Mathematics Education Journals
Vol. 6 No. 1 February 2022

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Analysis of Students' Concept Understanding Ability Through E-Modules on Linear Program Materials

Fransiska Dwi Lestari[1], Ali Syahbana[2], Allen Marga Retta[3]

[1,2,3] Program Studi Pendidikan Matematika, Universitas PGRI Palembang
E-Mail :fransiskadwi20@gmail.com[1], syahbanaumb@yahoo.com[2]
allenmargaretta1@gmail.com[3]

Abstract

One of the mathematical abilities that students must master in order to learn mathematics is the ability to understand concepts, since it can affect the quality of learning and academic accomplishment of students. If the student's idea understanding is good, he or she will be able to solve the problem using the procedure. As a result, the goal of this study is to determine and describe students' grasp of mathematical ideas in linear programming material. This study's instrument is a set of learning outcomes test questions that refer to indications of concept comprehension. A qualitative research design is used in this study. Data reduction, data presentation, and generating conclusions were used to examine the data in this study. According to the findings, 33 students were able to meet the indicators of the ability to understand mathematical concepts by providing examples and non-examples, which received the highest percentage value, followed by indicators presenting concepts in various forms of mathematical representation, which received the second highest percentage value.

Keywords: Ability to understand concepts, E-Modules, Linear Programs

INTRODUCTION

Mathematics is crucial in many facets of life, especially in terms of strengthening one's ability to think (Sumartini, 2016). This agrees with Mursalina, Marhamah, and Retta (2020), who stated that mathematics plays a vital role in the development of one's ability or thinking strength, one of which is understanding mathematical concepts. One of the key purposes of learning mathematics, according to Mawaddah & Maryanti (2016), is to build the ability to understand concepts. The necessity of being able to understand concepts is highlighted in the mathematics learning curriculum's objectives (Khairani, Maimunah & Roza, 2021).

The standard content of the mathematics learning objectives section, according to Ningsih (2016), comprises of abilities in (1) understanding mathematical concepts, (2) applying reasoning, (3) solving problems, (4) communicating ideas, and (5) having the nature of appreciating utility. mathematics. One of the mathematical talents that students must master in order to learn mathematics is concept understanding (Purwanti, Pratiwi, and Rinaldi., 2016). According to Maure, Djong, and Dosinaeng (2020), conceptual understanding is the ability of a person to connect or relate concepts (facts) based on his knowledge, and to deduce the meaning of a concept by extending it into various types of knowledge.

According to Fatqurhohman (2016), children with a good level of conceptual knowledge can solve arithmetic problems quickly at varied levels of difficulty. This is in line with Ariyanto, Aditya, and Dwijayanti (2019), who stated

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

that if a student does not comprehend the concept, he or she will be unable to solve the questions presented according to the protocol. According to Yanti, et al. (2019), understanding mathematical concepts might affect the quality of student learning and, in turn, affect students' overall academic accomplishment. As a result, it can be claimed that a student's grasp of the idea has a significant impact on the quality of their learning because it is a fundamental ability that students must acquire in order to solve issues in studying mathematics based on the concept. According to Zuliana (2017), someone can grasp mathematical concepts if they can: (1) repeat a concept, (2) classify an item according to specific attributes according to the concept, (3) provide examples and non-examples of the concept, and (4) present.

One of the materials that requires a significant amount of mathematical knowledge in linear programming. This supports Anwar & Abdillah's (2016) assertion that linear programming notions are high-level mathematical concepts because they entail algebraic operations, graph drawing, and numerical procedures. Problems in linear programming are those that have to do with obtaining the target function or optimization, which seeks to solve problems in the most efficient and effective method possible while adhering to economic principles that reduce expenditure expenses in order to get maximum outcomes (Zulmaulida & Saputra, 2014). According to Ahmad, Nurhidayah, and Nurdin (2018), linear programming issues or forms are typically in the form of story questions with extensive language.

When providing linear programming content, the teacher usually offers formulae right away, and students simply memorize them, therefore students are not actively and autonomously involved in discovering patterns or formulas in the material (Mustain, 2021). Because it is accompanied with videos and pictures, electronic modules, or E-Modules, are one of the teaching materials that can draw more students' interest in learning to understand the concepts in the topic to be studied (Romayanti, Sundaryono, & Handayani, 2020). This is in line with what Murod, Utomo, and Utaminingsih (2021) stated in that electronic modules (E-Modules) are arranged and equipped with various learning content such as text, images, animations, and videos that can be used as learning resources because they can make it easier for students to learn.

