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Students' Numeracy Skills in Learning Cartesian Coordinate System Using PMRI in the Context of Palembang LRT

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Abstract

This research aims to describe the numeracy skills of eighth grade students in learning Cartesian coordinate system using the approach of realistic mathematics education in the Indonesian context, or PMRI, by using Palembang Light Rail Transit (LRT) context. This research is a descriptive qualitative research and the research participants were students who belonged to class 8 of secondary school (SMPN) 59 Palembang. Tests and interviews with students were the data collection techniques used, and the written examination comprised two questions designed to measure the students' proficiency in mathematics. From the analysis and discussion of the students' responses, it was found that there were 11 high ability students (39.29%), eight middle ability students (52.14%), and nine low ability students (32.14%). Interviews were conducted to clarify the responses of the students. The interviews revealed that the main cause of the students' difficulties was a lack of concentration while attempting to answer the numeracy test questions. It is concluded that the students of SMPN 59 Palembang demonstrated adequate numerical skills in solving the test problems related to the Cartesian coordinate system using the PMRI approach in the context of Palembang LRT.

Keywords: Cartesian Coordinates, Light Rail Transit, Numeracy Skills, PMRI

Abstrak

Penelitian ini bertujuan untuk menjelaskan kemampuan numerasi siswa kelas VIII dalam pembelajaran sistem koordinat kartesius menggunakan pendekatan pendidikan matematika realistik dalam konteks Indonesia atau PMRI dengan menggunakan konteks Light Rail Transit (LRT) Palembang. Penelitian ini merupakan penelitian kualitatif deskriptif dan subjek penelitiannya adalah siswa kelas 8 Sekolah Menengah Pertama (SMPN) 59 Palembang. Tes dan wawancara dengan siswa merupakan teknik pengumpulan data yang digunakan, dan ujian tertulis terdiri dari dua pertanyaan yang dirancang untuk mengukur kemahiran siswa dalam matematika. Dari analisis dan pembahasan dari jawaban siswa diperoleh siswa berkemampuan tinggi sebanyak 11 orang (39,29%), siswa berkemampuan sedang sebanyak 8 orang (52,14%), dan siswa berkemampuan rendah sebanyak 9 orang (32,14%). Wawancara dilakukan untuk memperjelas tanggapan siswa. Wawancara mengungkapkan bahwa penyebab utama kesulitan siswa adalah kurangnya konsentrasi ketika mencoba menjawab soal ujian. Disimpulkan bahwa siswa SMPN 59 Palembang menunjukkan kemampuan numerasi yang memadai dalam menyelesaikan soal tes terkait sistem koordinat kartesius menggunakan pendekatan PMRI pada konteks LRT Palembang.

Kata kunci: Koordinat Kartesius, *Light Rail Transit*, Kemampuan Numerasi, PMRI

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INTRODUCTION

The independent curriculum should meet the demands of 21st century skills, which include numeracy. Numeracy is the key to students' access to, understanding of, and preparation for the important role of mathematics in the modern world (MoECRT, 2021). It is required in the independent curriculum to define mathematics learning in schools so that mathematics learning is more contextually meaningful for students. Numeracy skills are much needed in life to, among other things, analyze and

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interpret quantitative data presented in various forms, to make predictions, and to make decisions (MoEC, 2021). As defined by Goos et al. (2020), numeracy is the ability to use mathematics to solve problems in everyday life. It is the ability to use mathematical concepts, procedures, facts, and tools in a variety of relevant contexts. Numeracy is about applying mathematical concepts, not just understanding them (MoECRT, 2021). Furthermore, numeracy is defined as the ability to understand, apply, and analyze mathematics in different contexts to solve problems in everyday life, as well as the ability to explain the use of mathematics. This is supported by the Government Regulation No. 4 of 2022 Article 6 paragraph (1), which states that the competency standards for graduates of the basic education units focus, among other things, on increasing the literacy and numeracy skills of students to enable them to pursue further education. Beyond this, students are expected to be able to use their mathematical knowledge to solve problems in their daily lives (MoECRT, 2021).

Personal (based on personal interests), socio-cultural (based on cultural or community interests), and scientific (based on scientific interests) are the domains of numeracy contexts (MoECRT, 2021). According to the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia (2021), there are three indicators to measure numeracy: 1) competency in using different types of numbers and symbols related to mathematics in different contexts of daily life; 2) competency in analyzing information presented in different forms (charts, graphs, tables, etc.); and 3) competency in interpreting the results of the analysis to make predictions and decisions.

