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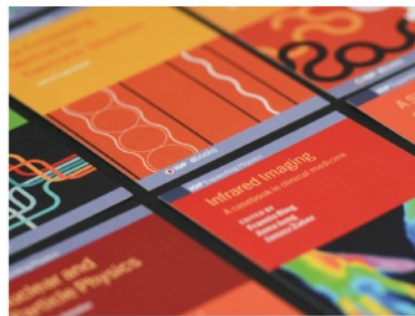
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## Students' mathematical modelling skills with the model eliciting activities (MEAs) approach on material number patterns

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**Abstract.** This research aims to obtain a description of the student's mathematical modelling skills after the MEAs approach was applied to the material of number patterns. This type of research is a descriptive research study to the grades VIII.1 of SMPN 56 Palembang with the total number of 27 students. Data collection techniques are carried out with written tests, interviews, and observation. Test questions are arranged based on indicators of the skills of mathematical modelling, interviews were conducted as supporting data from test results, while the observation is done to see the approach process in MEAs during the learning. Based on the research result of obtained information that the mathematical modelling skills to the grades VIII.1 of SMPN 56 Palembang are in good category with an average of 78.29. There are 17 students with a very good category, 6 students with a good category, 3 students with sufficient categories, and 1 student with poor category. The result of interview showed that students are able to identify the problems related to the patterns of numbers, but in the process of creating a mathematical model is still a difficult task, because the students do not remember the previous material, in solving the problems and in reinterpreting the mathematical results obtained there are students who are unable to do so. The process on the component approach MEAs namely component newspaper article, readiness or warm-up questions, the data table or mathematical information, and problem statement stimulate students' mathematical modelling skills.

### 1. Introduction

The principle of learning in the curriculum 2013 according to the Ministry of Education and Culture Regulation No.22 Year 2016 concerns the standard processes such as in changing learning that emphasizes single answers to learning with answers that are multi-dimensional in truth and also from verbal learning towards applicative skills [1]. In addition, students are also required to solve the real problems in mathematics. These demands are also included in PISA tests by OECD as a framework of about PISA is mathematical literacy.

Mathematical literacy involves the ability to change the real world problems into the mathematical from that can include structuring, conceptualization, making assumptions, and formulate a mathematical model relating to the real problem [2]. Connecting mathematics in daily life today is an important skill such as making the students the real life contexts in mathematics problems [3].

The results of PISA 2018 assessment showed that Indonesian students only get 379 points and ranked 72 out of 78 participating countries and decreased from the previous year, i.e. 386 points and ranked 64 out of 72 participating countries [4, 5]. It shows that Indonesian students have problems in

solving PISA test that using real context in everyday life. The weakness of mathematics today is the students can not correlate the mathematical concepts at school with their daily experience [6, 7]. Besides the causes of errors students in solving problems related to real life is a mistake in changing the information given to the sentence of mathematics, can not determine the formula to be used to solve problems, misconceptions, lack of strong prerequisite material understanding needed for solving problems, the mistake in interpreting the solution, and the lack of the accuracy of students in the calculation [8, 9].

According to Lawson and Marion the process of translating problems the real world into mathematical language is called mathematical modeling [10]. Mathematical modeling is a process of turning a problem the real world to a form of mathematics that can not be separated with math skills such as reading, communicating, designing, implementing problem-solving strategies, or working systematically in order to represent, analyze, make a predication as an effort to resolve a problems in the real world [11-13].

One of the material that requires students to be able to connect real world problems - the day into the language of mathematics, namely on the material numbers pattern. It is known from the competencies that must be achieved in accordance with the curriculum is to solve contextual problems in daily life that related with the patterns in sequence number and ranks of object configurations. In line with this, according Kaur & Dindyal that the application of mathematics in life daily cannot be separated from modelling skills and the modelling process that involvs discussion of some real issues, thus the model has on important role in making mathematics real for students [14]. The importance of material number patterns must be learned because it is one of the competencies that must be mastered by the eighth grade students in the curriculum of 2013.