Furthermore, learning to use E-Modules allows students to be more engaged in their learning, making it easier to grasp the principles of the content being studied (Hariani, Nuswowati, & Winarno, 2020). E-Modules can also be utilized by students to learn independently with a little aid from others, according to Jannah, Yuniawatika, and Mudiono (2020). This makes students more involved in the learning process. E-Modules are more useful for learning because they may be used at school or at home (Laili, Ganefri & Usmeldi, 2019). The implementation of E-Modules in the educational process has a positive impact on student learning activities and outcomes (Gunawan, 2018). As a result, it is believed that by using this E-Module, students would be more motivated to learn mathematics because it is presented in an appealing and efficient manner, and that students' knowledge of ideas will improve. The level of students' conceptual comprehension abilities will be examined in terms of learning through E-Modules based on the aforementioned description.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

RESEARCH METHOD

This is a qualitative descriptive research project. The goal of this study is to determine, characterize, or reveal students' capacity to understand concepts in linear programming curriculum. This study took place in SMA Negeri 4 Palembang. There were 33 students in class XI IPS 3 who were the subjects of this study. The test instrument that was employed in this study is a test instrument. The test is a validated learning outcome test that includes four essay questions about indicators of conceptual understanding. Only four concept understanding indicators were employed in this study, all of which were borrowed from Zuliana (2017). The four concept understanding indicators used were as follows:

1. Provide examples as well as non-examples, the capacity of pupils to discriminate between linear and non-linear programming issues is emphasized in linear programming material.
2. In linear programming material, the ability of students to turn linear programming problems in the form of story problems into mathematical models and graphs or build equations from the regional graphs of the solutions is presented in many forms of mathematical representation.
3. Using, employing, and selecting specific procedures/operations, which in linear programming material refers to students' abilities to calculate the intersection point of two lines using specific ways and successfully solve issues using the procedure.
4. Using problem-solving algorithms or concepts, which, in linear programming curriculum, refers to students' ability to apply concepts and techniques to solve issues that arise in real life.

This study's data analysis technique is qualitative data analysis, which includes: 1) In this study, data reduction was accomplished by recording the most important points, focusing on the most important points, and simplifying the data collected from the learning outcomes test, which pertains to indicators. comprehension of the concept 2) The data in this study is presented in the form of descriptive language or an explanatory description of the data, which has been collated and summarized for easy comprehension. 3) Drawing conclusions, based on the results of students' replies to the learning outcomes test questions given after the learning process activities using E-Modules, conclusions will be drawn from the data that has been acquired after the data has been presented.

RESULTS AND DISCUSSION

A total of 33 students from class XI IPS 3 SMA Negeri 4 Palembang participated in this study. The study starts with learning how to use the E-Module, a linear program in which the solution to each problem is explained via indicators of concept understanding. Students can benefit from using E-Modules in class to help them learn content topics (Hikayat & Suparman, 2019). Following the completion of learning activities utilizing the E-Module, students are given a learning outcome test consisting of four essay questions that allude to markers of concept understanding.

Table 1 shows the average percentage value of students answering correctly from each indicator of concept understanding from the four learning outcomes test

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

questions whose questions refer to indicators of concept understanding given after students learn to use the E-Module linear programming material:

Table 1: Data from the Concept Understanding Indicators Test

Concept understanding indicator	Many Students Answer Correctly				Average (%)
	Question 1	Question 2	Questi on 3	Question 4	
Give examples and non-examples	33				100%
Presenting concepts in various forms of mathematical representation	19	17	29	25	68,2 %
Using, utilizing, and selecting certain procedures or operations		23	26	10	60,6 %
Apply problem solving concepts or algorithms		28	22	5	51,5 %

Dari Tabel 1 di atas dapat dikategorikan peserta didik ke dalam kriteria tiga skala pembagian tingkatan (Arikunto & Jabar, 2010) yaitu:

1. $68\% \leq P \leq 100\%$ dikategorikan mampu (tinggi)
2. $34\% \leq P \leq 67\%$ dikategorikan cukup mampu (sedang)
3. $0\% \leq \text{P} \leq 33\%$ dikategorikan tidak mampu (rendah)

Table 1 shows that the average percentage of students answering correctly on the indicator of ability to understand the concept of providing examples and non-examples is 100%, implying that if this indicator is included in the criteria for three-level division scales, the participant's students are categorized as able to meet the indicators of providing examples and non-examples because the percentage value of students' correct answers is included in the first level, namely $68\% \leq P \leq 100\%$ in the capable or high category. According to Pranata (2016), pupils can be deemed to understand a concept from the material being studied if they can provide examples and non-examples of the notion. Students are declared capable of fulfilling these indicators because the average percentage value of students answering correctly is 68.2 percent, which is included in the high category. In addition to providing examples and non-examples, indicators present concepts in various forms of mathematical representation. In accordance with the opinion of Hanifah and Abdi (2018), students can fulfill the indicators of presenting concepts in various forms of mathematical representation if they can draw or make graphs, make mathematical expressions or mathematical models of a story problem.

When viewed from the three-level scale criteria, it is included in the second level, namely 34 percent P67 percent with moderate or moderate category in the indicator of using, utilizing, and selecting certain procedures or operations, with the average percentage value of students answering correctly on that indicator being 60.6 percent. Students' capacity to satisfy the indications of employing, utilizing, and picking certain procedures or operations falls into the category of quite capable in this circumstance. Students are stated to be fairly capable on the indicators of applying concepts or problem solving algorithms, with a percentage value of students' accurate answers on these indicators of 51.5 percent. Students can be deemed to understand mathematical concepts, according to Aledya (2019), if they can design settlement methods, use elementary calculations, utilize symbols to

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

express concepts, and shift one form to another. Students have moderate concept understanding skills, according to Ruhama, Hairun, and Bani (2021), if they can articulate concepts in many forms of mathematical representation but are incomplete and cannot correctly answer signs of applying concepts or problem solving algorithms.

In question 1, the learning outcomes test includes two indications of concept understanding ability: providing instances and non-examples, as well as indicators presenting concepts in various mathematical representations. Figure 1 depicts the format of the question.

