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How to Train Students' Mathematical Communication Skills Through Generative Learning?: An Evaluation of Circle Material

Eva Dwi Minarti[1], Wahyudin[2], Bambang Avip Priatna Martadiputra[3]
[1,2,3]Department of Mathematics Education, Universitas Pendidikan Indonesia, Indonesia
eva.arti@student.upi.edu[1], wahyudin_mat@yahoo.com[2], bambangavip@upi.edu[3]

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ABSTRACT

The purpose of this study is to apply the Generative Learning model to circle material in order to train students' communication skills. In previous research from the author and several studies that have been conducted by researchers, it was found that the Generative Learning model can improve Students' Mathematical Communication skills. On this occasion, it was explained how the Generative Learning Model can train students' communication skills. The research subjects were 25 students of class VIII from one of the State Junior High Schools in Bandung. The method in this research is qualitative. Data obtained through observation and interviews during learning circle material using a generative learning model takes place. The results showed that through the steps in the generative learning model, namely the orientation; the idea stage; the challenge and restructuring; the implementation and; the review stage, can: (1) increase student interaction in learning, (2) stimulate students to create mathematical models; (3) train students in arguing based on analysis of images and concepts; (4) explain ideas, mathematically in writing with pictures.

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A. INTRODUCTION

Humans are individuals who are essentially social creatures. Humans as social creatures make one and another need to interact and communicate. Based on this, it appears that communication skills are important. Communication is information that is conveyed from one place to another by transferring information, ideas, emotions, skills and others by using symbols such as words, figures and graphics as well as giving, convincing speech and writing (Mufid, 2005).

Communication in education is in a position to create new stigma, strengthen existing stigma, or help eliminate or reduce misunderstandings (Smith & Applegate, 2018). In education, at this case teaching and learning, the communication process is very helpful and becomes the most important part in the learning process. The teacher and students interact with each other, the teacher conveys learning and the students express what they know and what they don't know about the material being taught. So that one aspect that needs to be taught to students is how they are able to express their thoughts both in writing and in speech, so that later they are able to interact with the community. Students and teachers should be able to communicate effectively in order for the transfer of knowledge to run well. The effectiveness of the communication depends more on the content than on the procedural part, which means it depends more on the knowledge part, it's about what will be communicated than on the knowledge part about what people's thoughts will be communicated (Ferrés & Masanet, 2017).

Communication is used to support learning content so that it has good language (Kosko & Gao, 2017; Yaniawati et al., 2019). Communication in mathematics is called mathematical communication, this is formed to encourage students to express and express mathematical ideas. Mathematical communication skills are very useful, because they can also affect many things in everyday life (Lee, 2015; Yaniawati et al., 2019; Chasanah et al., 2020). In the cognitive aspect, mathematical communication skills have a use value in learning. Communication skills can increase curiosity, because this ability will attract and trigger student interest during learning.

Mathematical communication skills can be seen from the activities of students understanding mathematical concepts and procedures, the ability of students to represent concepts, and express their understanding in several mathematical topics, and apply them in everyday life (Chasanah et al., 2020). Mathematical communication skills foster thinking skills and convey students' ideas so that it should be the main concern in learning mathematics (Triana & Zubainur, 2019). Mathematical communication activities help students understand learning material, with communication between students and teachers making teaching and learning methods more effective.

Students' communication skills have not achieved maximum results, (Ramadhan & Minarti, 2018) especially in the ability to explain ideas, mathematical situations in writing with pictures and algebra. Students have not been able to express daily events in the language of mathematical symbols, and students experience problems with their ability to make conjectures, formulate arguments and generalizations. The abilities that are still lacking from students, apart from the above abilities, are that students have not been able to make any questions about mathematics that have been studied. The lack of student communication skills, it encourages researchers to reveal how to teach mathematics so that students have good mathematical communication. In fact, according to (Lee, 2015) communication skills are often neglected in the classroom in mathematics learning. Mathematics learning is considered one of the quietest classes, where student work on the problems individually and calmly.

One of the learning models that can be promoted to improve mathematical communication skills is the generative learning model (Fiorella & Mayer, 2016). In the generative learning model (Fiorella & Mayer, 2016) believes, it does not only depend on instructional methods such as information presented to students, but rather on learning strategies regarding how students try to understand it. Through the generative learning model students can interact which is believed to improve mathematical communication skills. The generative learning model is appealing to students because of its theoretical foundation and evidence of its effectiveness (Brod, 2020). The result of (Wardono; et al., 2020) research is the improvement of students' written mathematical communication skills by applying generative learning assisted by teaching aids is better than discovery learning. Generative learning strategies are intended to improve student learning by encouraging them to actively understand the material to be studied (Brod, 2020). In the research (Eva Dwi Minarti & Nurfauziah, 2016)revealed that the increase in communication skills and mathematical connections students who learn using a constructivism approach with a generative learning model is better than students who learn with direct learning.

