# PROSIDING
# SEMINAR NASIONAL JURUSAN MATEMATIKA 2023

**"Transformasi Matematika dan Teknologi Menuju Generasi Matematika Unggul untuk Pendidikan Indonesia Maju"**

**Kamis, 9 November 2023**
**Aula lantai 3 Gedung FMIPA**

**Penyelenggara :**

**Jurusan Matematika**
**Fakultas Matematika dan Ilmu Pengetahuan Alam**
**Universitas Negeri Medan**



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**"Transformasi Matematika dan Teknologi Menuju Generasi Matematika Unggul untuk Pendidikan Indonesia Maju"**

**Universitas Negeri Medan, 09 November 2023**

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## KATA PENGANTAR
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Segala puji dan syukur kepada Allah SWT atas terbitnya Prosiding Seminar Nasional Jurusan Matematika (SEMNASTIKA) FMIPA Universitas Negeri Medan. Prosiding ini merupakan kumpulan artikel ilmiah yang telah dipresentasikan pada kegiatan SEMNASTIKA 09 November 2023 di Aula Gedung Prof. Syawal Gultom, Universitas Negeri Medan. Adapun cakupan bidang kajian yang disajikan dalam prosiding ini meliputi Matematika, Statistika, Ilmu Komputer, dan Pendidikan Matematika.

Dengan mengangkat tema seminar, "Transformasi Matematika dan Teknologi Menuju Generasi Matematika Unggul untuk Pendidikan Indonesia Maju", kami mengharapkan SEMNASTIKA dapat turut serta berkontribusi bagi perkembangan ilmu pengetahuan jurusan matematika sebagai wadah bagi para peneliti, praktisi, penggiat pendidikan matematika dan pengguna untuk terjalinnya komunikasi dan diseminasi hasil-hasil penelitian.

Kegiatan SEMNASTIKA dan prosiding ini dapat diselesaikan dengan baik tidak terlepas dari bantuan berbagai pihak, oleh sebab itu kami mengucapkan banyak terimakasih kepada:

1. Pimpinan Universitas Negeri Medan
2. Dekan FMIPA dan para Wakil Dekan FMIPA Universitas Negeri Medan
3. Para Narasumber yaitu Bapak Prof. Dr. Janson Naiborhu, M.Si., Bapak Mangara Marianus Simanjorang, M.Pd., Ph.D dan Bapak Ahmad Isnaini, M.Pd.
4. Ketua Jurusan Matematika FMIPA Universitas Negeri Medan
5. Para Ketua Program Studi di Jurusan Matematika Universitas Negeri Medan
6. Panitia SEMNASTIKA
7. Pemakalah dan Peserta SEMNASTIKA
8. Semua pihak yang terlibat dalam pelaksanaan SEMNASTIKA

Kami menyadari bahwa buku prosiding ini masih jauh dari kata sempurna, karena itu kami mengharapkan kritik dan saran yang membangun dari para pembaca untuk perbaikan selanjutnya. Akhirnya, kami menghaturkan maaf jikalau ada hal-hal yang kurang berkenan bagi para pembaca serta ucapan terimakasih kepada semua pihak yang telah berkontribusi bagi terbitnya buku prosiding ini. Semoga buku prosiding ini dapat memberikan manfaat sesuai dengan yang diharapkan.

Medan, November 2023
Ketua Panitia,

Susiana, S.Si., M.Si.
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## KATA PENGANTAR
## DEKAN FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
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Puji dan Syukur kepada Allah SWT atas segala rahmat dan anugerah-Nya sehingga Prosiding Seminar Nasional Jurusan Matematika dengan tema "Transformasi Matematika dan Teknologi Menuju Generasi Matematika Unggul untuk Pendidikan Indonesia Maju" yang diselenggarakan oleh Jurusan Matematika FMIPA Universitas Negeri Medan pada hari Kamis, 09 November 2023 di Medan dapat diselesaikan.

Publikasi prosiding ini bertujuan untuk memperluas wawasan pengetahuan yang berasal dari para akademisi baik dari Universitas Negeri Medan maupun yang berasal dari luar Universitas Negeri Medan. Selain itu, prosiding ini juga sebagai sarana untuk mengkomunikasikan hasil penelitian dengan menyajikan topik-topik terbaru yang meliputi bidang Pendidikan Matematika, Statistika, Ilmu Komputer dan Matematika.

Kami mengucapkan terimakasih dan apresiasi yang setinggi-tingginya kepada semua pihak yang telah berkontribusi dalam Seminar Nasional Jurusan Matematika, baik sebagai keynote speakers yaitu Prof. Dr. Janson Naiborhu, M.Si., Mangara Marianus Simanjorang, M.Pd., Ph.D dan Ahmad Isnaini, M.Pd., reviewer makalah, peserta dam panitia yang terlibat. Akhir kata, semoga Prosiding Seminar Nasional Jurusan Matematika ini bermanfaat bagi kita semua sehingga dapat memberikan kontribusi maksimal bagi negara dan bangsa.

Medan, November 2023
Dekan

Prof. Dr. Fauziyah Harahap, M.Si
NIP. 196607281991032002

**KATA PENGANTAR**
**KETUA JURUSAN MATEMATIKA**
**FMIPA UNIVERSITAS NEGERI MEDAN**

Dengan penuh rasa syukur kepada Allah SWT, prosiding Seminar Nasional Jurusan Matematika FMIPA Universitas Negeri Medan ini dapat diselesaikan. Kemajuan ilmu pengetahuan dan teknologi di era ini sangat berdampak bagi kehidupan manusia. Kajian penelitian terkait perkembangan ilmu pengetahuan dan teknologi serta terapannya perlu disosialisasikan kepada khalayak. Seminar Nasional Jurusan Matematika merupakan forum diskusi ilmiah yang sangat penting dalam pengembangan dan penyebaran pengetahuan di bidang matematika yang meliputi pendidikan matematika, statistika, ilmu komputer dan matematika (non pendidikan). Melalui buku prosiding ini, kami berupaya untuk menyajikan rangkuman makalah-makalah yang telah dipresentasikan, serta memberikan wadah bagi pembaca untuk menjelajahi gagasan-gagasan cemerlang yang ditawarkan dan penelitian-penelitian terkini yang dihasilkan oleh para akademisi, peneliti, dan praktisi matematika.