1. Perhatikan ketiga permasalahan berikut:

Permasalahan I	**Permasalahan II**	**Permasalahan III**
Cleo adalah seoarang penjual hampers masker. Hampers I yang Cleo jual berisikan 3 sheet mask dan 1 sleeping mask. Hampers II berisikan 5 sheet mask dan 3 sleeping mask. Dia hanya mempuanyai persediaan 20 sheet mask dan 10 sleeping mask. Hampers I dijual dengan harga Rp. 20.000 dan Hampers II dijual dengan harga Rp. 30.000. Tentukan jumlah hampers yang terjual agar cleo mendapatkan keuntungan maksimum?	Mahendra membeli 3 buah jeruk dan 2 buah pir dengan harga Rp. 8.500. Lestari membeli 2 buah jeruk dan 1 buah pir dengan harga Rp. 5.000. Jika Agam membeli 4 buah jeruk dan 3 buah pir ditempat yang sama, ia harus memebayar?	Disebuah event bola basket, Yesaya menjual dua jenis headband yaitu headband hitam dan headband navy. Yesaya harus menjual minimal headband hitam sebanyak 25 piece dan headband navy minimal sebanyak 15 piece. Jumlah kedua jenis haedband yang harus dijual tidak boleh melebihi 100 piece. Yesaya akan mendapat komisi Rp. 5.000 untuk setiap penjualan headband hitam dan Rp. 3.000 untuk setiap penjualan headband navy. Berapakah minimal komisi yang akan diterima Yesaya?

Setelah membaca setiap permasalahan yang telah diberikan maka jawablah pertanyaan berikut:

a. Jelaskan yang manakah permasalahan program linear dan yang bukan merupakan permasalahan program linear!
b. Dari permasalahan program linear yang kamu pilih tuliskan fungsi tujuan dan fungsi kendalanya!

Figure 1. Learning Outcomes Test Question Number 1

In problem number one, students are given three different problems and are required to determine which of the three problems is a linear programming problem and which is not. This question is designed to assess students' abilities to provide examples and non-examples of linear programming problems using indicators. Students are also required to construct a mathematical model of the selected problem in the form of the objective function and constraint function. This question is designed to assess students' abilities to communicate concepts in multiple mathematical formats, and students are required to translate story questions into mathematical language in this example. Figure 2 shows one of the outcomes of the students' responses to question number one.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

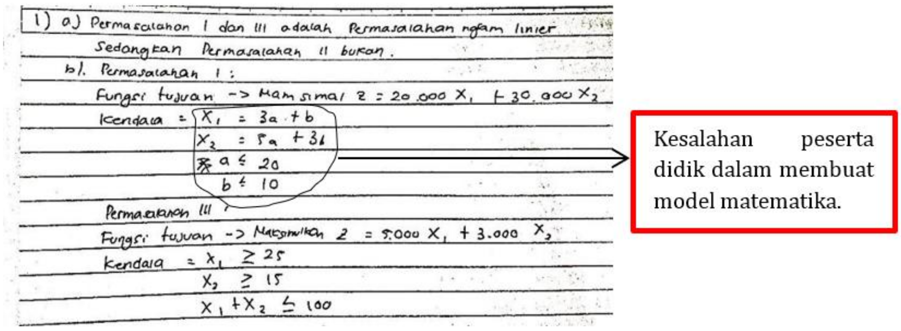
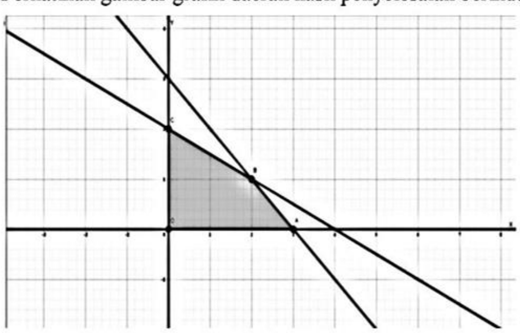


Figure 2. Results of Students' Answers to Question Number 1

Figure 2 shows the students' responses to question number 1, which incorporates two markers of conceptual knowledge. Students can correctly answer question 1a by writing instances of linear programming issues and which are not program problems, as can be shown from these answers. linear. In the meantime, the student made a mistake when answering question 1b. In problem 1a, the student is unable to write the mathematical model of the problem he has chosen. Students encountered mistakes when developing the mathematical model, in that the variables utilized in the objective function and the constraint function were different. These students use variables X_1 and X_2 in the objective function, whereas variables a and b are used in the constraint function, which is not consistent with the linear programming information provided in the E-Module. 19 pupils are able to correctly answer question 1b, which incorporates indicators of presenting concepts in various forms of mathematical representation, based on the results of the calculation of the learning outcomes exam on question number 1. Students are regarded to be moderately capable or sufficient, according to Khairunnisa and Aini (2019), if they are incomplete in answering and satisfying markers of presenting concepts in various forms of mathematical representation. In contrast to the findings of student responses to question 1a, which included indicators that provided instances and non-examples, 33 students were able to accurately answer questions and meet these indicators. Three indicators of concept understanding are included in the learning outcomes test item number 2: 1) presenting concepts in various forms of mathematical representation, 2) using, utilizing, and selecting certain procedures or operations, and 3) applying problem-solving concepts or algorithms. Figure 3 shows the format of question number 2 on the learning outcomes test.