According to the 2018 PISA of mathematics performance, Indonesia ranked 72nd out of 78 countries (OECD, 2019). The lack of students' numeracy skills can be attributed to the lack of teacher training in numeracy (Ekowati, et al., 2019). Nusantara et al., (2021) also found the same result about the teachers have a significant role in the low achievement of students. This is supported by Widiastuti and Kurniasih (2021) who found that teachers were not interested in implementing the approaches, models, and learning media that were used. Furthermore, the numeracy of the students' skills has not improved because of the school-based mathematics education that they have received. In addition, students have difficulties in applying mathematics to real-world problems (Maulidina & Hartatik, 2019). Based on the results of PISA Indonesia and research conducted a few years ago, students' numeracy skills were classified as low. As a result, there is a need to plan appropriate learning activities for the learning process in the context of everyday life (Putri, et al., 2022). Realistic mathematics education in the Indonesian context or PMRI is a practical approach that can be used in everyday situations (Meitrilova & Putri, 2020).

Pendidikan Realistik Matematika Indonesia or, PMRI, is an adaptation of Realistic Mathematics Education (RME) to the Indonesian context and culture (Zulkardi & Putri, 2019; Fauziah, et al., 2020; Fauziah & Putri, 2022). It starts learning in a real-world context (Zulkardi & Putri, 2019) and helps students understand mathematics by connecting it to learning contexts relevant to everyday life, so that students can locate concepts in learning materials based on the context provided as a reference (Van den Heuvel-Panhuizen & Drijers, 2020; Meitrilova & Putri, 2020). According to Lestariningsih and

Trismawati (2020), PMRI emphasizes learning that helps students better understand problems presented in everyday contexts. It is consistent with the need for mathematics learning in the classroom must occur in a context that is relevant to students' everyday lives (MoECRT, 2021). The PMRI approach was used in this study for learning Cartesian coordinates. This is because PMRI links learning contexts to everyday life, allowing researchers to see students' numeracy skills in a particular context.

Cartesian coordinates are taught in primary schools around the world, including Indonesia. In Indonesia, students are taught the coordinate system directly by giving them forms, notations, and rules. However, students often find it difficult to determine the position of a point in a Cartesian coordinate plane (Setiyowati et al., 2023). Some students were unable to draw number lines both horizontally and vertically, and some are unable to determine the abscissa and ordinate in a Cartesian coordinate plane (Khaeroni & Nopriyani, 2018).

In observations at SMPN 59 Palembang, the researcher learned from the mathematics teacher who taught in the eighth grade that students had difficulties with Cartesian coordinates, where there were still many students who did not understand the coordinate system, could not determine the abscissa and ordinate, and even still incorrectly determined the distance to the x-axis and y-axis, as well as students' difficulties. Moreover, when students first learn about the coordinate system, they only learn it at the formal level, and this does not really help their understanding. However, the coordinate system is important in many aspects of everyday life, such as the arrangement of seats in the classroom and books in the library. Students also need to learn more than the basic components of graphing and map reading, and the coordinate system can help them organize and locate objects accurately. This can be facilitated by implementing the Independent Curriculum (Phase D on learning outcomes on geometric elements), which can help students solve Pythagorean theorem problems and simple transformations, especially with Cartesian coordinates (MoECRT, 2021).

Teaching Cartesian coordinates in the classroom needs to consider the context of everyday life to allow students to discover these mathematical ideas for themselves. The use of distance is one of the mathematical ideas related to the use of Cartesian coordinates, because in this case, students need to understand the concept of quadrants in the Cartesian coordinate plane. In the previous study conducted by Khaeroni and Nopriyani (2018), the context of Cartesian coordinate learning did not include the Palembang Light Rail Transit (LRT). The researcher used the LRT context in coordinate learning because the researcher received information from the teacher after observations in the school about the students' shortcoming in coordinate learning, which was difficulty in selecting a point. This can be related to the context of LRT and the Cartesian coordinates that can determine these locations in the investigation. Using the context of Light Rail Transit Palembang on Cartesian coordinates helps students understand the difficulties associated with Cartesian coordinates, one of which is determining the position of a point in the Cartesian coordinate plane. This study aimed to describe the numeracy skills of eighth grade students in learning Cartesian coordinates using the PMRI approach in the context of the Palembang Light Rail Transit (LRT).

METHODS

This research is qualitative descriptive research. In the context of the Palembang LRT, this research focuses on describing the numeracy skills of eight grade students consisting of 28 students of SMPN 59 Palembang in learning Cartesian coordinates using the PMRI approach.

The research technique was divided into three stages: preparation, implementation, and final. The preparation stage was completed before the researcher conducted the research. The steps that were completed were creating the research instrument, validating the instrument with expert review, and validating the questions through individual and small group sessions. Next, in the implementation stage and the researcher collected research data by providing sharing and jumping tasks in the first session, test questions in the second session, and further by selecting three students to validate the results of the students' responses through interviews. The students' scores were categorized as low, average, and high. Finally, the researcher reviewed the results of the data, specifically the results of the tests and the results of the student interviews, which were then further detailed and compiled into a research report.

