# Investigating The Learning Obstacle and The Self Confidence of Students College in Material Understanding Ability of Linear Algebra Course

Sulistiawati, Arumella Surgandini

**Abstract**— This research was motivated by the condition of many college students come from Papua-Indonesia having a lack of capability to understand Linear Algebra course. In the other side, this understanding is a main requirement to master the learning material. One of its causes is that they have learning obstacles. Both lack of understanding capability and learning obstacle strongly imply the inferior feeling among of the students. Subjects of this research are 13 students Linear Algebra who enrolled in academic year 2015/2016 and 2014/2015 of Surya College of Education (STKIP Surya) Tangerang-Indonesia. Methodology of this research is qualitative approach in which researcher acts as the key instrument. Data are collected by test and questionnaire which will be analyzed by descriptive qualitative analysis. The result of this research were students have learning obstacle in their material understanding ability in interpreting, exemplifying, classifying, summarizing, comparing, and explaining, which relatively low because the students' ability to think are still low and undeveloped (ontogenic origin) and the influence of the learning process experienced by students from the beginning to the present (didactical origin), and also they have self-confidence in average weak level which means that the level of confidence is within normal limits, tends to be rather weak, tends to feel doubtful, worry about the impression that is caused to others and have an inferiority complex.

**Index Terms**— Learning obstacle, Epistemological Obstacle, Self-Confidence, Papuan Student.

## 1 INTRODUCTION

ACCORDING to the Oxford Dictionary, ability is possesion of the means or skill to do something, or could also be interpreted as talent, skill, or proficiency in a particular area [1]. In Indonesia Dictionary called Kamus Besar Bahasa Indonesia (KBBI) ability is defined as capability, skill, and strength [2]. In the other hand, in Oxford Dictionary, understanding is the ability to understand something. From the two things, the ability of understanding can be interpreted as a person's ability to interpret something successfully [1]. Bloom [3], mentioned that understanding covers constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.

Stylianides & Stylianides stated that most of academics make understanding abilities as goals in learning [4]. The same thing was said by Bloom in Bloom's Taxonomy which is famous with a hierarchy of six levels in cognitive domain of learning goals [5]. They are knowledge, comprehension, application, analysis, synthesis, and evaluation. In this hierarchy the comprehension is synonym of understanding. The Bloom's Taxonomy is revised in 2001 by Anderson and Krathwohl results Revised Bloom's Taxonomy. Hierarchy of Revised Bloom's Taxonomy different with the Bloom's Taxonomy. Revised Bloom's Taxonomy hierarchy are remembering, understanding, applying, analyzing, evaluating, and creating.

In the Revised Taxonomy Bloom [3], explained that understanding is defined as meaning from instructional messages, including oral, written, and graphic communication. It has the intention that understanding it includes the part in constructing instruction messages (learning), including: oral, written, and graphical. For example learning messages are physical or chemical demonstrations in the classroom, the shape of the surface of the land seen during tourism, writing and symbols in mathematics learning, and so forth. A student is said to be able to understand if he is able to connect the knowledge he has (old abilities) that has contained schemes and cognitive frameworks with new knowledge.

Bloom [3] cognitive processes included in the category of understanding include interpreting, modeling, classifying, summarizing, concluding, comparing, and explaining. In this study the ability to understand the material to be measured is the ability to interpret, exemplify, classify, summarize, conclude, compare, and explain.

The ability to understand the problematic material is caused by the presence of student learning obstacles. Cornu [6] classifies barriers to learning into 4 different parts, namely: cognitive obstacle, genetic and psychological barriers, didactic barriers, and epistemological barriers. Cognitive barriers can occur if students experience difficulties in the learning process. Genetic and psychological barriers can occur if a result of students' personal development. Didactic obstacles occur because of the nature of teaching from the teacher, and epistemological barriers can occur due to the nature of mathematics itself.