2. Perhatikan gambar grafik daerah hasil penyelesaian berikut!



Tentutkanlah nilai maksimum dari fungsi tujuan $f(x, y) = 2x + 3y$ yang telah diketahui grafik daerah hasil penyelesainnya!

Figure 3. Learning Outcomes Test Question Number 2

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Figure 3 is a test of learning outcome number 2 on linear programming material, in which students are required to find the maximum value of an objective function whose area graph is known to match the solution's conclusion. Students should be able to develop mathematical models from the regional graphs of the results in order to meet the indicators of presenting concepts in various forms of mathematical representation in this topic.

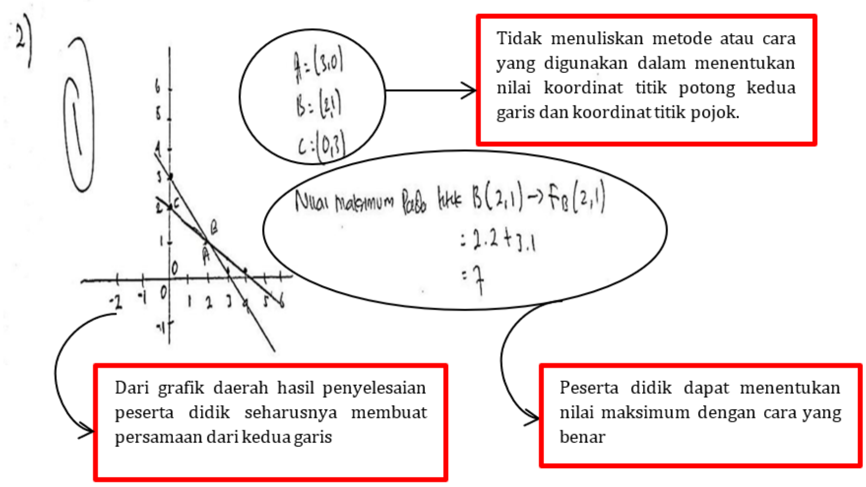


Figure 4. Results of Students' Answers to Question Number 2

As shown in Figure 4, students' error in answering question number 2 is that they are unable to construct a mathematical model in the form of a line equation with a known graph, preventing them from meeting the indications of expressing concepts in diverse forms of mathematical representation. Students can only put down the value of the coordinates of the intersection of the two lines and the corner point of the resultant area without describing how they determined the value of the coordinates of the intersection point and corner point. This signifies that these students failed to meet the criteria for employing, utilizing, and selecting specific methods or operations. Students can determine the greatest value of the objective function and the procedures for solving it by meeting the indicators of applying the concept or problem-solving algorithm.

There were 17 students who were able to meet the indicators of presenting concepts in various forms of mathematical representation, according to the findings of the computation of the learning outcomes exam in question number 2. A total of 23 pupils that fit the criteria employ, utilize, and select certain methods or operations. Students that meet the markers use concepts or problem-solving algorithms in a total of 28 cases. As a result, many students still do not comprehend how to create a mathematical model in the form of a line equation when the solution's local graph is known.

In addition, question 3 of the learning outcomes test refers to the corner point test material and offers three measures of concept understanding ability. In order to meet the indicators of presenting concepts in various forms of mathematical representation, students are expected to be able to create mathematical models of linear programming problems in the form of story questions and graphs of the area of the completion results in question number three. Can identify the value of the intersection point's coordinates and the corner point's coordinates using the

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

appropriate stages or technique of completion to meet the indicators of employing, utilizing, and selecting specific processes or operations.

With the correct solution procedures, you may identify the optimum value of the objective function. "Korean boyband EXO will have a fan meetup to promote their return album," says the third question. For the fan meeting, the EXO agency has only given 60 seats, which will be divided into two classes. Fans who purchase class I tickets will receive 5 posters from each member, while those who purchase class II tickets will receive 4 posters from each member. There are no more than 260 sheets in the bonus poster. If the class I ticket costs Rp. 750,000 and the class II ticket costs Rp. 550,000, Determine how much money EXO will make from the fan meeting!"

Figure 5 shows one of the findings of students' answers to question 3, which is related to the corner point test method.