According to research results Juliant & Noviatati there is an error on the students in organizing data of 16.67%, an error in the data manipulated of 30.56%, and errors in modeling the problem of 5.56% [15]. According to Nur Salam, & Hasnawati in the learning process so far this most teachers use teaching methods that tend to be the same each time the learning process [16]. Meanwhile, according to Susanty, students are not only accepted material but expected that student will be able apply it in their daily lives [17]. To overcome this problem mathematics learning approaches needed that can stimulate students to applying material in daily life or modeling problems to the form of mathematical models. One approach that can be used is the Model eliciting Activities (MEAs) approach. The MEAs approach is an approach to learning that focuses on students in solving real-world problems by linking the concept of mathematics into a mathematical model [18-20]. According to Chamberlin & Coxbill component of the MEAs approach at is newspaper article, readines or warm-up questions, the data table or mathematical information, article, readines or warm-up questions, the data table or mathematical information, and problem statement [21].

The use of MEAs approach can see how the answers to problem is converted into a different variables given in a problem situation, also provides a significant relationship between mathematics to real life by using a different approach in solving complex problems, and can be used as an alternative in encouraging students to form a mathematical model in solving the problem [22, 23]. Based on the description above, the role of the MEAs approach for mathematical modeling skills that as a connector that can be used to connect real problems with knowledge of the students. In this study describes the mathematical modeling skills of students after applying learning with the approach Model eliciting activities the mathematical modeling capabilities of students after learning the MEAs approach the material number pattern.

## 2. Method

This study is a descriptive study aimed to describe the skills of mathematical modeling of the students after the applied learning the MEAs approach to the material number pattern. The subjects were students of SMPN 56 Palembang VIII.1 classes totaling 27 students. The variable in this study is the skills of msthematical modelling of the students on the material number pattern. The mathematical modelling skills the students ability in changing the real problems in daily life into the language of mathematics or a mathematical model as an effort to find a settlement of the problems with indicators of the mathematical modelling skills is to identify the real issues, forming a mathematical model of the

real world problems, solve the problems with the mathematical models, and tranlste the results of mathematics in real situations [24-26].

This study consisted of three steps, namely preparation step, the implementation step, and the data analysis step. During the preparation step there is a validation process research instrument consisting of lesson plan, student worksheet, observation sheets, interview guides, and test question. The **3** implementation step of learning is based on the component MEAs approach th**3** is newspaper article, readines or warm-up questions, the data table or mathematical information, article, readines or warm-up questions, the data table or mathematical information, and problem statement. During the learing process carried out also observed by the observers related with the enforceability of the MEAs approach. Data mathematical modelling skills of number pattern material obtained a written teast consisting of three questions description type of test (as shown in Figure 1) that must be answered individually.

Selama dua tahun sampai 15 Januari 1929 terjadi rentetan semburan air laut ke udara di pusat Kompleks Gunung Krakatau. Pada 20 Januari 1929, asap meniang keluar dari tumpukan material gunung api yang baru muncul di permukaan, yang mulai tumbuh dari kedalaman laut. Itulah gunung yang baru lahir yang diberi nama Gunung Anak Krakatau. Anak gunung api ini tumbuh 4 m per tahun dan mempesona banyak orang. Sejak 1929 hingga saat ini pertumbuhan Gunung Anak Krakatau terbilang cepat. Selama 80 tahun tinggi sudah mencapai 320 m di atas permukaan laut.

1. Berdasarkan artikel bacaan tersebut, tentukan pola untuk memprediksi pertumbuhan ketinggian Gunung Anak Krakatau ! Tulislah langkah penyelesaiannya.
2. Pada tahun tahun ini, berapa perkiraan ketinggian Gunung Anak Krakatau di atas permukaan laut ? Tulislah langkah penyelesaian.
3. Pada tahun berapa tinggi Gunung Anak Krakatau mencapai 404 m di atas permukaan laut ? Tulislah langkah penyelesaiannya.

**Figure 1.** mathematical modelling skills test questions.

The test results are then analyzed to detremine the category of students' mathematical modelling skills. Categories mathematical modelling skills of students can be seen in Table 1 [26]. Further, conducted interviews with students who represent from each of the categories of mathematical modelling skills in order to find aout more about student processes in solving mathematical modelling skills test on the material number pattern.

