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Scientific Learning Model: Analytical Thinking and Process Skills in Mathematics

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ABSTRAK

Pendidikan merupakan salah satu upaya untuk meningkatkan kecerdasan generasi penerus bangsa. Pendidikan dipandang sebagai faktor penting dan strategis dalam pembangunan nasional, dengan upaya yang berorientasi pada peningkatan kualitas sumber daya manusia. Dalam menghadapi masalah dalam kehidupan bermasyarakat, tentunya setiap siswa perlu mengembangkan keterampilan proses. Keterampilan proses setiap siswa akan terasah dengan sendirinya jika siswa memiliki kemauan untuk menjadi lebih baik. Ini berkaitan dengan keterampilan fisik dan mental yang menghasilkan sikap dan proses yang baik. Penelitian ini bertujuan untuk mengetahui hubungan kemampuan berpikir analitis dan keterampilan proses siswa dengan menggunakan model pembelajaran berbasis masalah dan model pemecahan masalah, serta untuk mengetahui perbedaan kemampuan berpikir analitis dan keterampilan proses siswa dengan menggunakan model pembelajaran berbasis masalah dan model pemecahan masalah. Penelitian ini menggunakan penelitian kuantitatif dengan jenis penelitian asosiatif dan komparatif. Untuk jenis penelitian asosiatif digunakan uji statistik deskriptif, sedangkan untuk jenis penelitian komparatif digunakan uji asumsi dan hipotesis. Teknik pengambilan sampel yang digunakan adalah purvosive sampling dengan kriteria siswa yang belajar matematika pada materi lingkaran, sampel yang diambil sebanyak 180 siswa. Hasil penelitian menunjukkan bahwa ada hubungan antara berpikir analitis dan keterampilan proses siswa dengan model pembelajaran berbasis masalah dan pemecahan masalah selain itu terdapat perbandingan antara berpikir analitis dan keterampilan proses siswa di kedua sekolah tersebut. Implikasi dari penelitian ini adalah penerapan model pembelajaran dapat digunakan sebagai sarana untuk mengembangkan kemampuan berpikir analitis dan keterampilan proses siswa dalam matematika.

ABSTRACT

Education is one of the efforts to improve the intelligence of the next generation of a nation. Education is considered an important and strategic factor in national development, with efforts oriented towards improving the quality of human resources. In dealing with problems in social life, of course, every student needs to develop process skills. The process skills of each student will be honed by itself if students have the will to be better. It relates to physical and mental skills that result in good attitudes and processes. This study aims to determine the relationship between students' analytical thinking and process skills using the problem based learning model and the problem solving model, and to find out the differences between students' analytical thinking and process skills using the model and the problem solving model. This research uses quantitative research with associative and comparative types of research. For this type of associative research, descriptive statistical tests are used, while for this type of comparative research, assumptions and hypothesis tests are used. The sampling technique used is purvosive sampling with the criteria of students studying mathematics on circle material, the samples taken are 180 students. The results showed that there was a relationship between analytical thinking and student process skills with the problem based learning and problem solving models besides that there was a comparison between analytical thinking and student process skills in both schools. The implication of this research is that the application of the learning model can be used as a means to develop students' analytical thinking skills and process skills in mathematics.

1. INTRODUCTION

Education is one of the efforts to improve the intelligence of the next generation of a nation. Education is considered an important and strategic factor in national development, with efforts oriented towards improving the quality of human resources (Putri et al., 2020; Rogahang, 2019; Sukendar et al., 2019). Producing an intellectual generation and able to combine knowledge and skills that are used as the basis for social life should be a top priority for education (Darmaji et al., 2019; Flores-Tena, 2020; Raharjo