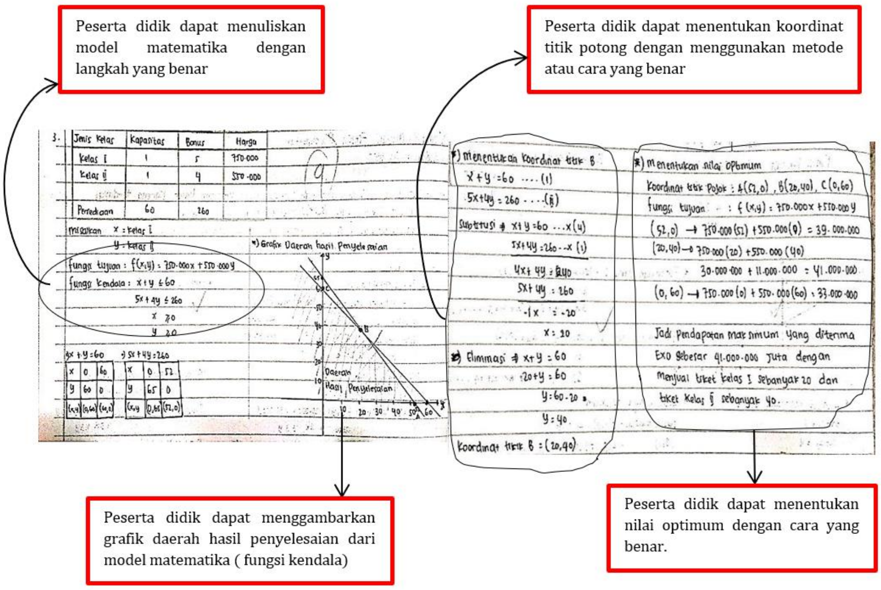


Figure 5. Students' Answers to Question Number 3

Figure 5 depicts one of the students' right solutions to question 3, which includes three markers of comprehension of the corner point test method material. There are as many as 29 students who can write mathematical models and regional graphs of the results of solving linear programming problems in question number 3, based on Table 1. In this case, students have met the indicators of understanding the concept of presenting concepts in various forms of mathematical representation. Using the substitution and elimination method, a total of 26 students were able to correctly determine the value of the coordinates of the point of intersection of the two lines, allowing them to meet the indicators of concept understanding, namely using, utilizing, and selecting certain procedures or operations. Furthermore, 22 students can fulfill the indicators of applying concepts or problem-solving algorithms since they can determine the best value and draw the correct conclusions. Based on the computation of the number of students who answered correctly on each indicator of concept comprehension in question number 3, it can be concluded that the students' conceptual understanding capacity is sufficient on the corner point test method material.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Question number 4 on the learning outcomes exam refers to the line of inquiry technique, and the question is the same as question number 3 on the learning outcomes test, which is in the form of story questions and has three indicators of understanding the same topic. "Megan will buy two heroes to compete in the Mobile Legend tournament," says question number four. Moskov and Hayabusa are the heroes he will purchase. You'll need 60 Batlle Points and 40 Diamonds to purchase the Moskov Megan hero. Meanwhile, 30 Battle Points and 40 Diamonds are required to purchase the Hayabusa Megan hero. Megan must provide at least 180 Battle Points and 160 Diamonds to purchase both heroes at the same time. Please keep in mind that the Moskov Megan hero costs Rp. 40,000 for Top Up, while the Hayabusa Megan hero costs Rp. 25,000. What is Megan's minimum budget for these two heroes?" Students must use the line of inquiry method to answer this question. Figure 6 shows the outcomes of the students' responses to question number 4.

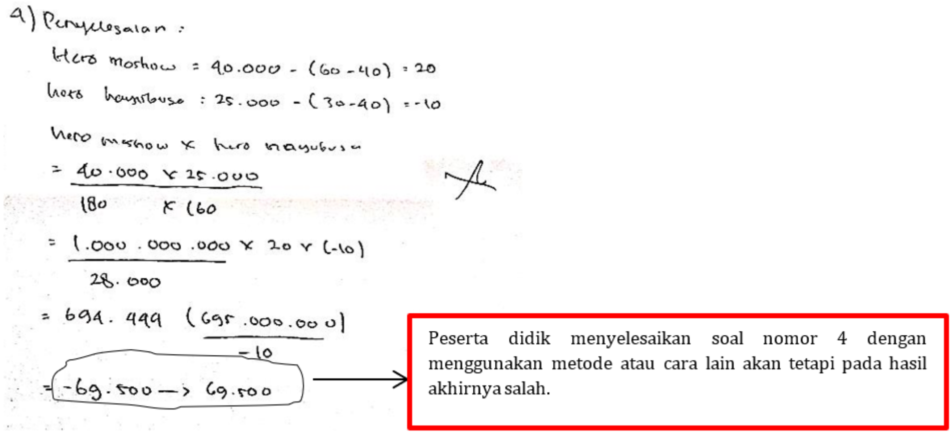


Figure 6. Students' Answers to Question Number 4

Figure 6 depicts one of the incorrect student responses to question 4 addressing the line of inquiry strategy. Question number 4 has three indicators of concept understanding, just like question number 3. Students are expected to be able to create mathematical models, probing equations, and area graphs of the answer in order to meet the requirements of presenting concepts in diverse forms of mathematical representation in these problems. Students must be able to calculate the coordinates of the point of intersection of the two lines, as well as the coordinates of the corner points, in order to meet the indicators of employing, utilizing, and selecting processes or operations. Finally, in order to meet the indicators of applying the idea or problem-solving algorithm, students must be able to accurately estimate the optimum value of the objective function.