According to Brousseau [7] revealed that the initial cause of learning obstacle in this case is called the epistemological obstacle, there are 3 categories, namely ontogenic origin, didactical origin, and epistemological origin.

First, ontogenic origin is a cause of abnormal neuropsychological development which should be achieved at a certain age. This development is supposed to build concepts

- *Sulistiawati is a lecturer at Sekolah Tinggi Keguruan dan Ilmu Pendidikan Surya (Surya College of Education), Indonesia, Email: sulistiawati@stkipsurya.ac.id*
- *Arumella Surgandini is a lecturer at Sekolah Tinggi Keguruan dan Ilmu Pendidikan Surya (Surya College of Education), Indonesia, Email: arumella.surgandini@stkipsurya.ac.id*

and rules, when used in exact nature conditions, they show limitations. For example, someone at a certain age should have been able to understand the concept of addition without teaching aids, but because of this condition, this ability has not been possessed.

Second, didactical origin is a problem caused by the education level process that has been passed. For example, in wetting the decimal concept at the elementary school level is influenced by one's ability in the encyclopedia and scientific conventions

Third, epistemologicaloOrigin is a constraint because someone does not seek knowledge by itself. For example, one only accepts an explanation of the concept of Pythagoras in school and does not deepen this concept by finding out for you more deeply.

In linear algebra course, some research show that linear algebra is not an easy course for university students, one of them is mathematics students [8]. Students so struggle to grasp the idea to solve the problems in linear algebra course. Students have difficulties in understanding especially in definition, although they have difficulties in procedural.

In this study the learning obstacle that will be discussed are epistemological obstacle based on the three causes above, namely ontogenical origin, didactical origin, and epistemological origin. This study aims to find out what are the learning obstacles of Papuan students in Linear Algebra course and to determine the level of self confidence of Papuan students in Linear Algebra course.

## 2 METHODS

In general, this study intends to examine natural conditions. Therefore this research belongs to qualitative research [9]. Further revealed that qualitative research designs are temporary and adapted to the reality on the ground continuously [10].

### 2.1 Researh Subject

The subjects in this study were 13 STKIP Surya students who had attended Linear Algebra in academic year of 2014/2015 and 2015/2016. The selection of this subject is based on the consideration of the observations of lecturers and fellow lecturers during teaching that many Papuan students find it difficult to accept the material presented. The impact of this was that they lacked confidence in their classmates and did not even attend college.

### 2.2 Research Instrument

The instrument in this study is the individual researcher or human instrument. For that as a research instrument, the researcher must have broad insight in order to be able to analyze, photograph, and construct the social situation of education [9]. As an instrument in this study, researchers developed a test instrument to obtain data on learning barriers experienced by students in Linear Algebra courses and the ability to comprehensively understand material. The test instrument used was a test of material understanding consisting of 7 items.

The test instrument was developed based on indicators of material understanding including: interpreting, modeling, classifying, summarizing, concluding, comparing and explaining. The types of test instruments developed in this study can be seen in the table below.

TABLE 1
THE BENCHMARK OF MATERIAL UNDERSTANDING ABILITY TEST

| Variable | Understanding Indicators | Questions | Question Numbers |
|---|---|---|---|
| Material Understanding | Interpret | Presenting linear equation system form into augmented matrix form | 1 |
| | Exemplify | Giving the meaning of the solution of linear equation system from three possible solution that was presented by cartesian graphic, then giving examples of their functions. | 2 |
| | Classify | Distinguish whether matrices can be multiplied or not | 3 |
| | Summarize | Make a statement that the determinant of the upper triangular matrix is obtained by multiplying the entries in the main diagonal on the calculation process from several examples. | 4 |
| | Conclude | Finding the value of $x_2$ and $x_4$ from linear equation system of four variables if $x_1$ and $x_3$ given. | 5 |
| | Compare | Compare which equation applies from the equation $(AB)^{-1} = A^{-1}B^{-1}$ and $(AB)^{-1} = B^{-1}A^{-1}$ | 6 |
| | Explain | Giving the reason for the answer made, whether a given matrix has an inverse or not. | 7 |

How to score for material understanding test instruments is by giving 10 points per item.