Tema seminar kali ini, "Transformasi Matematika dan Teknologi Menuju Generasi Matematika Unggul untuk Pendidikan Indonesia Maju", mencerminkan komitmen kami untuk terus menghadirkan diskusi yang relevan dan mendalam mengenai isu-isu terkini dalam dunia matematika. Melalui buku ini, kami berharap pembaca dapat m engeksplorasi berbagai sudut pandang, temuan, dan pemikiran-pemikiran baru yang dapat memperkaya wawasan serta menginspirasi penelitian dan pengembangan dan ilmu matematika.

Secara khusus, kami mengucapkan terimakasih kepada para narasumber, yaitu : Prof. Dr. Janson Naiborhu, M.Si., Mangara Marianus Simanjorang, M.Pd., Ph.D dan Ahmad Isnaini, M.Pd., yang telah membagikan ilmunya dalam kegiatan seminar. Terimakasih yang tulus juga kami sampaikan kepada semua pihak yang telah mendukung kegiatan ini, para pimpinan Universitas Negeri Medan dan para pimpinan FMIPA Universitas Negeri Medan. Apresiasi yang tinggi juga saya ucapkan teruntuk para penulis, reviewer, dan panitia yang telah berperan aktif dalam pembuatan buku prosiding ini. Kontribusi dari setiap individu adalah pondasi kesuksesan acara ini, dan semangat kolaboratif ini sangat berharga bagi perkembangan ilmu matematika.

Akhirnya, kami berharap buku prosiding ini dapat menjadi sumber pengetahuan yang bermanfaat dan memotivasi pembaca untuk terus menggali potensi dalam bidang matematika. Mari kita bersama-sama memperkuat dan memajukan ilmu matematika demi keberlanjutan pembaruan pengetahuan.

Medan, November 2023

Ketua Jurusan Matematika

Dr. Pardomuan Sitompul, M.Si
NIP.196911261997021001

## SUSUNAN ACARA

| Waktu | Kegiatan | PIC |
|---|---|---|
| 08.00 - 08.30 | Pendaftaran Ulang | Panitia |
| 08.30 - 09.00 | Acara Pembukaan<br>1. Salam Pembuka<br>2. Menyanyikan Lagu Indonesia Raya<br>3. Doa<br>4. Laporan Ketua Pelaksana<br>5. Sambutan dan Pembukaan acara seminar oleh Dekan Fakultas Matematika dan Ilmu Pengetahuan Alam<br>6. Foto Bersama | MC:<br>Putri Maulidina Fadilah, S.Si., M.Si<br>Nurul Ain Farhana, M.Si<br>Khairuddin, M.Pd.<br>Susiana, S,Si., M.Si.<br>Prof. Dr. Fauziyah Harahap,M.Si |
| 09.00 - 10.00 | Pembicara I<br>Prof. Dr. Janson Naiborhu, M.Si<br>(Guru Besar Matematika ITB) | Moderator:<br>Yulita Molliq Rangkuti, M.Sc., Ph.D |
| 10.00 - 11.00 | Pembicara II<br>Mangaratua Marianus Simanjorang, M.Pd. Ph.D (Dosen Jurusan Matematika UNIMED) | Moderator:<br>Andrea Arifsyah Nasution, S.Pd., M.Sc. |
| 11.00 - 11.45 | Pembicara III<br>Ahmad Isnaini, M.Pd (Guru berprestasi Nasional) | Moderator:<br>Dinda Kartika, S.Pd., M.Si. |
| 11.45 - 13.00 | ISOMA | |
| 13.00 - 14.30 | Sesi I : Seminar Paralel | Moderator<br>Pemakalah Pendamping |
| 14.30 - 16.00 | Sesi II: Seminar Paralel | Moderator<br>Pemakalah Pendamping |
| 16.00 | Penutupan acara oleh Dekan FMIPA | MC |

**KEYNOTE SPEAKER**

KEYNOTE SPEAKER 1

# Prof. Dr. Janson Naiborhu, S.Si., M.Si.

Prof. Janson Naiborhu memiliki dua gelar doktor yang ia peroleh dari Keio University (Jepang) dan Institut Teknologi Bandung. Kariernya sebagai dosen dimulai sejak tahun 1991, sejak ia bergabung sebagai Dosen FMIPA ITB, dengan Kelompok Keahlian Matematika Industri dan Keuangan. Ia menjadi Guru Besar sejak 1 Desember 2014 dan Pembina Utama Muda/Gol IV C sejak 1 April 2011.

Prof. Janson aktif dalam melakukan riset dan telah banyak menghasilkan jurnal ilmiah baik nasional maupun internasional. Namanyapun telah dikenal luas di dunia pendidikan dan industri, khususnya dalam bidang Matematika.

KEYNOTE SPEAKER 2

# Mangaratua M Simanjorang, M.Pd., Ph.D

Mangaratua M Simanjorang, M.Pd., Ph.D adalah dosen Pendidikan Matematika di Universitas Negeri Medan. Beliau meraih gelar sarjana di Universitas HKBP Nomensen tahun 2003, dan di tahun 2007 beliau mendapat gelar magister dari Universitas Negeri Surabaya. Beliau melanjutkan program doktor di Murdoch University, Australia dan memperoleh gelar Ph.D tahun 2016. Fokus pada pendidikan matematika, beliau melaksanakan tridarma universitas, beliau mendapatkan penghargaan sebagai dosen muda terbaik tahun 2009.

Dengan menjadi reviewer dan narasumber dibanyak kegiatan seminar, beliau berbagi ilmu dalam bidang pendidikan matematika, pendidikan karakter dan media pembelajaran seperti *augmented reality*.

KEYNOTE SPEAKER 3

# Ahmad Isnaini M.Pd.

Ahmad Isnaini, M.Pd adalah seorang pendidik yang memiliki dedikasi tinggi terhadap dunia pendidikan. Ia meraih gelar Sarjana Pendidikan Matematika dari Universitas Negeri Medan pada tahun 2010, kemudian melanjutkan studi pascasarjana dan meraih gelar Magister Pendidikan Matematika pada tahun 2019 dari universitas yang sama. Saat ini, Ahmad sedang mengejar gelar Doktor dalam bidang yang sama di Universitas Negeri Medan.

Ahmad Isnaini juga telah mengukir prestasi gemilang dalam berbagai kompetisi dan olimpiade. Sebagai Finalis Apresiasi GTK 2023 BBGP Sumatera Utara Tingkat Provinsi dan penerima berbagai medali emas, perak, dan perunggu dalam Olimpiade Guru tingkat Nasional dan Provinsi, Ahmad Isnaini memperlihatkan dedikasinya dalam pengembangan kemampuan diri dan juga siswanya.