As seen in Figure 6, the students did not answer the problem appropriately using the line of inquiry method's procedures for solving the problem. Students tackle these problems using different approaches or methodologies, and the consequences of their replies are incorrect, preventing them from meeting the three indicators of grasping the concepts in the questions. Figure 4 shows the students' accurate answers and their ability to meet the three indicators of grasping the topic of question number 4.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

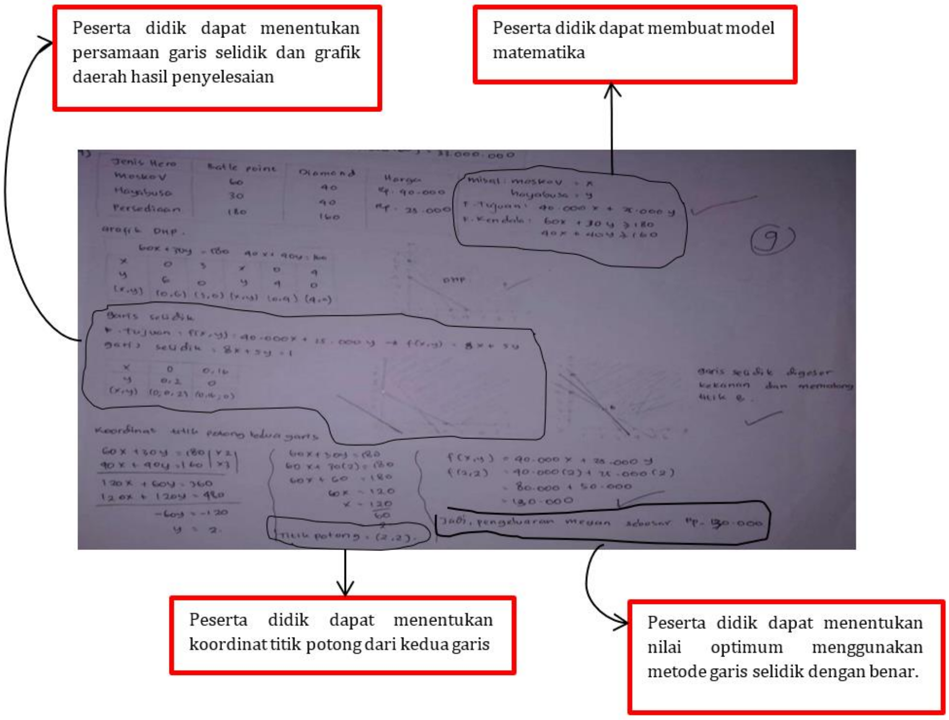


Figure 4. Results of Students' Correct Answers on Question Number 4

Figure 4 shows one of the students' responses to question 4 about how to use the material of the inquiry method correctly. Students can write down mathematical models, following which they can write down the equations of the probing lines they acquired after writing out the problem's objective function. Students can also describe the area of the settlement findings in conjunction with the line of inquiry, establish the value of the coordinates of the intersection of the two lines, and write down the optimal value of the problems that have been supplied. Only ten students are capable of computing the equation of the probing line and determining the coordinates of the point of intersection of the two lines by employing, utilizing, and selecting particular processes or operations. Finally, only five students may meet the indicator of applying the idea or problem-solving algorithm, implying that only five students can determine or compute the optimum value of the goal function using the correct stages of the probing approach. Based on the amount of students who properly answered question 3 and 4 on the line of inquiry technique, it can be said that it is more challenging than the corner point test method.

This is consistent with Kusuma, Aryanto, and Astriandini's (2020) conclusion that the line of inquiry approach is less practical if completed manually due to students' lack of precision in describing the graph of the area of the settlement findings. And the most common errors students make while utilizing the probing line approach to solve problems are conceptual errors, such as not being able to apply or forgetting the notion of the probing line method itself (Noviartati & Ernawati, 2021).

Based on the research above, it is known that there are two indicators of concept understanding where the average value of the percentage of students' correct answers is included in the high category, namely indicators providing

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

examples and non-examples and indicators presenting concepts in various forms of mathematical representation, after learning to use the E-Module and students working on learning outcomes tests. This means that many students can correctly differentiate between linear and nonlinear programming issues, as well as build mathematical models and graph the results of solving linear programming problems.

This is in line with Russefendi's assertion that learning achievement represents the cognitive taxonomy bloom domain, which encompasses translation, interpretation, and extrapolation. The capacity to change symbols or words without losing their meaning is known as translation (Syarifah, 2017). Students have a high level of concept understanding capacity, according to Fajar, et al (2018), if they can correctly and totally meet the indicators of presenting concepts in various forms of mathematical representation. Meanwhile, indicators of employing, utilizing, and selecting particular procedures or operations, as well as indicators of applying concepts or problem-solving algorithms, are included in the sufficient group of indicators of ability to understand the concepts employed in this study. This means that students' understanding of concepts in solving linear programming problems, particularly in determining the coordinates of the point of intersection of the two lines, determining the coordinates of the resultant area's corner points, determining the optimum value, and drawing conclusions, remains in the low category.

The findings support Salimi's assertion that students will understand mathematical concepts if they do several things, including defining concepts verbally and in writing, providing examples and non-examples, writing down a concept using models, diagrams/graphs, and symbols, and changing the form of representation to another form (Kartika, 2018). Meanwhile, Puspitasari and Ratu (2019) claim that students in the medium category are unable to correctly apply the formula in accordance with the problem-solving technique.

The employment of E-Modules in the learning process can improve students' conceptual comprehension abilities, according to the learning outcomes exam. This is in line with Novilia's (2019) assertion that using E-Modules in the learning process can assist students in grasping the notion of a material being taught more simply. The usage of E-Module teaching resources can improve students' understanding of ideas and make mathematical material more appealing to them (Wulandari, Octaria & Mulbasari, 2021). E-Module teaching materials based on specific models or techniques can aid students in understanding mathematics ideas and encourage them to think critically (Hikayat and Suparman, 2019).