Based on the things that have been described earlier, the writer was interested in analyzing how the generative learning model can improve mathematical communication skills, in which steps in the generative learning model make it possible to hone students' mathematical communication skills? Researchers were interested in observing generative learning models on circle material in class VII. Circular material is an important geometric material for students to learn, and this material is a prerequisite for other geometry material. It is listed in the 2013 curriculum which is the standard of graduate competence for grade VII mathematics.

B. METHODS

This study observed and analyzed the students' mathematical communication skills in teaching and learning activities in mathematics learning using generative learning models. This research was a qualitative research. Qualitative approaches largely adopt the idea as a method that allows for tracing the complex attachments about which particular practices are formed (Attride-Stirling, 2001; Decuypere, 2020). The aim was to analyze students' mathematical communication skills in learning activities carried out in the steps of a generative learning model. The population in this study was a junior high school in Bandung and a sample of 25 students of class VIII.

The instrument consisted of learning instruments, observation instruments of mathematical communication skills and generative learning models and a questionnaire to measure students' interest in generative learning models. The questionnaire measurement scale uses a Likert scale model which has 5 choices, namely: strongly agree, agree, doubt, disagree, strongly disagree. The Likert scale is usually used in social work research, and is usually composed of four to seven points, this is an ordinal scale, where arithmetic operations cannot be performed (Wu & Leung, 2017).

C. RESULT AND DISCUSSION

1. Mathematical Communication Skills with Generative Learning

Generative learning model is a learning model that carries the construction of knowledge. Students are accustomed to constructing their thoughts and ideas so that they get the core of the intended learning. In the generative learning model, students are strived to be able to create, think about, and reconstruct their thoughts so that they can review the intended learning. This model has five main steps: the orientation; the idea stage; the challenge and restructuring; the application and; the review stage. One of learning strategy that is inspired by constructivist learning theory is called a generative learning strategy (Fiorella & Mayer, 2016; Breitwieser & Brod, 2021). In the generative learning model also adopts the strategy of asking students to generate predictions before telling them the correct solution, it requires students to be involved in retrieval of relevant prior knowledge (Huelser & Metcalfe, 2012; Potts et al., 2019; Breitwieser & Brod, 2021).

The teacher's strategies have an important contribution to the generative model, it is designing learning situations and managing the content of the material presented in order to attract the attention of students (Grabowski, 2004). The first stage in the generative learning model is orientation. This stage is the stage to motivate students to study the material. It links material benefits to everyday life. Connecting students' daily experiences with the concepts being learned, so that it is expected that a good impression can be built in the minds of students in the long term (Wittrock, 2010; Fiorella & Mayer, 2016; Ponce et al., 2020).

The orientation of the circular material begins with a reminder of how the circle forms. At this stage students were reminded again about the circle material that has been studied in elementary school. Before learning more about circles, students were invited to get to know first "what was a circle?", Figure 1 is an example of the activity in this section.

Material about material circles who have studied in elementary school. Before learning more about circles, let's get to know "what is a circle?", Through this activity:
1. Draw a circle using the compass, with the navel at O
follow the steps:
• Draw (determine) two points that lie on the circle, then name them X and Y.
• Connect point X to O and point Y to O
• Measure the OX length and OY length using a ruler
2. What is the length of OX = OY?
3. What is the OX line segment called?

Figure 1. Examples of activities on the orientation of the circular material

Figure 1 is an example of the ore cross-stage activity in the generative learning model. The goal at this stage was that in the learning process students could imagine and be able to take advantage of the experience and knowledge they had to solve problems on the subject at hand, so that students were motivated to learn the subjects to be studied. The process of connecting (connecting) new knowledge with existing knowledge will involve motivation. Knowledge from the initial conception will produce meaning and understanding of students in learning. This was supported by Gagne's theory (Buscombe, 2013), where learning must be supported by instructional events, such as motivating students to communicate learning objectives, directing student attention, generating generalizations, generating performance, and providing feedback.

At the orientation, students were given the opportunity to communicate their ideas both in oral and written. Students hone their skills in emerging conceptual models, such as pictures. Based on the resulted of observations during the eight meetings, it showed an increase in student activity in learning circle material using a generative learning model. The aspects observed were (1) showed involvement in learning; (2) showed enthusiasm for learning; (3) listened to the teacher's explanation about the stages of learning; (4) paid attention to the teacher's explanation; (5) asked questions related to the exercise sheet; (6) conveyed the opinion.