Tidak hanya aktif di dunia akademis, Ahmad Isnaini juga telah berkontribusi dalam literatur pendidikan. Karya-karyanya yang terpublikasi dalam jurnal nasional dan internasional, serta buku-buku seperti "Guru Merdeka" (2020) dan "Inovasi Pembelajaran" (2018), mencerminkan pemikiran dan wawasan yang mendalam dalam bidang Pendidikan.

# DAFTAR ISI

# ANALYSIS OF STUDENT'S MATHEMATICAL COMMUNICATION ABILITY IN THE IMPLEMENTATION OF THE JIGSAW TYPE COOPERATIVE LEARNING MODEL IN SMP NEGERI 35 MEDAN

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## Abstract

*This research aims to describe the level of student's mathematical communication abilities in the application of the Jiigsaw Type Cooperative learning model, and to analyze student's difficulties in solving mathematical communication problems after applying the Jiigsaw Type Cooperative learning model. This research is a descriptive qualitative research. The results of the research were obtained as follows: (1) The level of mathematical communication ability of class VIII-6 students of SMP Negeri 35 Medan with the application of the Jiigsaw type cooperative learning model showed that out of 30 students it was found that the number of students with deficient assessment categories totaled 6 students (20%), students with good enough criteria totaled 4 students (13.33%), students with good criteria totaled 12 students (40%), and students with very good assessment criteria totaled 8 students (26.67%). (2) The difficulties faced of class VIII-6 students of SMP Negeri 35 Medan in their mathematical communication abilities were deficient, namely experiencing difficulties with fact, principle, and concept. For students with good enough mathematical communication skills, students have difficulties in fact, concept and operation. For students with good mathematical communication skills, students have difficulties in fact and operation.*

**Key Word***: Jiigsaw Type Cooperative Learning Model, Mathematical Communication Abilities, Mathematical Difficulties.*

## 1. INTRODUCTION

Education is an effort that plays an important role in improving human resources in Indonesia. Through education, humans gain experiences that can develop all the potential of human personality and abilities that are useful for themselves and society. Indonesia has high hopes for education in the future development of this nation because it is from education that the nation's young shoots of hope as the successor of generations are formed. This is same with (Ahmadi, 2014), which states that: "Education is a process of bringing about cool changes in human behavior. Education can also be defined as the process of processing knowledge and habitual habits through learning or study.

Meanwhile, the functions and objectives of education in Law of the Republic of Indonesia Number 20 of 2003, Chapter II Article 3 are stated as follows: "National education develops the ability and shapes the character and civilization of a nation that is steadfast to educate the nation's life, which aims to develop the potential of students to become human beings who are sincere and fearful of God The Almighty, has a noble character, is healthy, knowledgeable, capable, creative, and becomes a democratic and responsible citizen" (Ahmadi, 2014).

Given the importance of the role of education, the quality of education should continue to be developed. Chomaidi (2018) stated that: "Improving the quality of education can be done by improving the quality of teachers in the teaching process that has been implemented by the government and other educational institutions through various activities, including conducting teacher upgrades, providing opportunities to improve learning, curriculum renewal, pre-service program training, providing educational facilities and infrastructure, literature, laboratories. However, the education achieved is sometimes satisfying. Therefore, the role of teachers in efforts to improve the quality of students in the teaching and learning process is improved through education".

One of the subjects in the learning process which has an important role in mathematics. Mathematics is a universal science that is useful for human life and also underlies the development of modern technology, and has an important role in various disciplines and advances human thinking. In the 2013 curriculum, it is stated that mathematics subjects need to be given to all students from elementary to high school to equip students with logical, analytical, systematic, critical, innovative, and creative thinking skills, as well as the ability to work together (Apriza, 2019).

Learning mathematics has several objectives. The purpose of learning mathematics based on the regulation of the Minister of National Education Number 22 of 2006 regarding graduation competency standards is so that students have four ability. Of the four learning objectives based on Permendikbud Number 22 of 2016, one of them is to communicate arguments or ideas with diagrams, tables, and symbols. This shows that mathematical communication ability are very much needed by students to have.

The importance of communication ability in mathematics learning was also stated by Susanti et al., (2018) who stated that "Mathematical communication is a conveyance of mathematical ideas itself, Thus, through communication, students are expected to understand mathematics which has an important role in learning mathematics, to support and understand students to learn properly active".

The mathematical communication ability of each individual will affect the learning process and outcomes that are related. According to Baroody (Asikin and Junaedi, 2013), there are two important reasons why communication in mathematics needs to be developed among students. First, mathematics is language, meaning that mathematics is not just a tool to aid thinking, a tool for finding patterns, solving problems, or drawing conclusions, but mathematics is also a valuable tool for communicating ideas, precisely, and carefully. Second, mathematics learning is a social activity, meaning as a social activity in mathematics learning, mathematics is also a vehicle for interaction between students and also communication between teachers and students.

From the explanation above, it can be concluded that mathematical communication ability are very important in the learning process. Students are not only required to convey their mathematical ideas orally, but also in writing using diagrams, tables, and symbols. But the reality in the field shows that the results of mathematics learning in Indonesia are still far from what was expected. The mathematics skills of students in Indonesia are at a low level. This is supported by the results of the 2016 Trends in International Mathematics and Science Study (TIMSS) report, showing that Indonesia is ranked 46 out of 51 participating countries. The highest score was obtained by Singapore with a score of 618 (50% higher than Indonesia). In addition, based on data from the Program for International Student Assessment (PISA) in 2018, Indonesia was ranked 72nd out of 78 with an average score of 379 and the average world score for mathematics was 489. This shows that the mathematics learning achievement of Indonesian students is still very low (Septiani et al., 2020). In the Program for International Student Assessment (PISA) test, there are 4 mathematical abilities assessed, namely comprehension, problem-solving, reasoning skills, and communication ability at a low level, where one of the aspects measured is student's mathematical communication ability.

This is same with the results of an analytical study conducted by Wardhani & Rumiati, the cause of the low mathematics achievement of Indonesian students in the TIMSS results are caused by Indonesia's weakness in working on problems that require several abilities, one of which is mathematical communication ability (Salam, 2017).

In addition, several factors cause low student learning outcomes, namely learning materials that are considered difficult, teacher reception in teaching that is not good, and teaching strategies or methods that are still conventional. Mahmuzah and Aklimawati (2016) states that: "The low mathematical communication ability of students in mathematics learning need serious attention from all circles, especially mathematics teachers. Many factors cause low communication ability of students in the learning process. One is (conventional) teacher-centered learning that does not provide opportunities for students to develop ideas and express their opinions."