The researchers used tests and interviews to collect and analyze data. Data was collected and analyzed descriptively. The results of the students' responses were evaluated using measures of numeracy skills as seen in Table 1.

Table 1. Numeracy indicators and descriptors

Numeracy Skill Indicator	Descriptor
Using mathematical numbers and symbols in a variety of everyday contexts	Using different numbers related to basic mathematics to solve problems in the context of Palembang LRT.
	Using different symbols related to basic mathematics to solve problems in different contexts of Palembang LRT.
Analyzing data presented in different formats (graphs, tables, charts, and etc)	Identifying any important information contained in the problem presented.
	Identifying the problem
	Presenting data from one form (graph, table or figure) to another (graph, table or figure)
Interpreting the results of analysis to make predictions and decisions	Drawing conclusion and making decisions based on the solution process

(MoEC, 2017)

Table 1 provides information on indicators and descriptors of numeracy skills. In the first indicator, the researcher assessed whether students could use different types of numbers and symbols related to mathematics in different situations of daily life in each context of Palembang LRT. The researcher wants to see whether students can understand the information in the pictures or tables contained in the questions to solve the problems in the second indicator, which was interpreting information presented in different forms (graphs, tables, charts, etc.). The third indicator, students were

expected to be able to analyze the results of the analysis to make predictions and judgments. The researcher is interested in whether the students can complete the work that has been done. In addition, Table 2 shows ranges of numeracy scores and cognitive categories.

Table 2. Numeracy scores and cognitive categories

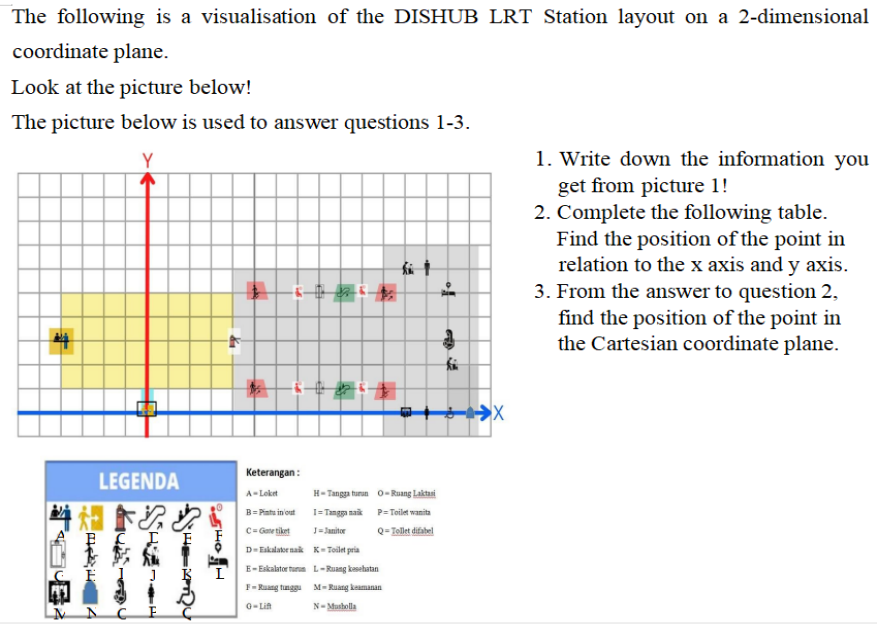
Score Ranges	Cognitive Categories
$\boldsymbol{Score \geq 80}$	High
$\boldsymbol{60 \leq Score < 80}$	Average
$\boldsymbol{0 \leq Score < 60}$	Low

(Arikunto, 2018)

RESULTS AND DISCUSSION

Preparation Stage

During the preparation stage, the researcher prepared the research instruments as shown in Figure 1. The research instrument consists of sharing tasks related to the LRT DISHUB station plan and jumping tasks related to the seating in the LRT. In the sharing task, there are three questions that students need to answer. The first question, students were asked to identify important information provided on a visualization of the DISHUB LRT layout. The second question, students were asked to complete a table to identify points on the x-axis and y-axis in Cartesian coordinates. The third question, students were asked to describe the coordinates in the form of a line graph. Different from sharing tasks, in jumping tasks there is only one question. Students were asked to identify and analyze the information given in the picture and find how far away of two people sitting on the Palembang LRT were seated.