Based on the observations of the three observers with the aspects observed previously mentioned. At this stage of the orientation, each meeting experiences a good bonding of student activity, which allowed the students to improve their communication skills. The result is as follows:

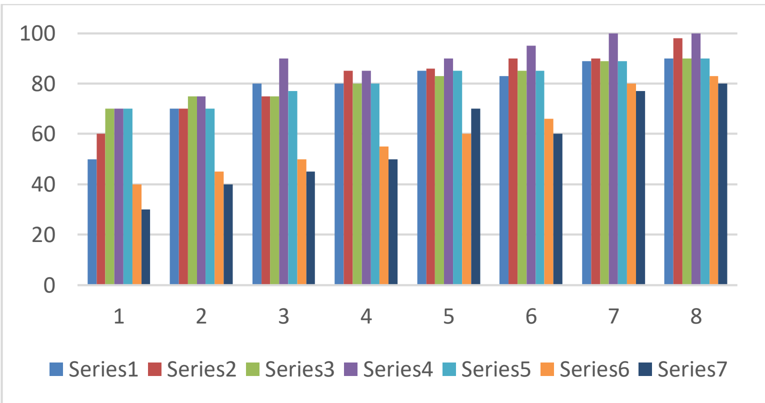


Figure 2. Observation results of the orientation stage

In Figure 2, it appears that student activity increases with each meeting. Figure 2 shows that students experienced an increase from paying attention to more and more students who dared to ask questions and put forward their opinions. These activities support the improvement of communication skills where students are trained to come up with ideas, make pictures and express their opinions. Generative thinking is looking for as many solutions as possible which must make sense, which comes from the facts being studied, which is a way of thinking that results in various ways of responding (Maknun, 2015; Waldeyer et al., 2020). Knowledge acquisition in the generative model is not only factual information retrieval by integration, but in this activity there is psycho-cultural assimilation, which means obtaining an understanding of the new principles in the function of this type of knowledge (Karpov, 2016).

The next stage in the generative learning model is the stage of expressing ideas. This was the stage where students express their ideas and concepts so that the teacher could find out the initial ideas or concepts regarding the material to be taught. Students were given the opportunity to present their ideas about the concepts being studied. The teacher acted as a motivator by asking Socratic questioning questions so that the ideas that were in the minds of students would be revealed. Optimize concept construction activities, effectively train analytical thinking skills (Prawita et al., 2019). Exploratory questions can help students appreciate the lack of clarity in their thinking and reconstruct their ideas in a more logically coherent way. (Grabowski, 2004) says that interest, persistence, and motivation can be generated from teaching strategies and models.

Based on the pictures and activities we do,

We can see that the circle is a flat plane in the form of a curve ... and all points on the circle are equidistant from the point ....

So a circle is the set of all points on a plane that is equidistant from a point on the plane.

The same distance between the points on the circle and the center is called the length ....

Figure 3. Examples of activities at the stage of expressing ideas on circle material

When students express ideas, students will realize that there are different opinions from other friends on the topic they are studying. At this stage the ability of students to communicate their ideas is also trained. This will cause conflict within him, causing dissatisfaction with ideas and ideas that will encourage students to make changes. This dissatisfaction can be generated by generating and raising awareness of their own ideas, asking them to explain inappropriate concepts, and discussing the concepts. Mathematical activities in the classroom require strategies in the form of text that function for students to interpret, when teaching is seen in this way, it becomes possible for students to understand the lesson so that they are more active in the class (Tiffany et al., 2017).

What were observed at this stage: (1) paying attention to the teacher's explanation regarding the prerequisite material and the assignments that must be done; (2) suggesting ideas about the topics discussed; (3) asking questions about the topics discussed. Description of activities at the expressing ideas, which allowed the improvement of students' communication skills. The results are as follows:

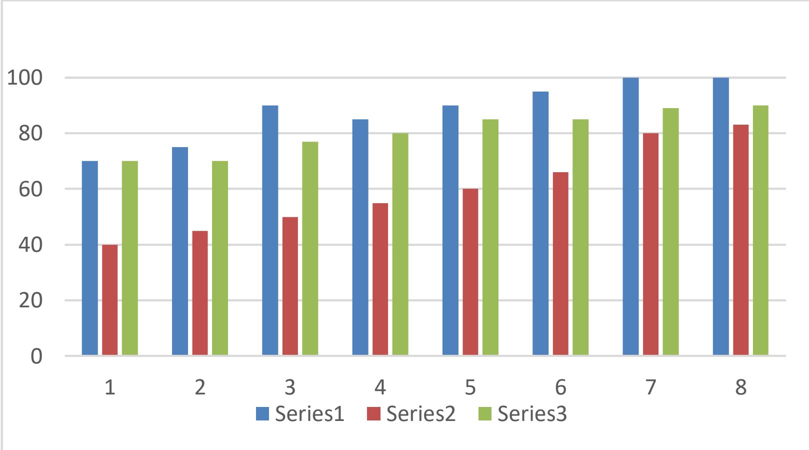
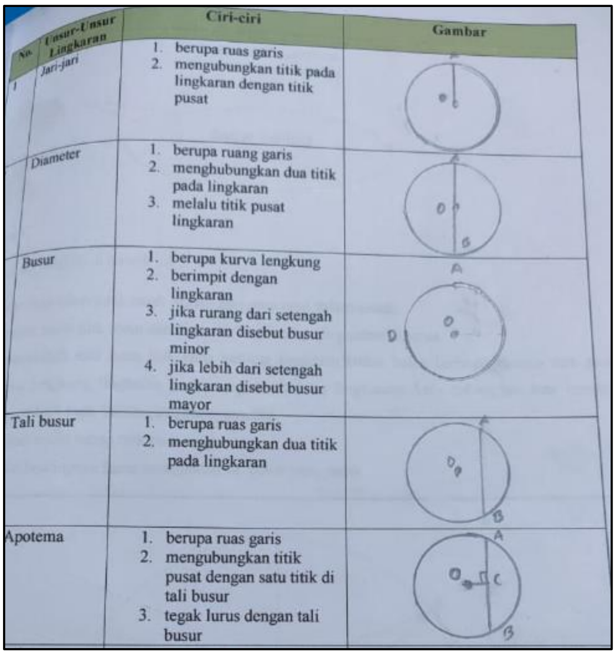