The 2016 Ministry of Education and Culture publication shows the fact that Medan State Middle School is not included as a national-level outstanding school. One of the schools that caught the attention of researchers was SMP Negeri 35 Medan. Puspendik Kemendikbud points out the fact that the National Middle School 35 Medan National Examination results in 2018 are in the low category, namely ranking 40 out of 45 schools with an average score of 47,97.

The results of the initial observation test given to 31 students in class VIII-6 of SMP Negeri 35 Medan showed that student's mathematical communication abilities were in the very low category with an average class score of 44.5 where students who had achieved completeness were 7 out of 30 students or as much as 23.33%. Based on student answer sheets, it was found that there were still many student errors in answering the questions given, even though the material had been studied before. Therefore, it can be concluded that the average mathematical communication ability of class VIII-6 students at SMP Negeri 35 Medan is still relatively low. When making observations, researchers conducted interviews with teachers who teach mathematics at the school. The teacher said that in general the learning process that took place was still teacher-centered so student's active participation was still low in terms of asking questions, answering questions, expressing opinions or ideas, discussing with other students, and learning models were still lacking varied during the learning process.

To overcome this problem, an interesting learning model is needed and can generate student's knowledge and mathematical communication ability in the teaching and learning process. The learning model that supports this is the cooperative learning model. Huda (2014) shows that: "The cooperative learning model is an effective teaching strategy in improving student achievement and socialization and also contributes to improving their attitudes and perceptions regarding the importance of learning and working together, as well as the understanding of their friends who have different backgrounds."

Cooperative learning has several types, but in this study, researchers are interested in using *Jigsaw* cooperative learning. According to Arends (Wui, 2021), The *Jigsaw* type cooperative learning model is a learning model in which learning is carried out in small groups consisting of 4 or 6 random people who work together, with positive interdependence and are responsible for completing part of the the material being studied and conveying it to other group members. This of course will lead to interaction between students in groups to improve student's mathematical communication ability.

The benefits of applying the *Jigsaw* cooperative learning type can be seen from the learning steps, namely: (a) Students are grouped with about 4 members, (b) Each person in the group is given different material and assignments (c) Members of different groups different from the same assignment forming a new group (expert group) (d) After the expert group has a discussion, each member returns to the original group and explains to the group members about the sub-matter they master (e) Each expert group presents the results of the discussion (Rusman, 2018). In this case, students learn to work together to the maximum learning experience, both individually and in a group experience.

Based on research conducted by Tiara et al. (2020) that there is a significant difference between students who take part in learning by applying the *Jigsaw* cooperative learning model and students who take part in learning by applying the direct learning model. In the *Jigsaw* cooperative learning model, each student is allowed to work with members of their group to manage information and interact as a whole, while the teacher's position is sufficient to be a facilitator when students experience difficulties. Furthermore, research conducted by Elviarni (2018), descriptively stated that the process of completing student answers using the *Jigsaw* type of cooperative learning is better than the STAD type of cooperative learning. Strengthened by the results of Wui's research (2021), which states that after implementing the *Jigsaw* cooperative learning model, student's mathematical communication ability show an increase in ability, where as many as 6 students or 20%, namely 20 people or 66.67% in the cycle I become 26 people or 86.67%.

Based on the problem regarding the low level of student's mathematical communication, the researcher was interested in conducting a study entitled, "Analysis of Student's Mathematical Communication Ability in the Implementation of the *Jigsaw* Type Cooperative Learning Model in SMP Negeri 35 Medan".

## 2. RESEARC METHOD

This research uses qualitative research, case studies that use qualitative data with quantitative as a facilitator/auxiliary tool which aims to describe student's mathematical communication ability through the application of the Jigsaw type cooperative learning model and uncover the various difficulties students experience when solving problems with 3 indicators of mathematical communication ability. The type of research conducted is a case study where this research discusses more deeply about an individual, a group, an organization, an activity program, or a condition at a

certain place and time with the aim of obtaining a complete and in-depth description and then analyzing it to produce a theory (Sani et al., 2018).

The subjects of this study were 31 students in class VIII-6 of SMP Negeri 35 Medan, who would be treated with the application of the Jigsaw cooperative learning model in the even semester of the 2022/2023 academic year. The selection of research subjects was based on a purposive sampling technique. Purposive sampling is a sample determination technique with certain considerations (Sugiyono, 2019). The reason for using a purposive sampling technique is because not all subjects have criteria that match the phenomenon under study. The subjects in this study will be taught by applying the Jigsaw cooperative learning model in the even semester of the 2022/2023 school year and the material that will be tested is material on flat-sided spaces.

The object of this research is the ability and difficulty of mathematical communication of Class VIII-6 students of SMP Negeri 35 Medan in the 2022/2023 Academic Year who learn to use the Jigsaw type cooperative learning model on flat sided geometric material. Data collection techniques are the most important step in research because the main goal of the research is to obtain data (Sugiyono, 2019). To get good results from this study, the data collection techniques that researchers used in this study are as follows: test, interview and documentation. In this study, the data analysis used was qualitative data analysis, where data analysis was carried out after giving a learning action.

Data on students' mathematical communication ability test results were analyzed descriptively with the aim of describing the level of students' mathematical communication ability after implementing the contextual learning model. The length of the value interval can be determined by:

**Table 1**. Level of Mathematical Communication Ability

| Interval Score | Category |
|---|---|
| $0 < SKKM \leq 65$ | Deficient |
| $65 < SKKM \leq 78$ | Good Enough |
| $78 < SKKM \leq 91$ | Good |
| $91 < SKKM \leq 100$ | Very Good |

Note:

SKKM: Mathematical Communication Ability Score obtained from the following formula:

$$SKKM = \frac{score\ obtained}{maximal\ score} \times 100$$

## 3. RESEARCH RESULT AND DISCUSSION

### The Level of Student's Mathematical Communication Ability of All Indicators in the Application of the *Jigsaw* Cooperative Learning Model

The level of mathematical communication ability of class VIII-6 students of SMP Negeri 35 Medan in the application of the *Jigsaw* cooperative learning model is relatively high. There are 24 students who have achieved KKM (Minimum Completeness Criteria) or 80% which are divided into 3 categories, namely good enough, good, and very good. While students who are under KKM or $0 \leq SK < 65$ are 6 students or 20%. Students who have not reached the KKM are students who make the most mistakes so they cannot fulfill the three indicators of mathematical communication ability for each question. From the test results, it is known that some students who have reached the KKM also still make some mistakes in answering the mathematical communication test questions so that they do not meet the indicators of mathematical communication ability. The results of the testing process can be seen in Table 2:

**Table 2.** Result of Student's Mathematical Communication Ability Test

| Value Intervals | students | Percentage | Criteria |
|---|---|---|---|
| $0 \leq SK < 65$ | 6 | 20% | Deficient |
| $65 \leq SK < 78$ | 4 | 13,33% | Good Enough |
| $78 \leq SK < 91$ | 12 | 40% | Good |
| $91 \leq SK \leq 100$ | 8 | 26,67% | Very Good |

From the results of the classification based on each indicator of mathematical communication ability, it was found that out of 30 students, as many as 15 students or 50% achieved a very good ($91 \leq$ SKKM $\leq 100$) score, which means they were able to fulfill the 1st indicator of Student's mathematical communication ability on each item. For the second indicator, as many as 5 people or 16,67% achieved the very good score, which means they were able to fulfill the second indicator of mathematical communication skills in each item. For the third indicator, it was found that as many as 9 students or 30% achieved the very good score, which means they were able to fulfill the 3rd indicator of Student's mathematical communication skills in each item.