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et al., 2019). These priorities are in line with the goals of education, namely to improve abilities and prepare students to live in social life (Corsi, 2020; Musanna, 2017; Pozo-Armentia et al., 2020). In dealing with problems in social life, of course, every student needs to develop process skills. The process skills of each student will be honed by itself if students have the will to be better. It relates to physical and mental skills that result in good attitudes and processes (Fitriana et al., 2019; Mawaddah et al., 2019; Siswono, 2017). With the process skills possessed by each student, it is hoped that students will be able to solve the problems they are facing. That way students become more responsible for the problems they face (Concannon et al., 2020; Darmaji et al., 2019; Iswatun et al., 2017). In process skills, it is also discussed about science that demands to think critically and systematically (Fauzan et al., 2017; Mutakinati et al., 2018; Pahrudin et al., 2019). Thinking critically and systematically can be applied in analytical thinking. Some analytical thinking skills that can be developed by students are the ability to remember, understand and be able to apply (Setiawan, 2020; Ashworth, 2018; Sugianto et al., 2017). Thinking skills are abilities that need to be developed by students in developing their potential to face life (Anggraini, 2018; Fakhrurrazi et al., 2019; Nuryanti et al., 2018). To be able to improve students' analytical thinking skills, learning with effective media is carried out, besides that it can also be used to familiarize students with solving problems so that students' thinking power develops (Ilma et al., 2017; Kristanto et al., 2019; Laila et al., 2019). To be able to develop the thinking power of each student, it can also be developed through learning mathematics.

Learning related to counting numbers such as learning mathematics is often considered difficult to understand. Mathematics is often considered a difficult subject to understand (Arifin & Herman, 2018; Malihatuddarojah & Prahmana, 2019; Widjayanti et al., 2019). However, in the world of education and in everyday life, mathematics remains a very important science (Alan & Afriansyah, 2017; Apertha & Zulkardi, 2018; Nugroho et al., 2017). Because in the development of technology, mathematics plays a role in solving problems through the cognitive development of students (Hendriana et al., 2018; Jailani et al., 2017; Muslimin, M. et al., 2017). In improving students' cognitive abilities, in learning mathematics, material about circles can be taught. The circle is a subject in learning mathematics that is no less important to learn. This material is often considered difficult, therefore a very good mind mapping approach and method is used so that students can easily understand the circle material (Fitri & Prahmana, 2020; Hamdunah et al., 2016; Rosliana, 2017). Circles are an important material that discusses geometry and is closely related to everyday life (S. N. Dewi & Minarti, 2018; Warmi, 2019; Yadrika et al., 2019). One part of the geometric material is a circle which is the basic material and is related to other materials (Diandita et al., 2017; Maharani & Bernard, 2018; Sapitri et al., 2019). So that the learning process can run smoothly, it is necessary to have an appropriate learning model, such as a problem-based learning model.

Problem based learning model is a problem-solving learning model by sharing various kinds of existing problems. Problem-based learning begins with presenting a problem and then the problem is solved together, so that students can gain knowledge and understanding of concepts and be more independent (Kusumatuty et al., 2018; Maskur et al., 2020; Yulianto et al., 2019). Problem based learning strategies can improve students' problem solving skills (Astriani et al., 2017; Eviyanti et al., 2017; Simamora et al., 2017). In this case, problem based learning focuses on a learning approach based on analysis, resolution and discussion of a problem presented (Aini et al., 2019; Amalia et al., 2017; Masitoh & Fitriyani, 2018). In addition to problem-based learning, other learning models such as problem solving also apply problem solving in the learning process. Problem solving is good to be used as a strategy in moving from an initial condition to a condition to be achieved, in the sense of a change on the good side. As a determinant of students' cognitive level, problem solving is an important part and basic ability in learning mathematics (Hidayat & Sariningsinh, 2018; Tambunan, 2019; Wijayanti, 2020). What is considered important in solving mathematical problems is complex cognitive because every student needs it (Amalia et al., 2017; Peranginangin & Surya, 2017; Permatasari et al., 2019). In the process, each student requires a lot of effort and social interaction between each other so that problem solving can be achieved (Nurlaily et al., 2019; Rohman et al., 2020; Widodo et al., 2020). Of course, in achieving the solution of existing problems, every student need advice and input from peers or from a teacher. The importance of conducting research on students' analytical thinking abilities and process skills is to be able to find out how students' analytical thinking abilities and process skills are, so that they can be used as references in developing the abilities of each student. Considering the importance of students' analytical thinking skills and process skills in their efforts to solve problems in the ongoing learning process. This study focuses on the analytical thinking variable and the student's process skill variable using two learning models, namely the problem-based learning model and the problem-solving model. Research on analytical thinking that has previously been carried out by (Ilma et al., 2017; Puspita et al., 2018; Qomariya et al., 2018) where analytical thinking in this study is used as the focus of the research, from the three studies the sample studied was only limited to one school and the variables studied were only analytical thinking. Similar