Figure 4. Observation results from expressing ideas

In Figure 4, it appears that student activity increases with each meeting. Gradually the students began to show more and more positive activities. Students paid attention to the teacher's explanation of the prerequisite materials and assignments that must be done, the better each meeting. Because students were increasingly curious about the material given, the student's attention was getting better. Students' mathematics communication was influenced by the ways in which teachers practice, especially in the case of teacher questions with the use of open questions (Rodriguez & Bonner, 2018). Students began to practice communicating by suggesting ideas about the topic being discussed. Mathematical communication skills ware getting better trained by this. Students began to get used to ask questions about the topics discussed. Education continues to encourage student involvement in mathematics communication through discussion and writing (Kosko & Gao, 2017).

The next steps of the generative learning model are the challenge and reconstruction. The teacher creates cognitive conflict by preparing conditions in which students are asked to compare their opinions with those of their friends, and can strive to express the superiority of their opinions. Then the teacher proposes a demonstration or demonstration to test the correctness of their opinion (Wittrock, 2010).



No.	Unsur-Unsur Lingkaran	Ciri-ciri	Gambar
1	Jari-jari	1. berupa ruas garis 2. mengubungkan titik pada lingkaran dengan titik pusat	
	Diameter	1. berupa ruang garis 2. menghubungkan dua titik pada lingkaran 3. melalu titik pusat lingkaran	
	Busur	1. berupa kurva lengkung 2. berimpit dengan lingkaran 3. jika rurang dari setengah lingkaran disebut busur minor 4. jika lebih dari setengah lingkaran disebut busur mayor	
	Tali busur	1. berupa ruas garis 2. menghubungkan dua titik pada lingkaran	
	Apotema	1. berupa ruas garis 2. mengubungkan titik pusat dengan satu titik di tali busur 3. tegak lurus dengan tali busur	

Figure 5. Example activity sheet on challenges and reconstruction

Through activities on the challenge, it hoped that students could gain a new truer understanding of the concept in question. So that students had the desire to change the structure of their understanding. Students were given challenging problems to arouse their courage in proposing their opinions and arguing about the subject being studied. The teacher phase acted as a facilitator and mediator of learning. The Challenges and Reconstruction gave the opportunity to make maximum use of the five senses to stimulate students' curiosity, it develops a high level of reasoning power (Prawita et al., 2019). The teacher respected the opinions of their students, even students were advised to solve them in various ways, for example by way of their own thoughts, working with their peers, finding solutions through discussions, presentations and arguing over their ideas related to the material being discussed. The Challenges and Reconstruction is needed, because at this stage students are required to read. Students who have high reading motivation will have high thinking skills, on the other hand students who have low reading motivation will have low thinking skills (Ho & Guthrie, 2013).

In this step, the activities observed are: (1) worked on the group activity sheet; (2) paid attention to the division of group tasks; (3) provided ideas related to assignments; (4) asked questions related to activity sheet assignments; (5) paid attention to the explanation of friends; (6) paid attention to the teacher's explanation regarding; (7) collected activity sheet that was worked on in groups. Description of activities at the challenges and reconstruction, which allowed the improvement of students' communication skills. The results are as follows:

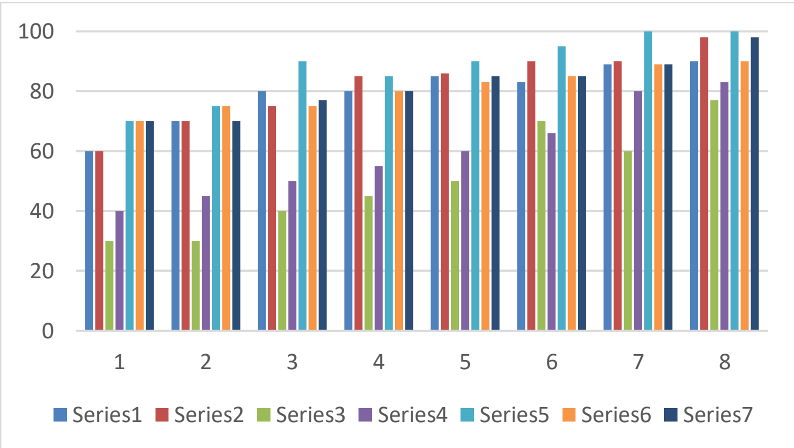


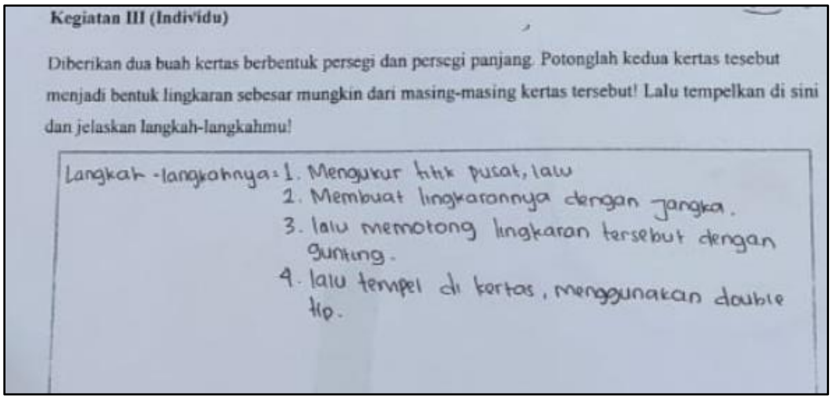
Figure 6. Observation results of the challenge and reconstruction

It can be seen in Figure 6, every activity at this stage has also experienced increased in each meeting. Students work on the group activity sheets, they were more active and diligent. Students began to get used to paying attention to the division of group assignments. Students were increasingly courageous to provide ideas related to assignments. They did not hesitate to ask questions about activity sheet assignments. Students also learned to respect by paying attention to friends' explanations regarding group assignments. They paid attention to the teacher's explanation regarding the material contained in group assignments so they could correct the mistakes they had made. They were increasingly disciplined in collecting group assignments. Students build instruction on knowledge about the brain and cognitive processes in understanding, gaining knowledge, attention, motivation, and knowledge transfer (Prawita et al., 2019).

Class discussion as a whole is a special form of class work used in exploratory teaching that attracts attention, the teacher prepares the discussion, trying to make the best use of the work previously done by students and available class time to increase student learning activities (da

Ponte & Quaresma, 2016). There were many activities that stimulated communication skills in this phase, because students were trained to continuously use their oral and written communication skills, especially in this circle material, students' communication was expressing in the form of images. Even though the practice was not 100% of students could follow every instruction smoothly, Figure 6 shows that more and more students can follow the lesson well. In this phase, the teacher acted as a facilitator and mediator of learning. Teachers respected students' opinions, students were directed to solve in various ways, for example by way of their own thoughts, collaborating with their peers, seeking solutions through discussions, presentations and arguing over their ideas related to the material being discussed. Discussion helps students develop a deeper understanding of mathematical concepts, and become more explicit in expressing their mathematical thinking (Wester, 2020).

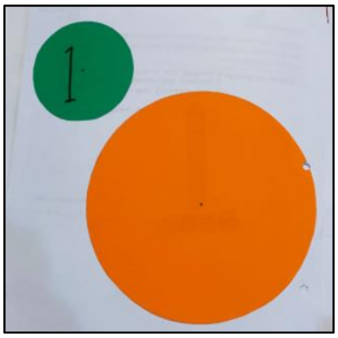
The fourth stage of the generative learning model is implementation. On application, students apply the initial concepts they have plus the new concepts they get to math problems in the form of problem exercises. Students are given the opportunity to solve more complex problems, test alternative ideas that they build to solve various problems.


Kegiatan III (Individu)

Diberikan dua buah kertas berbentuk persegi dan persegi panjang. Potonglah kedua kertas tesebut menjadi bentuk lingkaran sebesar mungkin dari masing-masing kertas tersebut! Lalu tempelkan di sini dan jelaskan langkah-langkahmu!

Langkah-langkahnya: 1. Mengukur titik pusat, lalu
2. Membuat lingkarannya dengan jangka.
3. lalu memotong lingkaran tersebut dengan gunting.
4. lalu tempel di kertas, menggunakan double tip.

