students Through 5E Instructional Model-Based Learning. *Journal of Physics: Conference Series PAPER*. https://doi.org/doi :10.1088/1742-6596/947/1/012021.

Elvanisi, A., Hidayat, S., & Fadillah, E. N. (2018). Analisis keterampilan proses sains siswa sekolah menengah atas Skills analysis of science process of high school students. *Jurnal Inovasi Pendidikan IPA*, *4*(20). https://doi.org/10.21831/jipi.v4i2.21426.

Fuadi, I., Minarni, A., & Banjarnahor, H. (2017). Analysis of Students' Mathematical Problem Solving Ability in IX Grade at Junior High School Ar-Rahman Percut. *International Journal of Novel Research in Education and Learning*, *4*(2), 153–159. http://digilib.unimed.ac.id/id/eprint/39202.

Irhandayaningsih, A. (2020). Pengukuran Literasi Digital Pada Peserta Pembelajaran Daring Di Masa Pandemi Covid-19. *Anuva*, *4*(2), 231–240. https://demo.dspacedirect.org/bitstream/handle/10673/1975/8073-25123-1-SM.pdf?sequence=1&isAllowed=y.

Isro, A. L., Anggraito, Y. U., & Bintari, S. H. (2021). Description of Students' Critical Thinking Skills in Integrated PjBL STEM Learning Environmental Change Material. *Journal of Innovative Science Education*, *10*(3), 237–243. https://doi.org/10.15294/jise.v10i1.43920.

John W. Creswell, P., Michael D. Fetters, MD, MPH, M., & Nataliya V. Ivankova, P. (2002). Designing A Mixed Methods Study In Primary Care. *Bmj*, *325*(7354), 7–12. https://doi.org/10.1136/bmj.325.7354.22.

López, P., Rodrigues-Silva, J., & Alsina, Á. (2021). Brazilian and Spanish Mathematics Teachers' Predispositions towards Gamification in STEAM Education. *Education Sciences*, *11*(10), 618. https://doi.org/10.3390/educsci11100618.

Manfra, M. M. (2019). Action research and systematic, intentional change in teaching practice. *Review of Research in Education*, *43*(1), 163–196. https://doi.org/10.3102 /0091732X18821132.

Meyer, M. W. (2020). Changing design education for the 21st Century. *She Ji: The Journal of Design, Economics, and Innovation*, *6*(1), 13–49. https://doi.org/10.1016/j.sheji.2019.12.002.

Minarti, E. D., Alghadari, F., & Hutajulu, M. (2020). Mathematical disposition ability and critical thinking: Evaluation of middle school students. *Journal of Physics: Conference Series*, *1657*(1). https://doi.org/10.1088/1742-6596/1657/1/012017.

Muslimahayati, Dasari, D., & Agustiani, R. (2020). Mathematical critical thinking ability of students with realistic mathematics learning innovations with ethnomathematics (PMRE). *Journal of Physics: Conference Series*, *1480*(1). https://doi.org/10.1088/1742-6596/1480/1/012004.

Nurkaeti, N. (2018). Polya'S Strategy: an Analysis of Mathematical Problem Solving Difficulty in 5Th Grade Elementary School. *EduHumaniora | Jurnal Pendidikan Dasar Kampus Cibiru*, *10*(2), 140. https://doi.org/10.17509/eh.v10i2.10868.

Pang, J., & Sunwoo, J. (2022). An Analysis Of Teacher Knowledge For Teaching Functional Thinking To Elementary School Students. *Asian Journal For Mathematics Education*, *1*(3), 306–322. https://doi.org/10.1177/27527263221125112.

Pathuddin, H., Kamariah, K., & Nawawi, M. I. (2021). Buginese Ethnomathematics: Barongko Cake Explorations as Mathematics Learning Resources. *Journal on Mathematics Education*, *12*(2), 295–312. https://doi.org/10.22342/jme.12.2.12695.295-312.