CONCLUSION

Based on the findings of the data analysis and discussion, it can be stated that learning to utilize the E-Modul linear program can help students enhance their conceptual knowledge. This is evidenced by the percentage of pupils who answered correctly on each indicator of conceptual understanding capacity, which is divided into two levels: able (high) and quite capable (medium). Students are evaluated based on their ability to provide examples and non-examples of linear programming problems, as well as indications for presenting concepts in various forms of mathematical representation, such as mathematical models and graphs of settlement area outcomes.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Students are quite competent of employing, utilizing, and selecting particular techniques or operations in finding the value of the intersection and corner points of the resultant area's coordinates. And students meet the criteria of being quite capable on indicators of using concepts or problem-solving algorithms in identifying the optimum value of the goal function in linear programming problems.

REFERENCES

Ahmad, H., Nurhidayah, & Nurdin. (2018). Analisis Kemampuan Siswa Dalam Menyelesaikan Soal Cerita Pokok Bahasan Program Linear. *Jurnal MathEducation Nusantara, 1(1)*, 1-14.

Aledya, V. (2019). Kemampuan Pemahaman Konsep Matematika pada Siswa. *May, 0–7*.

Anwar, Y. S., & Abdillah, A. (2018). Penerapan Teori Apos (Action, Process, Object, Schema) Untuk Meningkatkan Pemahaman Konsep Program Linier Bagi Mahasiswa Program Studi Pendidikan Matematika Tahun Akademik 2015/2016. *Paedagoria: Jurnal Kajian, Penelitian dan Pengembangan Kependidikan*, *7*(2), 53-60.

Arikunto, Suharsimi, & Jabar. 2010. *Evaluasi Progam Pendidikan (Pedoman Teoritis bagi Mahasiswa dan Praktisi pendidikan)*. Jakarta: PT Bumi Aksara

Ariyanto, L., Aditya, D., & Dwijayanti, I. (2019). Pengembangan Android Apps Berbasis Discovery Learning Untuk Meningkatkan Pemahaman Konsep Matematis Siswa Kelas

Fajar, A. P., Kodirun, K., Suhar, S., & Arapu, L. (2019). Analisis kemampuan pemahaman konsep matematis siswa kelas VIII SMP Negeri 17 Kendari. *Jurnal Pendidikan Matematika*, *9*(2), 229-239.

Fatqurhohman, F. (2016). Pemahaman Konsep Matematika Siswa dalam Menyelesaikan Masalah Bangun Datar. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, *4*(2), 127-133.

Gunawan, H. (2018, July). Efektifitas penggunaan e-modul terhadap keaktifan dan hasil belajar siswa. In *PROSIDING SEMINAR NASIONAL PROGRAM PASCASARJANA UNIVERSITAS PGRI PALEMBANG* (Vol. 5, No. 05).

Hanifah, H., & Abadi, A. P. (2018). Analisis pemahaman konsep matematika mahasiswa dalam menyelesaikan soal teori grup. *Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang*, *2*(2), 235-244.

Hariani, N. R., Nuswowati, M., & Winarno, W. (2020). Pengaruh penerapan model inkuiri terbimbing berbantuan e-modul terhadap pemahaman konsep hidrolisis garam. *Jurnal Inovasi Pendidikan Kimia*, *14*(1), 2561-2571.

Hikayat, C., & Suparman, S. (2019). Analisis Kebutuhan E-Modul Berpendekatan Realistic Mathematics Education untuk Meningkatkan Kemampuan Berpikir Kritis. *Prosiding Sendika*, *5*(1).

Jannah, Y. M., Yuniawatika, Y., & Mudiono, A. (2020). Pengembangan *E-Modul* Berbasis Game Based Learning Materi Pengukuran Dengan Penguatan Karakter Gemar Membaca dan Menghargai Prestasi. *Jurnal Gantang*, *5*(2), 179-189.

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Kartika, Y. (2018). Analisis kemampuan pemahaman konsep matematis peserta didik kelas vii smp pada materi bentuk aljabar. *Jurnal Pendidikan Tambusai*, *2*(2), 777-785.

Kartika, Y. (2018). Analisis kemampuan pemahaman konsep matematis peserta didik kelas vii smp pada materi bentuk aljabar. *Jurnal Pendidikan Tambusai*, *2*(2), 777-785.

Khairani, B. P., Maimunah, M., & Roza, Y. (2021). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Kelas XI SMA/MA Pada Materi Barisan Dan Deret. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(2), 1578-1587.

Kusuma, Y. J., Aryanto, A. F. D., & Astriandini, M. G. (2020, February). Penggunaan Dynamic Geometry Software GeoGebra untuk menentukan Prosedur Garis Selidik dalam Permasalahan Program Linear. In *PRISMA, Prosiding Seminar Nasional Matematika* (Vol. 3, pp. 393-401).

Laili, I., Ganefri, & Usmeldi. (2019). Efektivitas Pengembangan E-Modul Project Based Learning Pada Mata Pelajaran Instalasi Motor Listrik. *Jurnal Ilmiah Pendidikan dan Pembelajaran, 3(3)*, 306-315.

Maure, Y. L., Djong, K. D., & Dosinaeng, W. B. (2020). Analisis Pemahaman Konsep Matematik Siswa Sma Pada Materi Program Linear. *Asimtot: Jurnal Kependidikan Matematika*, *2*(1), 47-56.