Based on the classification and explanation above, it can be concluded that the mathematical communication skills that are built with the *Jigsaw* cooperative model look quite significant, although there are still students who have not reached the KKM or who are in a deficient assessment category. However, indicators 1 and 3 seem more developed. This means that the percentage of students who meet the 1st and 3rd indicators with a very good score is much higher than students who fulfill indicator 2. There are still many students who have not fulfilled indicator 2, namely *Mathematical Expression.*

This research is supported by Nam (2019) found that it was confirmed that the average of the experimental groups applying the Jigsaw model was higher than the average of the comparative group in the lecture class. In line with that, the results of this study are in accordance with research conducted by Yeubun, et al. (2020), which concluded that learning

mathematics through the *Jigsaw* type cooperative learning model has an effect on improving Student's mathematical communication skills. After completing the provision of learning materials in one Basic Competency, at the end of the lesson the researcher gave a posttest to the research subjects. And based on the posttest results of class XII Industrial Chemistry SMK Pandeglang Banten, the highest score was 88.00 and the lowest score was 64.00 with an average score of 77.27. There were 8 students belonging to the very good category, 9 students belonging to the good category and 5 students belonging to the good enough category.

Furthermore, research conducted by Siregar, et al. (2019) showed that after the pretest and posttest, 58.81 in the pretest became 81.13 in the posttest. Through the homogeneity test, which was carried out with the SPSS 16 sofare, it showed that the results of the calculation of sig = 0.24. This shows that there is a significant effectiveness of the use of the Jigsaw cooperative learning model on Student's mathematical communication skills at SMA Negeri 2 Padang Bolak.

Cooperative learning trains students to be able to actively participate and communicate. One of these cooperative learning models is the Jigsaw cooperative learning model. This type of jigsaw cooperative learning model is a cooperative learning technique in which students have greater responsibility in carrying out learning. This is in accordance with the opinion of Tiara et al. (2020) who say that the Jigsaw type cooperative learning model can involve students to be active during teaching and learning activities. In this model each student is given the opportunity to work with group members to manage information and establish overall interaction.

Burais et al. (2015) show that Jigsaw cooperative learning can improve mathematical understanding and communication skills. Likewise the results of research by Hadijah et al., (2016) showed that Jigsaw type cooperative learning affects the ability to understand mathematical concepts and students' mathematical communication skills. Suendarti (2017) in his research entitled (The Effects of Jigsaw Learning Model on the Ability to Solve Science in Midale East Indonesia Middle School Students) the results show that there is an influence of the jigsaw learning model on students' problem-solving abilities. Sugianto et al. (2014) also obtained research results that all students who studied with the jigsaw cooperative learning type were significantly better at improving mathematical communication skills than students who studied with the STAD cooperative type. Van Dat, et al (2016) shows that in the cooperative jigsaw group are most appreciated by working with others and getting help, discussing and sharing information and teaching others, and enjoying the jigsaw context. Furthermore, Hadijah et al., (2016) concluded that the improvement in the mathematical communication skills of students who took part in learning by applying the jigsaw type cooperative learning model was better than students who took part in learning conventions.

In the following, we will discuss the results of the previously described research on mathematical communication skills in terms of grouping abilities. Further discussion is presented as follows:

**Very Good Ability Mathematical Communication Skills**

The number of students who received $91 \leq SK \leq 100$ or very good assessment criteria totaled 8 people (26,67%). From the results of the scoring carried out on the nine subjects, it was found that students with very good assessment criteria also made several mistakes so that they were not able to fulfill every indicator of mathematical communication ability. The average error made by students is in question number 3. In this study, the representative for mathematical communication abilities with very good groupings was subject S-15.

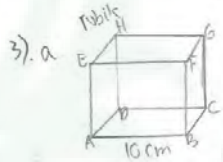


**Figure 1.** Results of TKKM subject S-15 question number 3 1st indicator

Based on Figure 1, it can be seen that subject S-15 did not describe the 2 cube shapes requested in the problem. S-15 was wrong in capturing the information asked in the problem. In the problem, someone is asked to draw an illustration from a Rubik's Cube and cardboard. However, S-15 did not describe the cardboard in the answers, S-15 only described the Rubik's Cube. It can be concluded that the S-15 subject has not been able to fulfill the third indicator of mathematical communication ability, namely the ability of students to draw mathematically

Based on the discussion above, students with very good ability groupings can express mathematical ideas using symbols or mathematical language in writing and the form of mathematical models in solving mathematical problems.

**Good Ability Mathematical Communication Skills**

The number of students who obtained a value interval of $78 \leq SK < 91$ or good criteria totaled 12 people (40%). From the results of the scoring carried out on the test results, it was found that students with good assessment criteria made several mistakes so that they were not able to fulfill all indicators of mathematical communication ability. To find out the indicators that have not been met and the form of errors made, S-07 was chosen as a representative for mathematical communication skills with good grouping. Subject S-07 made a mistake in answering questions number 1 and 3. From the results of the analysis that was carried out on question numbers 1 and

3, subject S-07 was able to fulfill the 1st indicator of mathematical communication, but was still unable to fulfill the 2nd indicator and 3rd.

For the 1st indicator, S-07 can be able to reflect real objects, pictures, in mathematical ideas through illustrations as requested in the questions. In problem number 1, subject S-07 was able to capture the information contained in the problem to describe an illustration of a tissue box in the form of a cuboid complete with its dimensions. In problem number 3, subject S-07 can capture the information contained in the problem to describe an illustration of a cube-shaped rubik and cardboard complete with its dimensions.