**Table 1.** Categories mathematical modelling skills

Scores	Category
$80 \leq T \leq 100$	Very Good
$60 \leq T < 80$	Good
$40 \leq T < 60$	Sufficient
$20 \leq T < 40$	Poor
$0 \leq T < 20$	Very Poor

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### 3. Result and Discussion

The experiment was conducted in three meetings that consist of two meetings for learning activities and one meeting to test the skills of mathematical modeling. The learning in this study using student worksheet made based MEAs components namely newspapers article, readines or warm-up questions, the data table or mathematical information, and statment problem. The learning process in component newspapers article, the article given in the form of problems in daily life, that is about motor vehicle progressive t<sub>6</sub>, it given to each group of students, it seems like the students are interested in reading the article it can be seen in Figure 2 and then the students are required to read and understand the contents of the article.



Figure 2. students interested in reading the article given.

In the component readines or warm-up questions that students are given some questions in order to make the students understand the essence of the problem. In the component a data table or mathematical information if there are difficulties students are expected to give questions to the teacher about mathematical problems that found in reading the article. Lastly, the components statment problem, student re-check the mathematical formula used to interpret or make components statment problem, student checking back as well as the mathematical formula used to interpret or make conclusion of the settlement obtained as the solution of existing problems in the article. The oservation of the process MEAs approach. The learning process in Table 2 as follows.

Table 2. Observations of the implementation of the MEAs approach.

Pendekatan MEAs	I	II	Kemampuan Pemodelan Matematika
- Newspaper Article	√	√	- Identify the real issues
- Readines or Warm-up Questions	√	√	
- Data Tabel or Mathematical Information	√	√	- Forming a mathematical model of the real wold problems
- Problem Statement	√	√	- Solve the problems with the mathematical models
			- Tranlste the results of mathematics in real situations

Results observation approach progress MEAs can be seen in Table 2, showed correspondence between component the MEAs approach with indicators of mathematical modeling capabilities. So it can be said that the component approach MEAs can encourage students' mathematical modeling skills.

The next meeting conducted tests on students after learning the MEAs approach. The results of the test analysis mathematical modeling skills of students who have converted shown in Table 3 below.

**Table 3.** Distribution frequency plugs mathematical modelling skills

Score	Category	Frequency	Percentage (%)
80 – 100	Very Good	17	62.96%
60 – 79.9	Good	6	22.22%
40 – 59.9	Sufficient	3	11.11%
20 – 39.9	Poor	1	3.70%
0 – 19.9	Very Poor	0	0
<b>Average</b>	<b>Good</b>	<b>78.29</b>	

From Table 3 shows that the average statistical mathematical modeling capabilities of students in the grades VIII.1 in number pattern material of SMPN 56 Palembang show at 78.29 in good categories.

Students with excellent category as many as 17 students or 62.96% of the students are able to perform the four indicators of mathematical modeling skills with the precision and clarity of identify the real issues, forming a mathematical model, solve problems with mathematical models, as well as translate back the mathematical result in a real situation. Here are examples of the students' answers are included in the very good category.

2. Pada tahun tahun ini, berapa perkiraan ketinggian Gunung Anak Krakatau di atas permukaan laut ? Tuliskan langkah penyelesaian.

Jawaban - Perkiraan ketinggian Gunung Anak Krakatau pada 2019. Ditambah 100 tahun bertambah 4 Meter

Jawab - Berapa tahun Gunung Anak Krakatau pada tahun 2019

Jawaban - Perkiraan gunung anak Krakatau pada tahun 2019 - Ditanya

$U_n = 4n$

$U_{90} = 4(90)$

$U_n = 360 \text{ m}$

Jawab - Perkiraan Gunung Anak Krakatau pada tahun 2019 adalah 360 m

At this the students identify the real problems by making the elements know, asked and also can create an example of variable

Student can form a mathematical model based on the information that has been obtained

Student solve the problems with mathematical models by appropriate notation

Students interpret the results obtained in real trouble with the appropriate language