Mawaddah, S., & Maryanti, R. (2016). Kemampuan pemahaman konsep matematis siswa SMP dalam pembelajaran menggunakan model penemuan terbimbing (discovery learning). *Edu-Mat: Jurnal Pendidikan Matematika*, *4*(1).

Murod, M., Utomo, S., & Utaminingsih, S. (2021). Efektivitas Bahan Ajar E-Modul Interaktif Berbasis Android Untuk Peningkatan Pemahaman Konsep Lingkaran Kelas VI SD. *Fenomena*, *20*(2), 219-232.

Mursalina, D., Marhamah, M., & Retta, A. M. (2021). Development Students Worksheet Using Ethnomathematics-based CTL Approach on SLETV Subject Material for Grade X. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *12*(1), 118-129.

Mustain, M. (2021). Peningkatan Pemahaman Siswa Melalui Strategi Investigasi Pada Materi Program Linier di SMAN 2 Madiun. *JEMS: Jurnal Edukasi Matematika dan Sains*, *9*(1), 49-58.

Ningsih, Y. L. (2016). Kemampuan pemahaman konsep matematika mahasiswa melalui penerapan lembar aktivitas mahasiswa (LAM) berbasis teori APOS pada materi turunan. *Edumatica: Jurnal Pendidikan Matematika*, *6*(01).

Nomleni, F. T., & Manu, T. S. N. (2018). Pengembangan media audio visual dan alat peraga dalam meningkatkan pemahaman konsep dan pemecahan masalah. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, *8*(3), 219-230.

Noviartati, K., & Ernawati, A. (2021, August). Analisis kesalahan mahasiswa calon guru matematika dalam menyelesaikan masalah optimasi selama perkuliahan daring. In *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika* (Vol. 6, pp. 223-230).

NOVILIA, N. (2019). *Pengembangan E-Modul Berbasis Exe Learning Pokok Bahasan Ruang Hasil Kali Dalam Pada Mahasiswa Uin Raden Intan Lampung* (Doctoral dissertation, UIN Raden Intan Lampung).

ISSN : 2579-5724
ISSN : 2579-5260 (Online)
http://ejournal.umm.ac.id/index.php/MEJ

Pranata, E. (2016). Implementasi Model Pembelajaran *Group Investigation* (GI) Berbantuan Alat Peraga Untuk Meningkatkan Kemampuan Pemahaman Konsep Matematika. *JPMI (Jurnal Pendidikan Matematika Indonesia)*, *1*(1), 34-38.

Purwanti, R. D., Pratiwi, D. D., & Rinaldi, A. (2016). Pengaruh Pembelajaran Berbatuan Geogebra Terhadap Pemahaman Konsep Matematis Ditinjau Dari Gaya Kognitif. *Al-Jabar: Jurnal Pendidikan Matematika*, *7*(1), 115-122.

Puspitasari, P., & Ratu, N. (2019). Deskripsi Pemahaman Konsep Siswa dalam Menyelesaikan Soal PISA pada Konten Space and Shape. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(1), 155-166.

Romayanti, C., Sundaryono, A., & Handayani, D. (2020). Pengembangan E-Modul Kimia Berbasis Kemampuan Berpikir Kreatif Dengan Menggunakan *kvisoft Flipbook Maker*. *Jurnal Pendidikan dan Ilmu Kimia, 4*(1), 51- 58.

Ruhama, M. A., Hairun, Y., & Bani, A. (2021). Analisis Kemampuan Pemahaman Konsep Matematis Siswa SMP Negeri 1 Kota Ternate pada Materi Persamaan Linear Satu Variabel. *Jurnal Pendidikan Guru Matematika*, *1*(2).

Sumartini, T. S. (2016). Peningkatan kemampuan pemecahan masalah matematis siswa melalui pembelajaran berbasis masalah. *Mosharafa: Jurnal Pendidikan Matematika*, *5*(2), 148-158.

Syarifah, L. L. (2017). Analisis kemampuan pemahaman matematis pada mata kuliah pembelajaran matematika SMA II. *JPPM (Jurnal Penelitian dan Pembelajaran Matematika)*, *10*(2).

Wulandari, S., Octaria, D., & Mulbasari, A. S. (2021). Pengembangan E-Modul Berbantuan Aplikasi Flip Pdf Builder Berbasis Contextual Teaching and Learning. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *5*(2), 389-402.

Yanti, R., Laswadi, L., Ningsih, F., Putra, A., & Ulandari, N. (2019). Penerapan pendekatan saintifik berbantuan geogebra dalam upaya meningkatkan 134 pemahaman konsep matematis siswa. *AKSIOMA: Jurnal Matematika dan Pendidikan Matematika*, *10*(2), 180-194.

Zuliana, E. (2017). Penerapan Inquiry Based Learning berbantuan Peraga Manipulatif dalam Meningkatkan Pemahaman Konsep Matematika pada Materi Geometri Mahasiswa PGSD Universitas Muria Kudus. *Lectura: Jurnal Pendidikan*, *8*(1).

Zulmaulida, R., & Saputra, E. (2014). Pengembangan Bahan Ajar Program Linear Berbantuan Lindo Software. *Infinity Journal, 3(2)*, 189-216