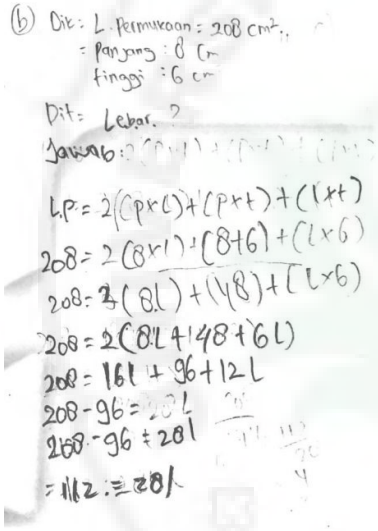


**Figure 2.** Results of TKKM subject S-07 question number 1 on the 2nd indicator

Based on figure 2, subject S-07 made a mistake in determining the width of the cuboid on solution number 1. Because the calculations made in solving the problem were incorrect and incomplete, therefore S--07 did not find the final result of solving the problem. This happened due to the lack of Student's ability to remember the nature of arithmetic operations and understand the questions well. For the 3rd indicator, subject S-07 made a mistake in writing the conclusions from the results obtained. Because the conclusions written in solving the problem were incomplete, so S-07 did not solve the problem correctly. This happened because students were in a hurry to answer questions.

Based on the discussion above, students with good ability groupings have not been able to provide answers using their own language, in a systematic, reasonable, correct, and completely arranged manner. Students with good ability groupings also still make mistakes in carrying out mathematical operations in solving problems regarding the surface area of cuboids.

**Good Enough Ability Mathematical Communication Skills**

The number of students who obtained an interval of $65 \leq SK < 78$ or good enough criteria totaled 4 people (13,33%). From the results of the scoring carried out on the test results, it was found that students with good enough assessment criteria made several mistakes so that they were not able to fulfill all indicators of mathematical communication ability. To find out the indicators that have not been fulfilled and the form of errors that have been made, S-24 was chosen as a representative for mathematical communication skills with a good enough grouping. Subject S-24 made a mistake in answering questions number 2 and 4. From the results of the analysis that was carried out on question number 2 and 4, subject S-24 was able to fulfill the 3rd indicator of mathematical communication, but was still unable to fulfill the 1st indicator and 2nd.

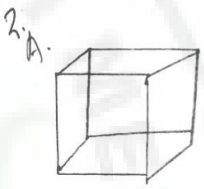


**Figure 3.** Results of TKKM subject S-24 question number 2 1st indicator

Based on figure 3, S-24 is already able to reflect real objects, images in mathematical ideas but is not complete. In problem number 2, subject S-24 was able to capture the information contained in the problem to describe an illustration of a cube-shaped Rubik's Cube, but not complete with its size. In question number 4 subject S-07 can capture the information contained in the problem to describe an illustration of a swimming pool in the form of a cuboid but does not include the length and diagonal of the side cuboids.

For the second indicator of mathematical communication ability, S-24 has not been able to express mathematical ideas using symbols or written mathematical language and the form of mathematical models. Subject S-24 has not been able to understand the symbols contained in the formula for the surface area of a cuboid, so he cannot distinguish s squared from s multiplied by two in question number 2. In problem number 4, subject S-24 made a mistake in determining which element asked the right questions. In the question, asked for the value of the depth of the pool. However, when solving the problem S-24 assumes that the depth of the pool is the width of the pool. Subject S-24 was also wrong in applying the volume formula for a cuboid. The errors above indicate that S-24 has not been able to meet the second indicator of communication skills, namely the ability to express mathematical ideas using symbols or mathematical language in writing and the form of mathematical models.

**Deficient Ability Mathematical Communication Skills**

The number of students who received an core $0 \leq SK < 65$ or a deficient rating category totaled 6 students (20%). From the results of the scoring carried

out on the test results, it was found that students with deficient assessment criteria made many mistakes so that they were not able to fulfill all indicators of mathematical communication ability. To find out the indicators that have not been met and the form of errors that have been made, S-11 and S-28 are selected as representatives for mathematical communication skills with deficient grouping. Subject S-11 made mistakes in answering questions numbers 1 and 4, while subject S-28 made mistakes in answering questions numbers 1, 3, 4. The two subjects above were able to represent mathematical communication abilities in terms of grouping abilities that were not good. From the results of the analysis that has been done, S-11 subjects and S-28 subjects have not been able to fulfill the three indicators of mathematical communication ability.

S-11 subject has not been able to fulfill the first indicator because the S-11 subject does not fully and correctly describe the illustration requested from the question. Subject S-11 has correctly described the illustrations from questions 1 and 4, but did not include information from the questions. However, subject S-28 did not correctly describe the illustrations requested for each question. It can be concluded that S-11 and S-28 have not met the first indicator of mathematical communication skills, namely the ability to reflect real objects, images in mathematical ideas.

For the second indicator, S-11 subjects are still unable to convert the information known in the problem into mathematical symbols. S-11 students are also not able to write down mathematical representations in the form of formulas used in solving mathematical problems. For example, in question number 1, subject S-11 has not been able to apply the formula for the surface area of a cuboid to solve the problem in the problem. S-11 subjects were still seen guessing the answers because they could not use the rotation formula in solving the problems in the questions so they could not do the calculations or get a complete and correct solution. The S-28 subject also made the same mistake who could not make a mathematical model of the problems in word problems. Subject S-28 also wrote the wrong formula. For example, in question number 4, subject S-28 was wrong in writing the formula for the volume of a cuboid. S-28 uses a fast way but does not explain where the formula comes from. S-28 also did not write down the information that was known and asked in full, so that it could not carry out the operation correctly and produce the correct answer. The errors above indicate that the S-11 and S-28 subjects have not met the second indicator, namely the ability to express mathematical ideas using symbols or written mathematical language and the form of mathematical models.

For the 3rd indicator, S-11 and S-28 have not been able to provide answers using their own language, in a systematic, reasonable, correct, and completely arranged manner. For example, in question number 1, S-28 did not get any results from the problems in the questions, so he could not write conclusions in his own language from the results of the answers correctly. It can be seen from this picture:

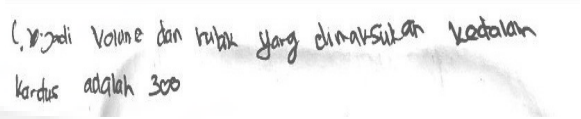


**Figure 4.** Results of TKKM subject S-28 question number 3 3rd indicator

In question number 3, S-11 was unable to write conclusions from the results of the answers correctly. Because the settlement process was carried out incorrectly, S-11 could not provide answers using their own language, in a systematic, reasonable, correct, and completely composed manner. S-11 was unable to determine the volume of the cuboid correctly and precisely so that no conclusions were drawn from the problem. The errors above indicate that S-11 and S-28 cannot meet the third indicator of communication skills, namely the ability to provide answers using their own language, in a systematic, reasonable, correct, and completely arranged manner.