7a



7b

Figures 7a and b. Sample activity sheet on implementation

Students were expected to be able to consider and evaluate the advantages of the new ideas they develop. This condition provided opportunities for students to develop their own problem-solving strategies. Students were actively stimulated to consider possible strategies to solve a problem. Students would try to solve them and are motivated to do mathematics. The settlement must be developed by students themselves by connecting previously owned concepts strategy and the concepts they were learning. The stage equates the learning process with the work of the human brain, as opposed to the digestive system, where the brain not only takes knowledge and stores it, in this case knowledge is built or constructed by students using carefully designed strategies (Reid & Morrison, 2014).

Things were observed at this stage: (1) doing individual assignments; (2) pay attention to the teacher's explanation regarding the material; (3) asking questions to the teacher regarding individual activity sheet; (4) presenting the results of the work. Description of activities at the application stage, which allows to stimulate students' communication skills. The results of the observation are as follows:

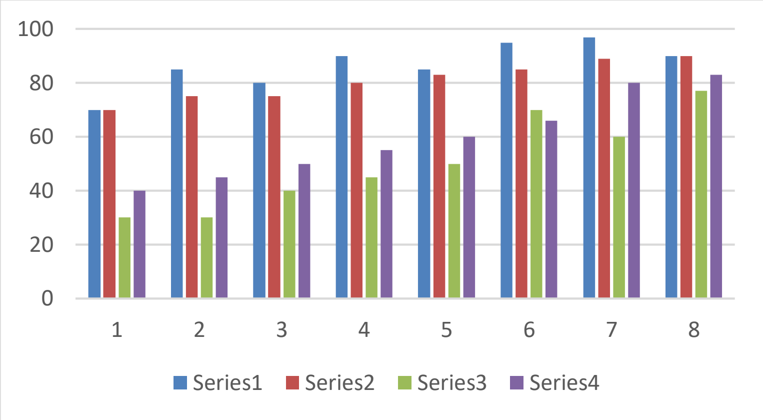
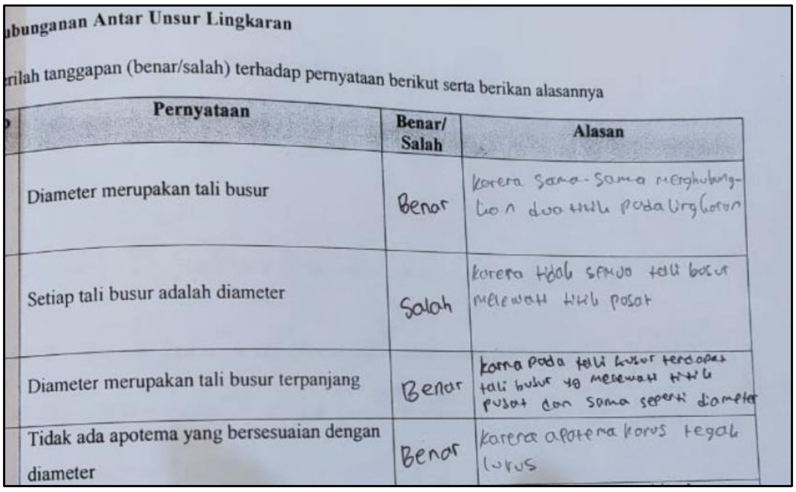


Figure 8. Observation results of the implementation stage

As the meeting progressed, students began to get used to the generative learning model. Students followed every step well. Figure 8 shows that learning activities at this stage are getting better. At this stage the student's individual communication skills were continuously explored. At this stage students were required to be able to explore the concepts that had been learned and put them in written language. Students also learned to form mathematical models, argue and also come up with concept ideas that had previously been studied in their groups. It is impossible to teach everything that students may need in their future lives, so what is usually taught in education tends to become the foundation for future students, they at all levels are expected to adapt and apply in their future learning (Tobias, 2010). Mathematical communication skills need to be explored. Practicing mathematical communication in the teaching and learning process is a strategy to develop students' thinking skills through mathematical speaking, discussion and stimulation of questions that explore abilities (Kaya & Aydin, 2016).

The last stage in the generative learning model is the review. Students were given the opportunity to evaluate the weaknesses of the concept, then choose the methods that were most effective in solving the problem. Students were also expected to be able to recall the concepts that have been studied as a whole. Teachers saw a number of benefits associated with mathematical communication, they believed that mathematical communication was very useful for monitoring student learning (Kaya & Aydin, 2016). This stage provided opportunities for students to reveal what they have done and are doing. What he did was in accordance with what he thought. Figure 9 shows an example of the activity at the review.