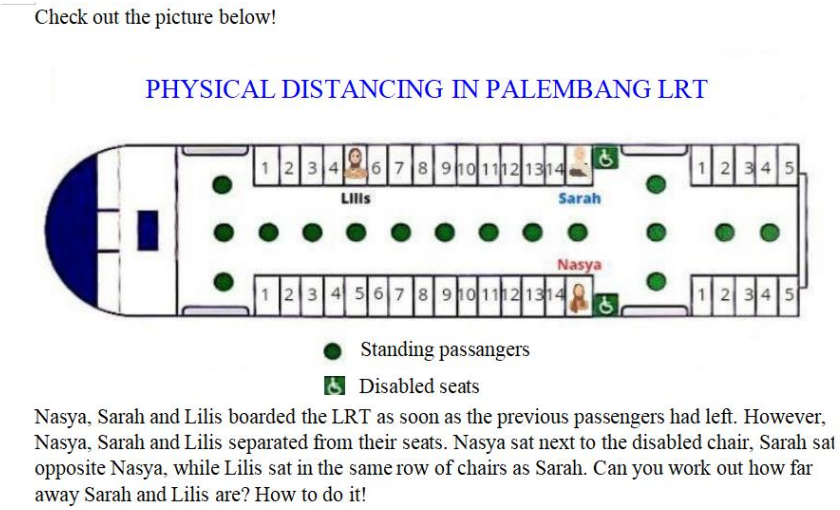


Figure 1. Sharing and jumping task given to students

Next, the researcher conducted observations and interviews with the model teacher at SMPN 59 Palembang (See Figure 2a). The purpose of the school observation and interview was to obtain information about the school through the mathematics teacher who teaches eighth grade, and to estimate the research plan that would be conducted and the research class that would be designated as the research subject. Then, in Figure 2b, it can be seen the researcher conducted the expert review with a lecturer from the Department of Mathematics Education of Sriwijaya University and a teacher from the SMPN 59 Palembang. As the result, the following Table 3 is obtained, which shows the results of validation with expert review.

(a) (b)

Figure 2. Validation process with expert review

There were several important points that needed to be revised according to input and suggestions from expert reviews (see Table 3). Instrument improvements were made based on content, construct and language. In general, the given input was related to the quality of the image or table. In addition, instrument changes were made to some sentences so as not to have double meaning.

Table 3. Validation process with expert review

Comment and Suggestion	Revision Results
Sharing Task	
Insert table for legend point code names	A column for the legend points code name has been added to the table
Enlarge the image and provide examples to answer question 2	The image has been enlarged and given 1 example of writing the position of the point in the table for question question 2
Jumping Task	
Shortened the question story, redesigned the picture, and added the word "row" next to the word chair in the second row from the bottom	Improved story problems in accordance with expert review suggestions and redesigned images
Numeracy Skill Test	
Re-create the table for the questions as the picture is blurred in the question 1	The table has been fixed in question 1
You do not need to use it for point A because it is not appropriate in the question 2	Question for point A removed

The researcher then carried out one-to-one (1-1) activity (See Figure 3a). The researcher was with three students with heterogeneous abilities who were selected based on teacher recommendations. Teachers provided recommendations based on daily assessment in class. Students provided input and suggestions regarding the language in the developed instruments. Some students felt confused in determining the coordinate points on the picture given. Therefore, the researcher clarified the instructions for working on the questions and improved the quality of the images on the questions.

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(a) (b)

Figure 3. Validation process with 1-1 activity

After the 1-1 activity, the researcher conducted small group as in Figure 3b. In a small group, the researcher with six students with mixed abilities were selected based on teacher recommendations. Of the six students selected, there were two students with high scores, two students with average scores, and two students with low scores. The students were equally divided into two groups with heterogeneous abilities to see group collaboration when working on problems. At this stage, students

could easily understand the sharing task, jumping task, and numeracy test questions. No improvements were made at this stage because students were able to work with a variety of answers.

Implementation Stage

At this stage, the researcher acts as an observer, while the class teacher acts as a model teacher. The learning process can be seen in Figure 4.

(a) (b)

Figure 4. Learning process in implementation stage

Figure 4a and Figure 4b show the learning process activities using the PMRI approach to help students understand Cartesian coordinate material that is implemented in everyday life, such as the arrangement of chairs in the classroom. In the learning process shown in Figure 4a, the teacher explained some material about Cartesian coordinates and then formed groups of three until four students. Then the students were given sharing tasks related to the context of the DISHUB LRT station. There was a problem with questions to help students solve problems and understand the Cartesian coordinate material, where students were asked to determine the points of the given illustration to be reloaded into the Cartesian coordinate plane and to determine the points on the x-axis and y-axis. When all the groups finished working on the common task, one of the group representatives presented and explained the results of the answers to the common task. Other groups responded to the answers given by the presenting group. Then, the results of the sharing task were completed and presented.

In addition, as shown in Figure 4b, the teacher gave jumping tasks with the context of physical distance on the Palembang LRT, with the same working system as for the sharing tasks. In the jumping task, there was a problem for which the students must find a solution by creating a mathematical model. After all groups finished working on the sharing task, one of the group representatives presented and explained the results of the answers to the jumping task (See Figure 4b). The other groups responded to the answers given by the group that made the presentation. At the end of the session, the teacher asked the students to summarize what they had learned that day.