**Figure 3.** answer SP1 very good category.

Following the result of interviews with students SP1

- P: Approximately do you understand what problems to be solved?  
 SP1: The height of Mount Anak Krakatau in 2019.  
 P: Why use  $U_{90}$ ?  
 SP1: Because of the early years tu Mount Anak Krakatau in 1929 continued into 2009 was 80 years, means plus 10 years was in 2019  
 P: Ok, now how do I ge  $U_n = 4n$   
 SP1: Stride,  $U_1=4, U_2=8, U_3=12$ , mean if  $U_n = 4n$   
 P: Now, what are the steps solve the question?  
 SP1:  $U_n = 4n$ , continue  $U_{90} = 4$  multiplied by 90,  $U_{90} = 360$   
 P: After finishing the question, are the answers obtained a solution to the problem ?  
 SP1: Yes sir, so the height of Mount Anak Krakatau in 2019 is 360 m above the sea level

Students with good category as many as 6 students or 22,22% with examples of student answer in Figure 4.

3. Pada tahun berapa tinggi Gunung Anak Krakatau mencapai 404 m di atas permukaan laut ?  
Tuliskan langkah penyelesaiannya.

Dik: tinggi gunung anak Krakatau Selama 80 tahun mencapai 320 m  
Dit: berapa lama gunung anak Krakatau mencapai 404 m di atas permukaan laut ?

Jawab: 80 tahun mencapai 320 m  
101 tahun mencapai 404 m

404  
4 = 101

Kesimpulan: Bahwa dalam 101 tahun mencapai tinggi 404 m

At this the students identify the real problems by making the elements know and asked

Students don't forming mathematical models, but students immediately guess the answer

Students try to solve problems but do not finish.

Students can interpret the mathematical results obtained into real situations, but it is not right

Figure 4. answer SP2 good category.

Followig the result of interviews with students SP2

- P: Well, do you understand the purpose of question three?  
SP2: Looking for, how tall the Mount Anak Gunung Krakatau reach 404 m above the sea level.
- P: Look again the question, in what year did the high of Mount Anak Gunung Krakatau reach 404 m above the sea level. What is asked?  
SP2: Years
- P: Yes. Well, after getting information that is known and asked. Then, how to solve the question?  
SP2: During the 80 years to reach 320 m above sea level, it means 101 years to reach 404 m above sea level. This right sir. 101 multiplied by 4 is 404.
- P: Okay, but try to see again because the right asked in what year, meaning 101 year on year?  
SP2: 1929 plus by 101 years. So on year 2030.
- P: After completing persoalanya, whether the answers obtained to be the solution to the problem?  
SP2: Less appropriate, sir. Because not yet finished in solving the problem.

3. Pada tahun berapa tinggi Gunung Anak Krakatau mencapai 404 m di atas permukaan laut ?  
Tuliskan langkah penyelesaiannya.

Dik: gunung anak Krakatau au tumbuh 4 m  
Dit: berapa tinggi gunung anak Krakatau mencapai 404 m

Jawab: 1929  
1930  
1931  
1932  
1933  
1934  
1935  
1936  
1937  
1938  
1939  
1940  
1941  
1942  
1943  
1944  
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2028  
2029

Jadi anak Krakatau bertum  
but bersol 54 tinggi 320 m

At this the students identify the real problems by making the elements know and asked.

Students try to solve problems by trial and error, but not to the end.

Students interpret mathematical result obtained, but not in accordance with the real situation in the problem

Figure 5. answer SP3 sufficient category.



In Figure 5 in one of 11,11% the students answers with enough category. the result of interviews with students SP3 as follows.

- P: Well, do you understand the purpose of question ?  
 SP3: Year  
 P: What this year?  
 SP3: What year did the high of Mount Anak Gunung Krakatau reach 404 m above the sea level.  
 P: Yes. Well, after getting information that is known. Can you forming a mathematical modelling?  
 P: Okay... now, are the solving steps correct or not?  
 SP3: Not yet, sir  
 P: After completing persoalanya, whether the answers obtained to be the solution to the problem?  
 SP3: Not yet, sir

While the achievement of mathematical modeling skills in the material numbers pattern based on the indicators shown in Table 4 below.