research on process skills has been carried out by (Aji et al., 2019; A. S. P. M. Dewi & Rati, 2017; Suryani et al., 2019) where the research is carried out in addition to knowing the effect of the approach used, the research is also to improve student learning outcomes. However, this research is still limited in the use of research samples. With the shortcomings of previous research, the researcher will conduct research using both variables, namely analytical thinking and process skills, with the latest being the use of two models at once, namely the problem-based learning model and the problem-solving model in two junior high schools in Batanghari district, Jambi. Based on the explanation of the research, researchers are interested in conducting research with the aim of knowing how the relationship between analytical thinking and process skills of students at SMPN 34 Batanghari and SMPN 35 Batanghari using the Problem Based Learning model; to find out how the relationship between analytical thinking and process skills of SMPN 34 Batanghari and SMPN 35 Batanghari students using the Problem Solving model; and to be able to find out the differences in analytical thinking and process skills of the students of SMPN 34 Batanghari and SMPN 35 Batanghari by using the Problem Based Learning model and the Problem Solving model.

2. METHODS

This research uses quantitative research with associative and comparative types of research. For this type of associative research, descriptive statistical tests are used, while for this type of comparative research, assumptions and hypothesis tests are used. Statistics is a science that studies how to collect, process, present, and analyze data as well as how to draw conclusions from survey results, so that they are easy to interpret (Rasyad, 2003; Morissan, 2012). Quantitative research methods are methods based on the philosophy of positivism (Mustafa et al., 2020; Nasution, 2017). Furthermore, what is included in the assumption test is the normality test, linearity test (Tentama & Yusantri, 2020). The test is used as a condition for testing the hypothesis (Fahruddin et al., 2016). The survey procedure of distributing questionnaires and observation sheets was used in data collection. The samples in this study were students from SMPN 34 Batanghari and students from SMPN 35 Batanghari, Batanghari district, Jambi. The sampling technique used is purposive sampling. The reason for taking this technique is because not all samples have criteria that match the phenomenon being studied. Therefore, the authors chose a purposive sampling technique in order to consider certain criteria that must be met by the sample used in this study. The criteria are students who are learning mathematics on circle material. The samples taken were 180 students from class VIII A, class VIII B and class VIII C from both schools, while the detailed data can be seen in Table 1.

Table 1. Research Sample

School Name	Total students		
	VIII A	VIII B	VIII C
SMPN 34 Batanghari	30	30	30
SMPN 35 Batanghari	30	30	30

This research was carried out starting from distributing questionnaires and observation sheets. After obtaining research data, quantitative data analysis was then carried out. Next, identify the results for follow-up. At the data collection stage, questionnaires were given to 180 students in two schools, namely SMPN 34 Batanghari and SMPN 35 Batanghari in Batanghari Regency. From the data, data analysis is then carried out, namely data coding, filtering appropriate data and analysis of the data. The data needed in this study were collected and obtained from SMPN 34 Batanghari and SMPN 35 Batanghari. After going through data analysis, the final step taken by the researcher is to draw conclusions from the results of the data analysis.

Table 2. Instruments Grid

Variable	Indicator
Students' process skills in mathematics with circle material	Observation Measure Understanding the concept
Students' analytical thinking towards mathematics	Identify Differentiate Organize Connect

Variable	Indicator
Problem-based learning (PBL) and problem solving (PS) learning model on mathematics subjects with circle material	Applicable ability Enthusiasm for learning Media use Interest in learning mathematics Easy to understand the concept and importance of mathematics

The instruments used in this study were observation sheets and research questionnaires. Observation sheets were used to collect data on Process skills while research questionnaires were used to collect data on analytical thinking, problem-based learning models and Problem-Solving Learning models. There are 6 items of process skills questions that use a Likert scale of 4, 20 items of analytical thinking questions that use a Likert scale of 5, 26 question items in a problem-based learning model that uses a Likert scale of 5, and 26 question items in a problem-solving learning model that uses a scale Likert. The grid of the research questionnaire can be seen in the Table 2. The description and categorization of each variable is presented in Table 3.