Figure 5. Students worked the numeracy skills test

Figure 5 shows the numeracy test questions that were administered three days after the students had completed the sharing task and jumping task (see Figure 4). The purpose of the test questions was to assess the students' numeracy skills. This written test uses the context of LRT. The test questions consisted of two questions that were completed individually by 28 students, as shown in Figure 5. Interviews were then conducted with three students of high, average, and low ability based on Table 2. The aim was to clarify the students' answers to the test questions by focusing on questions related to three indicators of numeracy skills The results of this analysis of student answers are further explained in the last stage.

Final Stage

In the final stage, the researcher analyzed the data results, which were test results and student interview results based on Table 2, to then describe and write a research report.

From the results of the analysis of the answers to the test questions based on Table 2, the numeracy skills of 11 students were in the high category (39.29%), eight students were in the average category (54.24%) and nine students were in the low category (32.14%). Not all indicators of students' numeracy skills are available from the test results. Similarly, one indicator was missing from the students' answers to the problem. As seen in Table 1, the indicator of numeracy skills was the analysis of information presented in various forms (graphs, tables, charts, etc.). The students still had difficulty in analyzing the question presented in Figure 6 which is a table of the number of passengers from July 2018 to February 2020 as well as memorizing the units of length of the problem in Figure 8. Returning to the previous material, some students did not complete the given problems. Some representative answers from the students were worth discussing regarding the first and second questions are as follows.

Pay attention to table below!

Month and Year	Total Passenger
July 2018	10. 606
August 2018	248. 975
September 2018	176. 229
October 2018	144. 653
November 2018	155. 699
December 2018	185. 900
January 2019	146. 954
February 2019	105. 837
March 2019	146. 512
April 2019	147. 322
May 2019	144. 201
June 2019	322. 628
July 2019	277. 801
August 2019	220. 526
September 2019	211. 105
October 2019	225. 546
November 2019	244. 722
December 2019	361. 559
January 2020	313. 502
February 2020	203. 979

Table above shows a list of the number of passengers on the Palembang LRT from July 2018 to February 2020.

A. From Table, convert Table into a line graph

B. What is the difference in *the total number of* passengers between January 2020 and February 2020?

Figure 6. Numeracy test question number 1

Figure 6 shows numeracy question number 1. In Figure 6, there is information about the list of the number of passengers in the Palembang LRT from July 2018 to February 2020. From this information, students were asked to sort it into a table from the highest number of passengers to the lowest number of passengers. This helped students to make a line graph and train students to focus. Students were also asked to make a line graph, which refers to the position of points in Cartesian coordinates. Students used the month and year as the x-axis and the number of passengers as the y-axis. Students then calculated the difference in the number of passengers between January 2020 and February 2020. The following students' answers to the first question can be seen in Figure 7.