**Table 4.** Achievement of students mathematical modelling skills based indicators

No	Indicators	Percentage	Category
1	- Identify the real issues	97.53%	Very good
2	- Forming a mathematical model of the real world problems	71.19%	Good
3	- Solve the problems with the mathematical models	79.83%	Good
4	- Translate the results of mathematics in real situations	64.60%	Good

Based on data that has been obtained for the indicators to identify problems that actually belongs to the Very good category skills which means that the average student grade VIII.1 able to determine and understand the information contained on the matter. It is also in line with the opinions Ahyan, Zulkardi & Darmawijoyo which states that students' skills in reading the questions and interpret the meaning of matter into a mathematical problem on average is good enough, but for low-ability students who need a long time to have it [27]. In the process of learning by using the MEAs approach stimulate students to identify the problem based on the matter. According Hanifah that learning to use the MEAs approach give a positive effect on students' skills to presenting matter [28].

Next to the second indicator is to establish a mathematical model of the real problems in categorized well, it indicating that most students are able to develop a mathematical model of the information obtained as well as using the appropriate mathematical notation. In the process of mathematical modeling may be differences in strategy arranged mathematical models and also the notation used. It agreed with the statement Doerr that students take a different approach in mathematic modeling process that allows a mathematical model that produced by students are different [29]. That during the learning process by the MEAs approach can help students in the form of that mathematical models, because that MEAs is a math learning approach that directs students in solving real-world problems to generalize it into a mathematical model [19]. 10

In indicator solve problems with mathematical models is included in a good category. This shows that students can use a mathematical concept that has been known to solve the problem contained in the question. There are some students also use various strategies to solve problems, but not all questions can be done correctly by students. Which states one of the difficulties experienced by

students in solving a problem is a lack of knowledge about the strategies to be used [30]. Then the fourth indicator is that re-translates mathematical results in real situations with either category. It means that the students have been able to interpreting the results of mathematical into real problems and using appropriate language to communicate the solution.

Juliant & Noviantati research results here is an error on the students in organizing data 16.67%, an error in the data manipulated by 30.56%, and errors in modeling the problem by 5.56% [15]. However, the overall ability of mathematical modeling VIII.1 grade students of SMPN 56 Palembang in solving pattern related to the daily life material numbers pattern are good categorized. That is because the use of MEAs approach can see how the answers to problem is converted into a different variables given in a problem situation, also provides a significant relationship between mathematics to real life by using a different approach in solving complex problems, and can be used as an alternative in encouraging students to form a mathematical model in solving the problem [22, 23].

#### 4. Conclusion

The result of the test show that students modeling skill is categorized as good with percentage of 78.29%. Students' ability in identifying real issue is 97.53%, forming a mathematical model of the real world problems is 71.19%, solving the problems with the mathematical models is 22.33%, and translating the results of mathematics in real situations is 64.60%. The interview showed that students are be able to identify the problems related to the patterns of numbers, but in the process of creating a mathematical model is still a difficult task, because the students do not remember the previous material, in solving the problems and in reinterpreting the mathematical results obtained there are students who are unable to do so.