Table 3. Categorization of Each Variable

Variable	Category	Indicator Interval	
		Observation	Measuring
Students' process skills in mathematics with circle material	Very Not Good	3.0-5.25	3.0-5.25
	Not good	5.26-7.50	5.26-7.50
	Good	7.51-9.75	7.51-9.75
	Very good	9.76-12.00	9.76-12.00
		Analytical Thinking	
Students' analytical thinking towards mathematics	Very Not Good	20.0-36.0	
	Not good	37.0-52.0	
	Enough	53.0-68.0	
	Good	69.0-84.0	
	Very good	85.0-100.0	
		Problem-based learning (PBL) and problem solving (PS) learning model	
Problem-based learning (PBL) and problem solving (PS) learning model on mathematics subjects with circle material	Very Not Good	26,0-46,8	
	Not good	46,9-67,6	
	Enough	67,7-88,4	
	Good	88,5-109,2	
	Very good	109,3-130	

This study uses quantitative data analysis with the help of SPSS statistics 26, to find descriptive statistics and inferential statistics. The statistical test used is presented in the form of a percentage of the frequency of the data and the average of the data. In this study, before testing the hypothesis, the assumptions were first tested. The assumption test carried out in this study is the normality test, linearity test and homogeneity test, while the hypothesis test uses the T test as well as the correlation test. The data is said to be normal if the Sig value > 0.05, the data is said to be linear if the Sig value < 0.05 and the data is said to be homogeneous if the sig value is > 0.05.

3. RESULT AND DISCUSSION

Results

The results of the descriptive statistical test of students' process skills towards mathematics lessons with circle material on observation indicators can be seen in Table 3.

Normality test is used to determine whether the data that has been collected is normal or not. Data can be said to be normally distributed if the value of sig. > 0.05. The description of the normality test of process skills, analytical thinking, the response of the problem-based learning (PBL) model and the response of the student problem solving model (PS) to mathematics lessons with circle material can be seen in Table 4.

Table 3. Descriptive Analysis Results

Variable	Respondent	Mean	Median	Min	Max
Students' process skills towards mathematics lessons with circle material on observation indicators	SMPN 34 Batanghari	8.2444	8.0000	3.00	12.00
	SMPN 35 Batanghari	7.9111	8.5000	3.00	12.00
Students' process skills towards mathematics lessons with circle material on measuring indicators	SMPN 34 Batanghari	7.6000	8.0000	3.00	12.00
	SMPN 35 Batanghari	7.6000	8.0000	3.00	11.00
Analytical thinking of students towards mathematics lessons with circle material	SMPN 34 Batanghari	76.9111	82.0000	30.00	100.00
	SMPN 35 Batanghari	61.7778	60.0000	30.00	100.00
Problem-based learning (PBL) students' learning models for mathematics lessons with circle material	SMPN 34 Batanghari	74.5889	75.0000	56.00	90.00
	SMPN 35 Batanghari	73.7667	74.5000	51.00	89.00
Problem solving (PS) learning models of students towards mathematics lessons with circle material	SMPN 34 Batanghari	76.5000	77.0000	56.00	93.00
	SMPN 35 Batanghari	75.2333	75.0000	54.00	93.00

Table 4. Normality Test Results

Variable	Respondent	Sig.	Conclusion
Process Skills	SMPN 34 Batanghari	0.200	Normal
	SMPN 35 Batanghari	0.200	Normal
Think analytically	SMPN 34 Batanghari	0.200	Normal
	SMPN 35 Batanghari	0.200	Normal
Problem based learning model response	SMPN 34 Batanghari	0.200	Normal
	SMPN 35 Batanghari	0.200	Normal
Problem solving model response	SMPN 34 Batanghari	0.200	Normal
	SMPN 35 Batanghari	0.200	Normal

Linearity test is a test used to determine whether the data used has a significant linear relationship or not. The data can be said to have a significant linear relationship if the value of sig. < 0.05. The description of the linearity test of process skills and analytical thinking on the response of the problem-based learning (PBL) model and the response of the problem-solving model (PS) of students in mathematics lessons with circle material can be seen in Table 5.