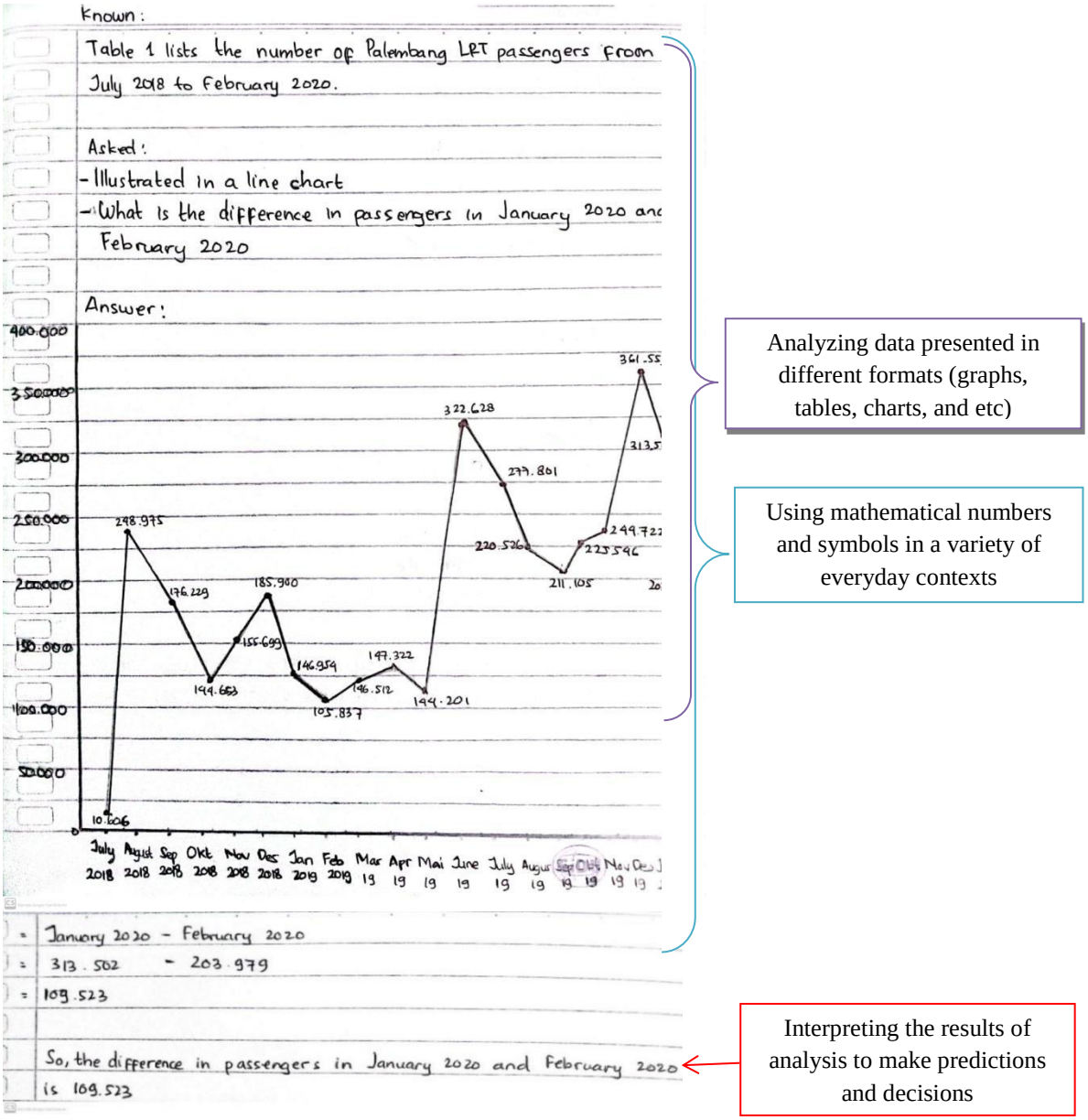

Figure 7. Student' solution on question number 1

Based on the results of the student' answer in Figure 7, it can be concluded that the student for question number 1a still has errors in the indicators of using different types of numbers and symbols. Students analyzed the table and presented it as a line graph. However, based on interview, students were able to use different types of numbers and symbols. The student was able to solve the problem in question number 1b. The students were able to analyze the information and problems and deduce the problem. The following are the results of the researcher's interview with student.

(Note: R= Research, S: Student)

R : What information do you think can be gleaned from the question number one?
S : It is a list of the number of passengers from July 2018 to February 2020.
R : Based on this information, how did you solve the problem?

S : Based on this question, I illustrated it again on a line graph, reordered the list from largest to smallest, and calculates the difference between the number of passengers in January and February 2020.
R : Was there any difficulty when illustrating back to the line graph?
S : I had trouble focusing when drawing line graphs
R : From the answer to question 1a, there were errors in placing the dots, what prevented you from focusing on drawing the line graph?
S : Due to the number of total passengers, I had difficulty placing the dots according to the data given in the table.
R : Was question 1b also difficult for you?
S : For question 1b, I had no trouble because I was only asked to calculate the difference between the number of passenger in January 2020 and February 2020.

From the transcript above, the students understand the known information in the problem given. Students were also able to describe the problem in the form of a line graph. However, students still make mistakes when drawing because they do not focus on the process. The following is the student's answer to the second question.

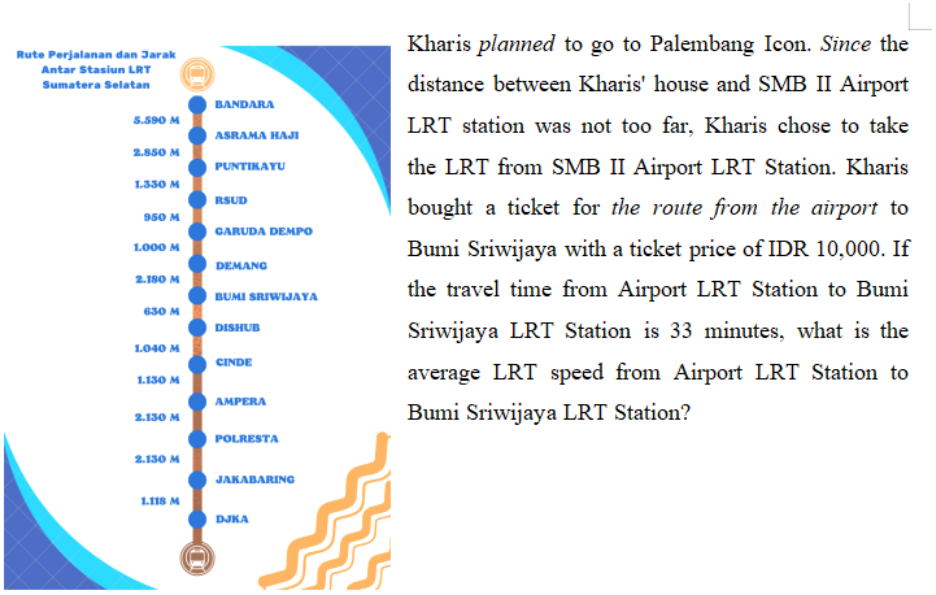

Figure 8. Numeracy test question number 2

Figure 8 is numeracy test question number 2. The question in Figure 8 presents a brochure on the routes and schedules of LRT in South Sumatra, based on which students were asked to calculate the distance from Airport LRT Station to Bumi Sriwijaya LRT Station, then to find a way to get the average LRT speed from Airport LRT Station to Bumi Sriwijaya LRT Station. The solution provided by students on the second numeracy test question is as follows can be seen in Figure 9.