**Student's Difficulties in Solving Mathematical Communication Problems after applying the *Jigsaw* Cooperative Learning Model**

Based on an analysis of the learning process carried out in class VIII-6 of SMP Negeri 35 Medan, students still find it difficult to follow the learning process. Students find it difficult to follow the learning steps which are the application of the *Jigsaw* cooperative learning model. In particular, in conducting discussions while working on LAS students experienced many difficulties. Discussion activities also require quite a long time, so that learning becomes less effective. Based on the analysis of the data obtained from the results of the research, it turned out that class VIII-6 students of SMP Negeri 35 Medan were still experiencing difficulties in answering questions on the mathematical communication test. The location of the difficulty in working on the test questions carried out by students is the difficulty of facts, concepts, operations and principles. The following will discuss the difficulties experienced by students from representatives of very good, good, moderate, and deficient levels of mathematical communication ability.

***Subjects with Very Good Abilities***

The S-15 subject as a representative of the subject with very good ability made a mistake in question number 1 not because it was difficult, but because the S-15 subject did not read carefully the problem and what was asked in the question so he did not write the answer. In the problem, you are asked to draw an illustration from a Rubik's Cube and cardboard. However, S-15 did not describe the cardboard illustrations, students only drew Rubik's illustrations. Based on the interview with S-15, the cause of the error was because S-15 did not pay close attention to the question that the illustration must be 2

pictures. S-15 thinks that only 1 cuboid picture is enough for an illustration. When subject S-15 was asked to draw an illustration of the two objects according to the information in the problem, S-15 did it right. This shows that the S-15 did not experience any difficulties.

***Subjects with Good Abilities***

Subject S-07 as a representative of good ability subjects experienced difficulties in number 1 and number 3. In problem number 1, subject S-07 experienced operational difficulties where students made mistakes in solving problems related to the surface area of the cuboid. S-07 was wrong in completing the final stage where the variable has a similar coefficient because what is asked in the question is the width value. Because it was wrong to determine the width value with 1 coefficient, S-07 could not determine the cuboid width value correctly. Based on the results of the tests and interviews with S-07, it was shown that the mistakes made by S-07 were due to the Student's lack of ability to remember and understand the questions well. An error like this is said to be in operational difficulty.

In question number 3, that subject S-07 experienced where students made mistakes in writing conclusions based on the results obtained. In the problem it is known that the rubik will be put into a cube-shaped box and students are asked to determine the number of rubik's that can be put into the box. However, subject S-07 was too hasty in working on the questions so he did not write down what is known from the questions correctly, so S-07 don't write down volume of the cardboard and the number of Rubik's cubes that could be put in the cardboard at the conclusion of the final answer. This is because subject S-07 is not careful in expressing conclusions in his own language correctly. Based on the results of tests and interviews with S-07, it was shown that the difficulties experienced by S-07 were caused by S-07 do not write down what is known from the questions correctly in solving cube problems, so that students could not write conclusions correctly. An error like this is said to be in fact difficulty.

***Subjects with Good Enough Abilities***

Subject S-24 as a representative of a good enough ability subject experienced difficulties in numbers 2 and 4. In question number 2, S-24 experienced factual difficulties where students made mistakes in understanding the symbols contained in the formula for the surface area of a cuboid, so he could not distinguish s squared from s multiplied by two. To find the value of the S-24 side, divide the surface area of the cube by the number 6, then divide it again by the number 2, so you get the wrong result. Next, S-24 also don't write down the steps in solving the problem about surface area of a cube completely. Based on the results of tests and interviews with S-24, it was shown that the difficulties experienced by S-24 were caused by S-24 do not know the meaning of mathematical symbols for the surface area of a cuboid, so he could not distinguish s squared from s multiplied by two and S-24 do not write down the the steps in solving cuboid and cube problems completely. An error like this is said factual and operational difficulty.

In question number 4, S-24 made an error in determining what was asked in the problem of flat side shapes. In the question, they are asked to find the depth of a pool in the form of a cuboid, namely the height of the cuboid. However, S-24 stated that what was asked in the question was the width. It was happened because S-24 did not first describe the illustration of the pond image according to the information contained in the problem so that it is difficult for students to determine the elements being asked from the problem. Based on the results of tests and interviews with S-24, it was shown that S-24 did not understand the concept of the elements of a cuboid, S-24 could not provide an example of a cuboid in the room. An error like this is said factual and conceptual difficulty.

***Subjects with Deficient Abilities***

Subject S-28 as a representative subject with deficient ability experienced fact and principle difficulties at number 1, fact and principle difficulties at number 3, and fact, concept and principle difficulties at number 4. In question number 1, S-28 made a mistake in writing down information known and asked and did not write down conclusion (end of answer). S-28 was also wrong in writing the formula for the surface area of a cuboid. Based on the results of tests and interviews with S-28, it was shown that the difficulties experienced by S-28 were caused by S-28 don't understand to write down the information he knew and asked about from the questions and forgot the formula for the surface area of a cuboid.

In question number 3, subject S-28 made a mistake in determining what was known and what was asked in the question. S-28 did not write down two cube shapes and the sizes matched the information from the problem to determine the number of Rubik's cubes that could be put in the box. To get the answer S-28 only multiply all the known edge values in the question, while to find the answer S-28 have to use the formula for the volume of a cuboid. Because he was wrong in determining the volume of the cube, S-28 could not determine the exact number of Rubik's cubes that could be put in the box. Based on the results of tests and interviews with S-28, it was shown that the mistakes made by S-28 were caused by S-28 not understanding the information that was known in the questions so that students only guessed the solution.

In question number 4, subject S-28 was wrong in writing the formula for the volume of a cuboid. S-28 only multiplies all the values that are informed in the problem. S-28 did not make up what was known in the problem at all and did not write down the formula for the volume of a cuboid correctly. Subject S-28 still seemed to be guessing at the answer because he could not use the volume of a cuboid formula in solving the problems in the problem so he could not do the calculations or get a complete and correct solution.

Based on the results of tests and interviews with S-28, it was shown that S-28 not understanding the concept of volume of a cuboid. S-28 didn't know what the definition of the cuboid volume. S-28 don't know what the known of the problem. Subject S-28 also admits that he forgot the formula for the volume of a cuboid so he can only guess at the answer.