Table 5. Linearity Test Results

Variable		School	Sig.	Conclusion
Process skills * Analytical thinking	PBL	SMPN 34 Batanghari	0.015	Linear
		SMPN 35 Batanghari	0.016	Linear
	PS	SMPN 34 Batanghari	0.021	Linear
		SMPN 35 Batanghari	0.022	Linear

Homogeneity test is carried out in order to determine whether the data studied are humogen or not. The condition is that if the significance value is > 0.05, it can be said that the data is homogeneous (same). If the significance value is <0.05 then the data is not homogeneous (not the same). The description of the homogeneity test of process skills and analytical thinking on the response of the problem-based learning (PBL) model and the response of the problem-solving model (PS) of students in mathematics lessons with circle material can be seen Table 6.

Table 6. Homogeneity Test Results

Variable	School	Sig.	Distribute
Process skills	SMPN 34 Batanghari SMPN 35 Batanghari	0.458	Homogen
Analytical thinking	SMPN 34 Batanghari SMPN 35 Batanghari	0,211	Homogen
Problem based learning model response	SMPN 34 Batanghari SMPN 35 Batanghari	0,299	Homogen
Problem solving model response	SMPN 34 Batanghari SMPN 35 Batanghari	0,283	Homogen

The next step is to test the hypothesis by using the T test which aims to determine whether the independent variable has an effect on the dependent variable and the correlation test which aims to determine the relationship between process skills and learning models, and analytical thinking with learning models on mathematics learning subjects. Table 7 show results of the T-test of process skills and the results of the T-test of analytical thinking using the problem-based learning and problem-solving models in the mathematics lesson on circle material.

Table 7. t-test Results

		School	N	Mean	Sig. (2-tailed)
Process skills	PBL	SMPN 34 Batanghari SMPN 35 Batanghari	90 90	134.5889 135.5000	0.046
	PS	SMPN 34 Batanghari SMPN 35 Batanghari	90 90	136.4444 135.6222	0.044
Analytical thinking	PBL	SMPN 34 Batanghari SMPN 35 Batanghari	90 90	76.9111 61.7778	0.000
	PS	SMPN 34 Batanghari SMPN 35 Batanghari	90 90	72.9222 69.7444	0.028

Based on Table 7, the results of the T-test of process skills and T-test of analytical thinking were obtained with a sig. (2-tailed) < 0.05. The results of the process skills T test with the problem-based learning model obtained a sig value. (2-tailed) of 0.046, which means that there are differences in student process skills between the two schools, as well as the results of the process skills T test with the problem-solving model, which obtained a sig value. (2-tailed) of 0.044, which means that there are differences in student process skills between the two schools. The results of the analytical thinking T test with the problem-based learning model obtained a sig value. (2-tailed) of 0.000 which means that there is a difference in students' analytical thinking between the two schools, as well as the results of the analytical thinking T test with the problem-solving model, the value of sig is obtained. (2-tailed) of 0.028 which means that there are differences in students' analytical thinking between the two schools. The results of the correlation test between process skills and students' analytical thinking on the learning model, to determine whether there is a relationship between the two can be seen in Table 8.