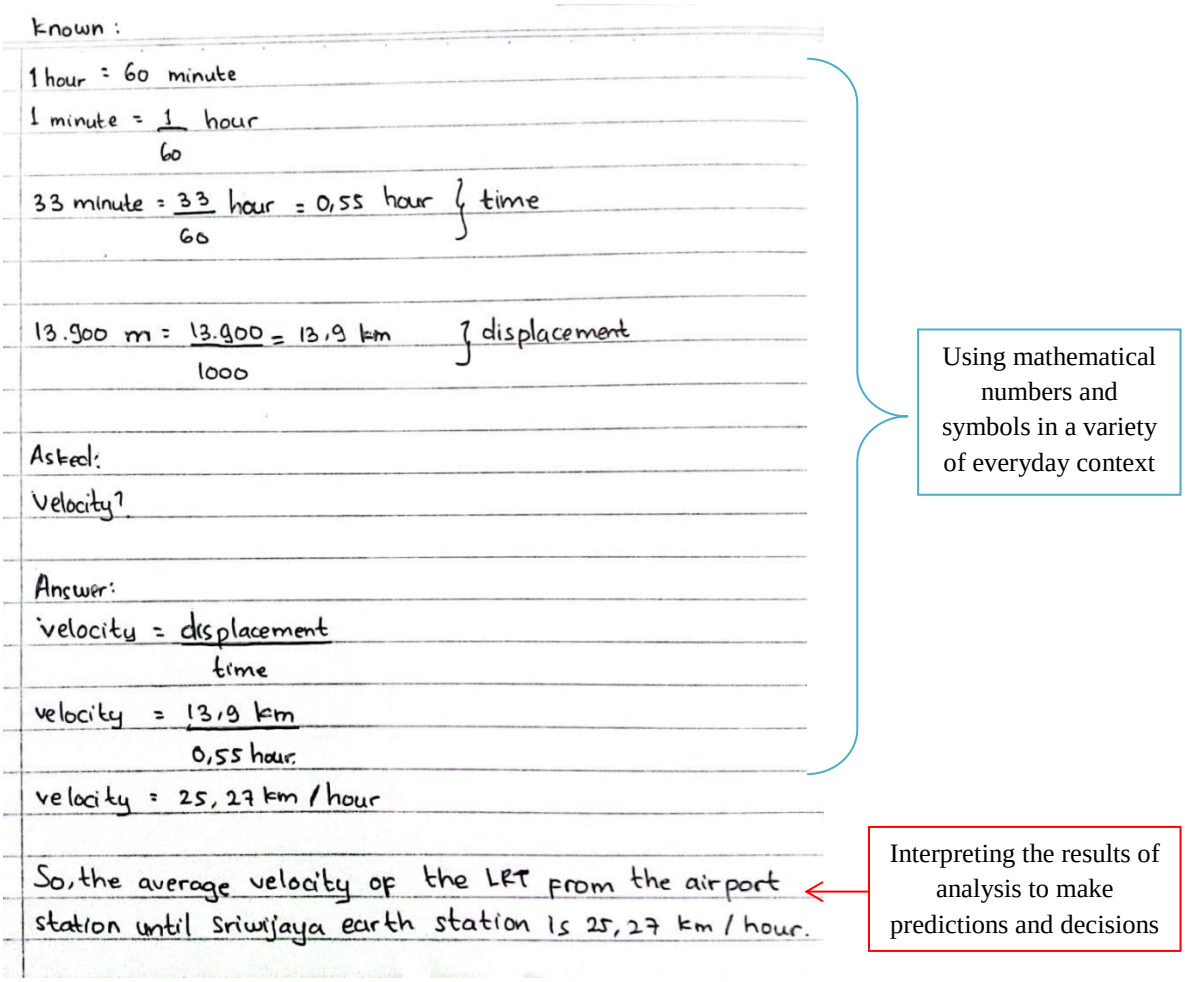

Figure 9. Student' solution on question number 2

Based on the results of the responses on test question 2, students were able to analyze the information and problems contained in the given tasks (Figure 8). Students were also able to use different types of numbers and symbols to solve test question number 2. Figure 9 shows the solution proposed by student, where student could analyze question 2 from what is known and asked in the question and solve the problem in question 2. However, there were still slight errors in the symbolism. The following are the results of the researcher's interview with the student.