Payu, C. S., Mursalin, M., Abbas, N., Umar, M. K., Yusuf, F. M., & Odja, A. H. (2022). Development of Guided Inquiry Learning Model Based on Critical Questions to Improve Critical Thinking on the Concept of Temperature and Heat. *Journal of Humanities and Social Sciences Studies*, *4*(2), 174–180. https://doi.org/10.32996/jhsss.2022. 4.2.21.

Prahmana, R. C. I., & D'Ambrosio, U. (2020). Learning geometry and values from patterns: Ethnomathematics on the batik patterns of yogyakarta, indonesia. *Journal on Mathematics Education*, *11*(3), 439–456. https://doi.org/10.22342/jme.11.3.12949.439-456.

Ramlee, N., Rosli, M. S., & Saleh, N. S. (2019). Mathematical HOTS cultivation via online learning environment and 5E inquiry model: Cognitive impact and the learning activities. *International Journal of Emerging Technologies in Learning*, *14*(24), 140–151. https://doi.org/10.3991/ijet.v14i24.12071.

Roza, N., Arnawa, I. M., & Yerizon. (2018). Practicality of mathematics learning tools based on discovery learning for topic sequence and series. *International Journal of Scientific and Technology Research*, *7*(5). http://repository.unp.ac.id/26411/.

Saleh, M., Charitas, R., Prahmana, I., & Isa, M. (2018). Improving the Reasoning Ability of Elementary School Student Through the Indonesian Realistic. *Journal on Mathematics Education*, *9*(1), 41–54.

https://doi.org/10.22342/jme.9.1.5049.41-54.

Siregar, E., Sutiarso, S., & Yusuf, Z. (2021). Analysis of Students' Mathematical Literacy Ability in Algebraic Concepts Based on Trends in International Mathematics and Science Study (TIMSS) Problems. *Technium Social Sciences Journal*, *21*, 381–392. https://doi.org/10.47577/tssj.v21i1.3904.

Sriwahyuni, K., & Maryati, I. (2022). Kemampuan Pemecahan Masalah Matematis Siswa pada Materi Statistika. *Plusminus: Jurnal Pendidikan Matematika*, *2*(2), 451–462. https://doi.org/10.31980/plusminus.v2i2.1830.

Sulasmi, E. (2022). Primary School Teachers' Digital Literacy: An Analysis On Teachers' Skills In Using Technological Devices. *Journal of Innovation in Educational and Cultural Research*, *3*(2), 140–145. https://doi.org/10.46843/jiecr.v3i2.81.

Suryawati, E., & Osman, K. (2018). Contextual learning: Innovative approach towards the development of students' scientific attitude and natural science performance. *Eurasia Journal of Mathematics, Science and Technology Education*, *14*(1), 61–76. https://doi.org/10.12973/ejmste/79329.

Wardani, K. W., & Setyadi, D. (2020). Pengembangan Media Pembelajaran Matematika Berbasis Macromedia Flash Materi Luas dan Keliling untuk Meningkatkan Motivasi Belajar Siswa. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *10*(1), 73–84. https://doi.org/10.24246/j.js.2020.v10.i1.p73-84.

Widiyanti, M., Eddy, D. L., Y., & Oto. (2020). Project-Based Learning Based On Stem (Science, Technology, Engineering, And Mathematics) To Develop The Skill Of Vocational High School Students. *International Conference on Vocational Education and Training (ICOVET)*, 123–126. https://doi.org/10.1109/ICOVET50258.2020.9230088.

Yantoro, Y., Kurniawan, D. A., Perdana, R., & Rivani, P. A. (2021). A Survey of Process Skills Mathematics Learning in Elementary School. *Jurnal Pendidikan Dan Pengajaran*, *54*(3), 467–474. https://doi.org/10.23887/jpp.v54i3.37180.

Yilmaz, Z., & Topal, Z. O. (2014). Connecting Mathematical Reasoning and Language Arts Skills: The Case of Common Core State Standards. *Procedia - Social and Behavioral Sciences*, *116*, 3716–3721. https://doi.org/10.1016/j.sbspro.2014.01.829.