Table 8. Correlation Test Results

School	Variable	Model	Pearson Correlation	Sig.(2-tailed)	N
SMPN 34 Batanghari	Process skills Analytical thinking	PBL	0.634	0.029	90
	Process skills Analytical thinking	PS	0.604	0.037	90
SMPN 35 Batanghari	Process skills Think analytically	PBL	0.651	0.032	90
	Process skills Think analytically	PS	0.621	0.035	90

Based on Table 8, the results of the correlation test between process skills and analytical thinking were obtained with a value of sig.(2-tailed) <0.05. The results of the correlation test between process

skills and analytical thinking using the problem-based learning model and the problem-solving model obtained a sig value. (2-tailed) are 0.029 and 0.037 respectively, which means that there is a relationship between process skills and analytical thinking skills of students at SMPN 34 Batanghari. Likewise, the results of the correlation test between process skills and analytical thinking using the problem-based learning model and the problem-solving model obtained a sig value. (2-tailed) are 0.032 and 0.035 respectively, which means that there is a relationship between process skills and analytical thinking skills of students at SMPN 35 Batanghari. We can see whether or not this relationship is strong in the results of the Pearson correlation, where this value indicates that the relationship between process skills and analytical thinking is in the strong category.

Discussion

The results of the descriptive statistical test showed that the students' process skills towards mathematics lessons with circle material on the observation indicators at SMPN 34 Batanghari were dominated by the good category of 52.2% as many as 47 students. Likewise, SMPN 35 Batanghari is dominated by the good category by 37.8% as many as 34 students. Of the two schools, the one with the superior process skills in the observation indicators is the student of SMPN 34 Batanghari, because the test results show that the school has a superior presentation. For indicators measuring at SMPN 34 Batanghari dominated by the good category of 46.7% as many as 42 students. And at SMPN 35 Batanghari dominated by the good category by 34.4% as many as 31 students, for that SMPN 34 Batanghari students are superior in measuring process skills. The results of the descriptive statistical test of students' analytical thinking on mathematics lessons with circle material at SMPN 34 Batanghari were dominated by the good category of 42.2% as many as 38 students. While at SMPN 35 Batanghari dominated by a fairly good category of 18.9% as many as 17 students, then SMPN 34 Batanghari students are superior in analytical thinking. Analytical thinking ability is a cognitive ability that underlies other thinking skills, namely synthesizing and evaluating (Maghfiroh & Sugianto, 2011).

The results of the descriptive statistical test of the problem-based learning (PBL) learning model of students on mathematics lessons with circle material at SMPN 34 Batanghari are dominated by the fairly good category of 76.7% as many as 69 students. And at SMPN 35 Batanghari, it is dominated by a fairly good category of 76.7% as many as 69 students. The results of the descriptive statistical test of the problem-solving learning model (PS) of students on mathematics lessons with circle material at SMPN 34 Batanghari are dominated by the fairly good category of 78.9% as many as 71 students. Similarly, SMPN 35 Batanghari is dominated by a fairly good category of 84.4% with 76 students. From the existing data, both schools have a good response to the problem-based learning model and problem-solving model, this is indicated by the test results that are above the average presentation, which is more than 70% of students. In this study, the assumption test used was the normality test, linearity test and homogeneity test. Where the results of the normality test with the Kolmogorov-Smirnov test, the significance value is greater than 0.05, so it can be concluded that the data is normally distributed. For the linearity test, the test results obtained with a significance value of less than 0.05, which means that there is a significant linear relationship between process skills and analytical thinking using problem-based learning models and problem-solving models in the two schools studied.

As for the homogeneity test, the test results obtained with a significance value greater than 0.05, which means the data used is homogeneous. Furthermore, to test the hypothesis used, namely the T test and correlation test. The results of the T-test of process skills with the PBL model and the PS model obtained a sig value. (2-tailed) respectively 0.046 and 0.044, which means that there are differences in student process skills between the two schools. Meanwhile, for the results of the analytical thinking T test with the PBL model and the PS model, the sig value was obtained. (2-tailed) respectively 0.000 and 0.028, which means that there are differences in students' analytical thinking between the two schools. The results of the correlation test between process skills and analytical thinking using the PBL model and the PS model obtained a sig value. (2-tailed) are 0.029 and 0.037 respectively, which means that there is a relationship between process skills and analytical thinking skills of students at SMPN 34 Batanghari. Likewise, the results of the correlation test between process skills and analytical thinking using the PBL model and the PS model obtained a sig value. (2-tailed) are 0.032 and 0.035 respectively, which means that there is a relationship between process skills and analytical thinking skills of students at SMPN 35 Batanghari. We can see whether or not this relationship is strong in the results of the Pearson correlation, where the existing values indicate that the relationship between process skills and analytical thinking is strong. The greater the Pearson correlation value, the stronger the relationship between process skills and analytical thinking. The use of problem based learning models can improve students' analytical thinking skills (Nurjanah et al., 2021). In accordance with research which said that learning with the Problem Based Learning model is suitable for use in improving students' analytical thinking skills (Yuwono et al.,