(Note: R= Research, S: Student)

R : *Please read the information in question number 2 first.*
S : *The distance between LRT stations and then the LRT travel time from Airport LRT station to Bumi Sriwijaya LRT station are known, but the distance from Airport LRT station to Bumi Sriwijaya LRT station must be added beforehand.*
R : *What does this problems ask?*
S : *If the travel time is 33 minutes, what is the average speed of the LRT from Airport LRT Station to Bumi Sriwijaya LRT Station?*
R : *Based on the information in the previous question, the time is 33 minutes; how did you convert 33 minutes to hours?*
S : *One hour is 60 minutes, so in my opinion, to convert 33 minutes to hours, I divide 33 by 60 and I get the time in (the unit of) hours.*
R : *Please check the answers; are there any mistakes in writing numbers or symbols?*

S : I confused km and m. It should have been 13,900 m, then I changed it to 13.9 km.
R : What conclusion can you draw from the problems in the second question?
S : After converting the (unit of) distance to km and the (unit of) time from minutes to hours, the average speed of the LRT from Airport LRT Station to Bumi Sriwijaya LRT Station is 25.27 km/hour.

From the interview excerpts, after clarification, it can be concluded that student was able to analyze and draw conclusions from the problem number 2 during the work (Figure 9). The student had sufficient numeracy skills, but when working on the questions they were not focused, so their test results were classified as low.

Given the urgent need to improve students' numeracy skills considering their low international performance, it is necessary to use the PMRI approach in the context of the LRT Palembang for eighth grade. The PMRI approach uses a real-life context as a starting point for learning, which accommodates mathematics by linking it to the context of everyday life as a reference so that students can discover the concept of the learning material.

Using Mathematical Numbers and Symbols in a Variety of Everyday Contexts

The use of context in mathematics topics can engage students and inspire them to learn (Van Galen & Van Eerde, 2018; Nusantara & Putri, 2018; Zulkardi & Putri, 2019). According to MoEC (2017), there are indicators of numeracy skills, one of which is using various kinds of numbers and symbols related to mathematics in various contexts of daily life as shown in Table 1. The aspects assessed were the aspect using various kinds of numbers related to basic mathematics to solve problems in different context of Palembang LRT contexts, and the aspect of using various symbols related to basic mathematics to solve problems in different contexts of Palembang LRT. This indicator often appears in students' responses, as shown in Figure 7 and Figure 9. However, there are still students who placed the wrong symbols when solving problems. Students' failure to focus on the given problems causes the aforementioned issue. As noted by Nusantara et al. (2021), students often divert their attention towards irrelevant information present in the pictures or tables provided, instead of focusing on essential data needed to answer the questions.

Analyzing Data Presented in Various Formats (Graphs, Tables, Charts, and etc)

The second numeracy indicator is analyzing data presented in various formats (graphs, tables, diagrams, etc.), with the aspects assessed being identifying what important information is contained in the problem presented, determining the question being asked, and transforming the data from one form (graph, table, or diagram) to another form (graph, table, or diagram). This is consistent with Guided Reinvention and Progressive Mathematisation, which involve presenting contextualized problem scenarios with mathematical themes so that students can rediscover mathematical ideas and concepts, leading to mathematical thinking (Lubur, 2021). Based on the results of average and low ability students'

answers, some students made mistakes or did not write down the information related to the problem. This indicator was hardly visible. Students' difficulties in answering the questions are due to their lack of knowledge about mathematical problems (Nurhayati & Bernard, 2019).

Interpreting the Results of the Analysis to Make Predictions and Decisions

The last indicators was the indicator of interpreting the results of the analysis to make predictions and decisions. This is related to the features of PMRI, namely student contributions where students use the results or strategies of the students themselves and providing opportunities for students to get ideas or strategies to solve the given problems (Zulkardi, & Putri, 2019). The aspect that was assessed was drawing conclusion and making decisions from the solution process. There were still some students who made mistakes in drawing conclusions due to miscalculations. The mistakes in concluding results tended to be due to students not being careful and making mistakes in their calculations.

CONCLUSION

The results of the numerical ability indicators show that 11 students are in the high category (39.29%), eight students are in the medium category (54.24%) and nine students are in the low category (32.14%). It can be concluded that the students of SMPN 59 Palembang showed sufficient numerical ability in solving numeracy test questions related to Cartesian coordinate system using PMRI approach in the context of Palembang LRT. The main factor in students' difficulties in understanding and solving problems related to Cartesian coordinates was a lack of concentration and focus on teaching and learning activities. It is recommended that future researchers who are interested in researching numeracy skills, especially in learning the Cartesian coordinate system, should first examine several sources related to the effectiveness of the learning process to obtain better and more comprehensive research results.

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