Based on the explanation above, it can be concluded that: the fact difficulties that students did were: a) do not write down the volume of the cardboard and the number of Rubik's cubes that could be put in the cardboard at the conclusion of the final answer by S-07 b) do not understanding the symbols contained in the formula for the surface area of a cuboid, so he could not distinguish s squared from s multiplied by two by S-24 c) can't describe the illustration of the pond image according to the information contained in the problem so that it is difficult for students to determine the elements being asked from the problem by S-24 d) they were not able to understand the elements contained in the formula for the surface area of a cuboid, so it cannot distinguish the height and width of a cuboid by S-11. e) do not know to write down the information that was known and asked from the questions by S-28. Errors like this are said to have fact difficulties, because mathematical facts are in the form of conventions expressed by certain symbols. Facts include terms (names), notations (symbols/symbols), and others. Facts can be learned by technique, namely memorizing, lots of practice, demonstrating, and so on.

Concept difficulties experienced by students, namely: a) can't provide an example of a cuboid in the room by S-24, b) don't know what the definitions of cuboid by S-11, c) didn't know what the definition of the cuboid volume by S-28. Errors like this are said to experience conceptual difficulties because a concept is an abstract idea that can be used to classify or classify a set of objects, whether a particular object is an example and not an example. Students must form concepts through previous experience, followed by practice questions to understand the meaning of a concept. So students who cannot meet the criteria above are said to have conceptual difficulties.

The difficulty of the operations carried out by students, namely: a) the calculations carried out by students do not write down correctly and completely, so that the final result of solving the problem is not found by S-07, b) don't write down the steps in solving the problem about surface area of a cube completely by subject S-24. Errors like this are said to experience operational difficulties or skills because operations are arithmetic, algebraic, and other mathematical operations. So, students who have not been able to perform the operations above are said to have skill difficulties.

Difficulties in principle that students do, namely: a) wrong in applying the formula for the surface area of a cuboid to solve the problem by S-11 and S-28 b) wrong to write the formula to solve the problem, S-28 just multiply all the known edges in the problem. Errors like this are said to experience principle difficulties because principles can be in the form of axioms/postulates, theorems, properties, and so on. So it can be said that the principle is the relationship between concepts. So students who cannot meet the above criteria are said to have principle difficulties.

## 4. CONCLUSION

Based on the results of research and discussion, conclusions can be drawn to answer the formulation of the problem, namely:

The level of mathematical communication ability of class VIII-6 students of SMP Negeri 35 Medan with the application of the *Jigsaw* cooperative learning model is relatively high. This is because most students have been able to meet the indicators of mathematical communication skills used in this study, namely: (1) *Drawing*: Students are able to reflect real objects, pictures, and diagrams in mathematical ideas, (2) *Mathematical Expression*: Students Able to express mathematical ideas using symbols or mathematical language in writing and in the form of mathematical models, (3) *Written Text*: Students are able to provide answers using their own language, in a systematic, reasonable, correct, and completely arranged manner. It was found that the number of students with deficient assessment categories was 6 students (20%), students with good enough criteria were 4 people (13,33%), students with good criteria were 12 people (40%), students with very good assessment criteria amounted to 8 people (26,67%). There are 24 students who have achieved KKM (Minimum Completeness Criteria) or 80% which are divided into 3 categories, namely quite good, good, and very good. These three categories can be classified into a high level of communication skills.

Students with very good ability grouping (S-15) is still unable to fulfill the first indicator. S-15 does not describe the 2 cube shapes requested in the problem. S-15 was wrong in capturing the information asked in the problem. In the problem, it is asked to draw an illustration from a Rubik's Cube and cardboard. However, S-15 did not describe the cardboard in the answers, the students only described the rubik's cube.

Students with good ability grouping (S-07) is still unable to fulfill the second and third indicator. S-07 cannot to change what is known in the problem into mathematical symbols. Subject S-07 does not use mathematical symbols when mentioning the edge of the cube, and S-07 also writes the length of the cube in the known part, which should be the second edge of the cube. S-07 cannot write a conclusion (final answer) using his own language completely and systematically. The answer from S-07 looks very short and looks monotonous.

Students with good enough ability groups (S-24) is still unable to fulfill the first and second indicator. All the illustrations depicted by S-24 do not contain the information already given in the problem in the form of the surface area of the cube along with the length. S-24 has not been able to understand the symbols contained

in the formula for the surface area of a cuboid, so S-24 cannot distinguish the square of a number with number multiplied by two. S-24 also experienced an error in applying the formula for the volume of a cuboid.

Students with deficient ability grouping (S-11) have not been able to fulfill the first, second and third indicators. S-11 has described the shape of the cuboid correctly but is incomplete and not in accordance with the instructions in the question. S-11 has not been able to use mathematical symbols in writing down the information asked in the cuboid volume problem and has not been able to apply the cuboid and cube formulas to solve problems in the problem. S-11 subjects are still seen guessing answers because they cannot use the formula of cuboids and cubes in solving problems in the problem so they cannot do calculations or get solutions completely and correctly.

Based on research findings developed from four types of difficulties carried out by students of SMP Negeri 35 Medan, it can be seen the difficulties experienced by students in solving student mathematical communication test questions. The four types of difficulties are facts, concepts, operations, principles difficulties. The fact difficulties that students did were: a) do not write down the volume of the cardboard and the number of Rubik's cubes that could be put in the cardboard at the conclusion of the final answer by S-07 b) do not understanding the symbols contained in the formula for the surface area of a cuboid, so he could not distinguish s squared from s multiplied by two by S-24 c) can't describe the illustration of the pond image according to the information contained in the problem so that it is difficult for students to determine the elements being asked from the problem by S-24 d) they were not able to understand the elements contained in the formula for the surface area of a cuboid, so it cannot distinguish the height and width of a cuboid by S-11. e) do not know to write down the information that was known and asked from the questions by S-28. Concept difficulties experienced by students, namely: a) can't provide an example of a cuboid in the room by S-24, b) don't know what the definitions of cuboid by S-11, c) didn't know what the definition of the cuboid volume by S-28. The difficulty of the operations carried out by students, namely: a) the calculations carried out by students do not write down correctly and completely, so that the final result of solving the problem is not found by S-07, b) don't write down the steps in solving the problem about surface area of a cube completely by subject S-24. Difficulties in principle that students do, namely: a) wrong in applying the formula for the surface area of a cuboid to solve the problem by S-11 and S-28 b) wrong to write the formula to solve the problem, S-28 just multiply all the known edges in the problem.

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