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#### 6. References

- [1] Kemdikbud 2016 *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar dan Menengah* (Jakarta: Kemdikbud)
- [2] OECD 2013 *PISA 2015 Draft Mathematics Framework* (Boulogne-Billancourt: OECD Publishing)
- [3] Brian 2016 *Jurnal Gantang* 1 15
- [4] OECD 2016 *PISA 2015: PISA Results in Focus* (Boulogne-Billancourt: OECD Publishing)
- [5] OECD 2019 *PISA 2018 Result in Focus* (Boulogne-Billancourt: OECD Publishing)
- [6] Murtiyasa Budi 2015 *Prosiding Seminar Nasional Matematika dan Pendidikan matematika* (Surakarta: Universitas Muhammadiyah Surakarta) pp 28–47
- [7] Utami A S 2017 *Journal of Mathematics Education* 3 48
- [8] Nurussafa'at F A, Sujadi I and Riyadi 2016 *Jurnal Elektronik Pembelajaran Matematika* 4 174
- [9] Lida N 2015 *Aksioma* 4 42
- [10] Lawson D and Marion G 2008 *An introduction to mathematical modelling* online: [https://people.maths.bris.ac.uk/~madjl/course\\_text.pdf](https://people.maths.bris.ac.uk/~madjl/course_text.pdf)
- [11] Ang K C 2001 *Math. Educ.* 6 63
- [12] Gum W and Ferri R B 2009 *J. Math. Model. Appli.* 1 45
- [13] Bliss K, et al 2016 *GAIMME: Guidelines for Assessment & Instruction in Mathematical Modelling Education* (United State America: COMAP, Inc. & SIAM)
- [14] Kaur B and Dindyal J 2010 *Mathematical Application and Modelling* (Singapore: World Scientific Publishing)
- [15] Juliant A and Novianti K 2016 *Jurnal Riset Pendidikan* 2 111
- [16] Nur MI, Salam M and Hasnawati 2016 *Jurnal Penelitian Pendidikan Matematika* 4 99
- [17] Susanty A 2018 *Jurnal Pendidikan Tambusai* 2 870
- [18] Budiman H and Syayyidah K N 2018 *Delta* 6 11

- [19] Chamberlin S A and Moon S M 2005 *J. Second. Gift. Educ.* **8** 37
- [20] Hamilton E, Lesh R, Lester F and Brilleslyper M 2008 *Model-eliciting activities (MEAs) as a bridge between engineering education research mathematics education research* online: <http://advances.asee.org/wp-content/uploads/vol01/issue02/papers/ace-vol01-issue02-p06.pdf>
- [21] Chamberlin S A and Coxbill E 2012 *Using model-eliciting activities to introduce upper elementary students to statistical reasoning and mathematical modelling* online: [http://www.uwyo.edu/wisdome/files/documents/chamberlin\\_coxbill.pdf](http://www.uwyo.edu/wisdome/files/documents/chamberlin_coxbill.pdf)
- [22] Altay M K, Elif Y O and Akar S S 2014 *Procedia Soc. Behav. Sci.* **116** 245
- [23] Jumadi 2017 *Aksioma* **8** 43
- [24] Pitriani 2016 *JES-Mat* **2** 65
- [25] Maaß K 2006 *ZDM* **38** 113
- [26] Nuryadi A, Santoso B and Indaryanti 2018 *Jurnal Gantang* **3** 73
- [27] Ahyani S, Zulkardi and Darmawijaya 2014 *IndoMS-JME* **5** 47
- [28] Hanifah 2015 *Jurnal Kreano* **6** 191
- [29] Doerr D C 2007 *Modelling Application in Mathematics Education: The 14<sup>th</sup> ICMI Study* Ed W Blum, H W Henn, P L Galbraith and Niss M (New York: Springer) pp 69–78
- [30] Angateeah K S 2017 *IJLT* **3** 46

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C Hiltrimartin, Y Hartono, Indaryanti. "In-service teachers' mathematical problem solving skills", Journal of Physics: Conference Series, 2020

Publication

---

21

Submitted to Sriwijaya University

Student Paper

---

22

S Ramayanti, S Utari, D Saepuzaman. "Training Students' Science Process Skills through Didactic Design on Work and Energy", Journal of Physics: Conference Series, 2017

Publication

---

23

hdl.handle.net

Internet Source

---

24

S Arifin, Zulkardi, R I I Putri, Y Hartono, E Susanti. "Scaffolding in mathematical problem-solving", Journal of Physics: Conference Series, 2020

Publication

---

25

A Suci, N Aisyah, Meryansumayeka. "Students' characters in solving higher-order thinking skill questions assisted with technology", Journal of Physics: Conference Series, 2020

Publication

---

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<1%

26

S M Ambarita, L Asri, A Agustina, D Octavianty, Zulkardi. "Mathematical Modeling Skills on Solving PISA Problems", Journal of Physics: Conference Series, 2018

Publication

---

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