...bunganan Antar Unsur Lingkaran

...rilah tanggapan (benar/salah) terhadap pernyataan berikut serta berikan alasannya

Pernyataan	Benar/ Salah	Alasan
Diameter merupakan tali busur	Benar	karena sama-sama menghubung-kan dua titik pada lingkaran
Setiap tali busur adalah diameter	Salah	karena tidak semua tali busur melewati titik pusat
Diameter merupakan tali busur terpanjang	Benar	karna pada tali busur terdapat tali busur yg melewati titik pusat dan sama seperti diameter
Tidak ada apotema yang bersesuaian dengan diameter	Benar	karena apotema harus tegak lurus

Figure 9. Example activity sheet from the review

Significant interactions were found between the generative learning strategies and the grouping conditions were revealed, this implication sequences the generative learning strategies (Ritchie & Volkl, 2000). The different ways of communicating in learning, there should be different responses shown by students, the challenges can give good responses such as enthusiasm, or not responding to the teaching and learning process (Minarti & Wahyudin, 2019). The stage of looking back to reinforce the concepts students have learned. Understanding the concept is needed in learning mathematics, because through understanding the concept students can communicate ideas well. Understanding the concept of students is needed to reduce errors in solving problems, it is the result of an unfounded design of knowledge and experience and no further verification is required, therefore it is necessary to learn through investigative and observation activities (Minarti et al., 2018).

The aspects observed at this stage were: (1) making conclusions regarding learning outcomes; (2) paying attention to the teacher's explanation of the material to be discussed next; (3) ending learning in an orderly manner; description of activity at the stage of looking back, which allows the improvement of students' communication skills. The results are as follows:

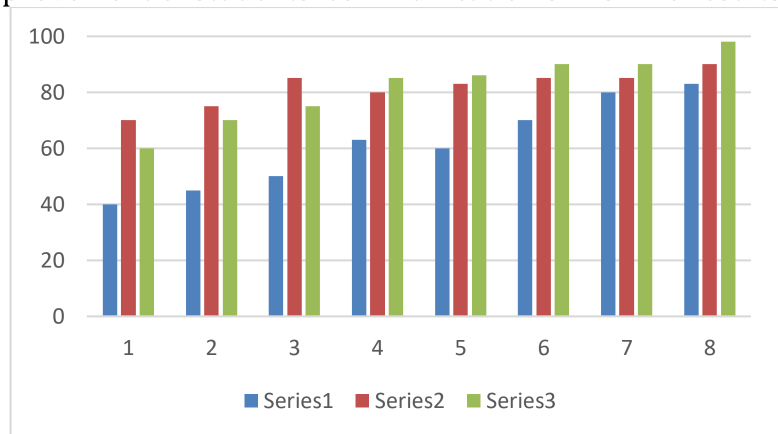


Figure 10. Observation results from the review

Figure 10 is a picture of the results of observations of student activities at the review stage. It was found that students were able to involve themselves in making conclusions to end learning in an orderly manner. At this stage, students' mathematical communication skills are still being explored, through disclosing students' arguments against the material being studied. Generative learning strategies can improve student assessment of learning and self-regulation, this is the benefit of self-reported learning assessments, so students are sensitive to the benefits of learning (Pilegard & Fiorella, 2016). Learning that involves students with problem solving has a high effect on the mathematical communication skills of junior high school students (Susanti et al., 2020).

2. Student Responses to Generative Learning

Researchers analyzed student responses, the purpose of analyzing student responses was to find out how students assessed the generative model learning that had taken place. Assessment of student responses were in the form of a closed questionnaire using a Likert scale. The criteria for student assessment of this generative learning model were: (1) interest in circle learning material; (2) activeness in participating in learning; (3) enjoy participating in learning; (4) seriousness in participating in learning; (5) confident in asking questions; (6) confident in answering; (7) bold in communicating ideas; (8) happy to solve the problems given; (9) likes to work in groups; (10) enjoy working individually; (11) able to make conclusions in learning. From 25 statements with 11 categories, the following results were obtained:

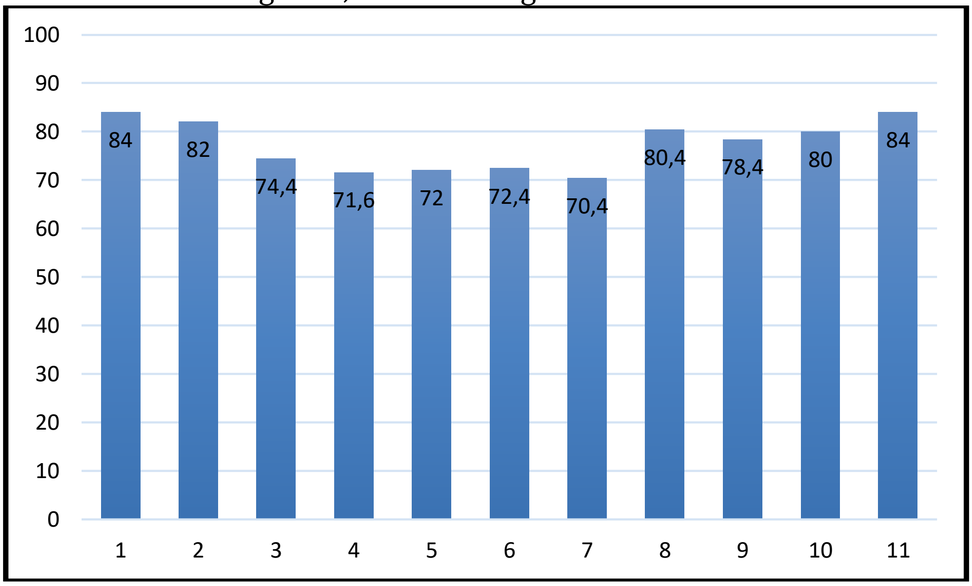


Figure 11. Questionnaire results

The results of Figure 11 show that the percentage of students' responses to generative learning models is good. Students have the courage, enthusiasm and good interest in learning by using a generative learning model. This can be seen from the percentage of each category showing good results. The lowest percentage is 70.4% and the highest is 84%, meaning that more than 50% of students respond well to generative learning and generative learning activities can train students' communication skills at each stage. Generative learning model encourages students to be involved in learning strategies so as to improve learning outcomes and student self-regulation in learning (Pilegard & Fiorella, 2016).

Students' mathematical communication skills are stimulated at each stage of the generative learning model. This communication ability is an ability that should be possessed by students. Students 'mathematical communication skills still need to be developed, so that mathematics teachers do not only teach mathematics but they must stimulate students' mathematical communication skills with activities that initiate creative and innovative learning (Rohid et al., 2019). Generative Learning Mode is a learning model that supports students' communication opportunities, Wittrock in (Reid & Morrison, 2014) the generative learning model explains the relationship between learners and information that is understood and explains the process carried out, it connects new information with existing knowledge. Generative learning in research education in the context of developing towards a knowledge society, in a modern knowledge culture, formulating generative didactic concepts and explicitly the main principles of generative learning, providing practical information about the implementation of research education (Karpov, 2016). Generative learning strategies for processing text include a variety of methods, generative learning techniques such as underlining, taking notes, summarizing key ideas, generating questions, and making conclusions and predictions from text to improve reading comprehension so as to improve mathematical application (Reid & Morrison, 2014).

D. CONCLUSION AND SUGGESTIONS

Based on the research that had been done, the generative learning model was a learning model that could help students develop their mathematical communication skills. Generative learning model through five stages of learning carried out, each stage stimulates mathematical communication skills. At the orientation stage, students were directed to connect new knowledge with existing knowledge, knowledge from the initial conception will produce meaning and understanding of students in learning that students must express orally or in writing. The second stage is the expression of ideas, students' mathematical communication was further explored here, because at this stage, students presented their ideas and concepts so that the teacher can find out the initial ideas or concepts regarding the material to be taught. (Maknun, 2015)research reveals that the generative learning model has a better impact in increasing concept mastery, proficiency in making logical inference, and proficiency in making mathematical modeling for students, and he concludes, this model has a better impact in improving generic science skills than students. The third stage is the challenge and reconstruction stage, at this stage students were trained to solve problems, through groups students are trained to pay attention to the division of group tasks, give ideas related to assignments, are also trained to ask questions related to assignments at this stage students also learn to respect by paying attention to friends' explanations. The fourth stage is implementation, after students learn in groups, at this stage the students were again challenged to solve the problems individually. And express it in front of the class. In this circle material the questions given explore the students' ability to make image perceptions, translate images, and form mathematical models, argue and also bring up concept ideas that have previously been studied in the group. The last stage in the generative learning model is the review, students evaluated the weaknesses of the concept they have, then choose the most effective way to solve the problem. At this stage, students' mathematical communication skills were still trained. (Wittrock, 2010), revealed that the generative learning model develops reading comprehension, personal memories and previous experiences on the material being studied, provides knowledge and to construct new meanings for the text. Wittrock in (Reid & Morrison, 2014), revealed that the generative learning model develops reading comprehension, personal memories and previous experiences on the material being studied, provides knowledge and to construct new meanings for the text.

At each meeting in learning circle material with this generative learning model, students have given better responses. Students have been more active and trained to develop communication skills until they have been able to express conclusions. Student responses during learning based on questionnaire data have also shown a positive response. it can be seen from, students were more excited, happy and motivated. Motivation is indispensable in the teaching and learning process, because with good motivation students have curiosity and become focused in receiving lessons. When teachers are willing to build caring relationships with students, learn about individual needs and strengths, and provide support so that students tend to be strongly motivated, they will be actively involved in learning activities, thus enabling them to excel academically (Yu & Singh, 2018).

The generative learning model is suitable for stimulating students' communication skills, however, this learning model must be designed by thinking about the learning time and the suitability of the subject matter. This model requires a long time in the learning process of teaching, and requires supporting modules to support it. This model has also not been tested for a pandemic like this, there has not been a trial for the application of the generative learning model with the online method. This is an opportunity for further researchers to collaborate on a generative learning model with online facilities. There are still many things that can be explored regarding the application of generative learning models, both suitable material or any suitable subject for it.

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