2020). Learning that is possible for teachers to do to improve process skills and student learning outcomes is learning using the Problem Based Learning model (Aji et al., 2019). The learning model can be a medium or a way to shape and develop students' skills and abilities. Research on analytical thinking skills and process skills is important to do because in the learning process, students' analytical thinking skills and process skills are very supportive in the teaching and learning process to improve student achievement. Similar research on analytical thinking that has previously been carried out by (Ilma et al., 2017; Puspita et al., 2018; Qomariya et al., 2018) where analytical thinking in this study was used as the focus of his research, from the three studies the samples studied were only limited to one school and the variables studied only think analytically. Similar research on process skills has been carried out by (Aji et al., 2019; A. S. P. M. Dewi & Rati, 2017; Suryani et al., 2019) where research was conducted in addition to knowing the effect of the approach used, the study was also to improve learning outcomes. student. However, this research is still limited in the use of research samples. With the shortcomings of previous studies, the researchers conducted research using both variables, namely analytical thinking variables and process skills, with the latest being the use of two models at once, namely the problem-based learning model and the problem-solving model in two junior high schools in Batanghari district, Jambi.

This study aims to find out how the relationship between analytical thinking and process skills of SMPN 34 Batanghari and SMPN 35 Batanghari students using the problem based learning model, can find out how the relationship between analytical thinking and process skills of SMPN 34 Batanghari and SMPN 35 Batanghari students using the problem solving model, and can find out the differences in thinking analytical and process skills of the students of SMPN 34 Batanghari and SMPN 35 Batanghari using the problem based learning model and the problem solving model. This research focuses on the variables of analytical thinking and process skills using problem-based learning and problem-solving models. The problem under study is considered important because it is hoped that with this research, it can be used as an evaluation of analytical thinking and process skills for junior high school level in mathematics, especially for the sample studied. And the hope is that students' analytical thinking skills as well as process skills can increase. Students who have good process skills tend to have the ability to think analytically, and this also certainly affects student achievement. The short-term impact of the results of this study is the application of the learning model that is used as a teaching procedure in the classroom, making the teaching and learning process more structured based on the steps of the applied learning model. While the long-term impact of this research is the hope that by applying the learning model it will be able to develop students' analytical thinking skills and process skills, especially in mathematics. The researcher is aware that this research has shortcomings and weaknesses, this is because this research only examines students' analytical thinking skills and process skills that focus on mathematics subjects using circle material. If this research is carried out using different subjects or materials, it is possible that the results of the research will also be different. However, the researchers also tried to use the learning model as an update of this research. With the existing shortcomings, the author hopes that there will be similar research using other materials or subjects.

4. CONCLUSION

Based on the results of the study, it can be concluded that there is a relationship between analytical thinking and process skills of students at SMPN 34 Batanghari and SMPN 35 Batanghari using a problem-based learning model. Furthermore, there is a relationship between analytical thinking and process skills of students at SMPN 34 Batanghari and SMPN 35 Batanghari using a problem-solving model. The relationship between the two is influenced by the ability of each student to think analytically or their process skills. Students who have good process skills tend to have good analytical thinking skills as well. In addition, based on the T test, it can be concluded that there is a comparison or difference between analytical thinking and process skills of students at SMPN 34 Batanghari and SMPN 35 Batanghari using problem-based learning and problem-solving models. With these findings, the short-term impact is that the learning model can support the learning process to be more conducive. While the long-term impact is the application of the learning model, it will affect students' analytical thinking skills and process skills.

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