For the material understanding test instrument, before the use of the expert validation test was used, namely the lecturer in Linear Algebra at STKIP Surya in previous years. Of the 8 items submitted, based on the consideration of expert validation, the items which will be used are 7 items. These seven questions were then tested on 13 students who had passed the Linear Algebra course from the class of 2011 to the 2013. Once the testing process of the test instruments was completed the calculation of the results of the trial analysis was carried out which included an analysis of the validity, reliability, differentiation, and level of difficulty. The recapitulation of the results of the analysis of the trial of the understanding test material can be seen in the table below.

TABLE 2
THE RESULT OF TEST INSTRUMENT TRIAL

| Question Numbers | Result | | | |
|---|---|---|---|---|
| | Validity | Reliability | Discriminating Power | Level of Difficulty |
| 1 | Valid | Very High | Poor | Easy |
| 2 | Valid | | Good | Medium |
| 3 | Valid | | Sufficient | Medium |
| 4 | Valid | | Good | Medium |
| 5 | Invalid | | Poor | Difficult |
| 6 | Valid | | Very Good | Medium |
| 7 | Valid | | Very Good | Medium |

The seven items tested each represent indicators of material understanding which also consist of 7 items. From the 7 items that were tested in reality, there was one invalid item, namely item number 5 with reliability that was generally "very high" at 0.812. This question number 5 has a "bad" distinguishing power and a "difficult" level of difficulty. This question number 5 is the only difficult question, besides being easy there is one number, namely number 1 and five items that are currently. This question number 5 is still used to retrieve data because it is the only question that represents the indicator of "concluding" and also the only "difficult" problem so that if the instrument is removed it will not have a uniform distribution of difficulty (close to the normal distribution).

While the non-test instrument was self-confidence

questionnaire which is using self-confidence scale modified from The Test of Self-Confidence compiled by Lauster [11]. This self-confidence questionnaire consists of 32 items taken from the book "personality test" by Lauster [11]. The scale used uses a Likert scale from 0 to 4, with the answer choices 0 for Never (N), 1 for Rarely (R), 2 for Sometimes (S), 3 for Frequent (F), and 4 for Very Often (VO).

To determine the level of self confidence, Lauster [11] classifies the results of values obtained based on age level. This level of self confidence includes: very strong, strong, average strong, average weak and weak. As complete as possible, the classification can be seen in the table below.

TABLE 3
THE GUIDELINE OF SELF CONFIDENCE LEVEL BASED ON AGE BY LAUSTER

| | Age (Years) | | | | |
|---|---|---|---|---|---|
| | 14-16 | 17-21 | 22-30 | 30 above | The Levels Of Self-Confidence |
| Total Score | 0-8 | 0-20 | 0-12 | 0-15 | Very Strong |
| | 9-17 | 21-36 | 13-25 | 16-29 | Strong |
| | 18-33 | 37-44 | 26-40 | 30-46 | Average Strong |
| | 34-54 | 45-69 | 41-59 | 17-66 | Average Weak |
| | 55-128 | 70-128 | 60-128 | 67-128 | Weak |

The interpretation of the results of the level of self-confidence can be seen in the following table.

TABLE 4
THE GUIDELINE OF INTERPRETATION OF SELF-CONFIDENCE LEVELS BY LAUSTER

| The Levels Of Self-Confidence | Interpretation |
|---|---|
| Very Strong | • Self-confidence is not a problem for you.<br>• You rarely worry whether you will make a good impression on someone else or not<br>• You have no doubts or feelings of inferiority. |
| Strong | • Compared to other people in your age group, your level of confidence is good.<br>• You are not worried about the impression you have on others.<br>• You rarely doubt and don't have an inferiority complex |
| Average Strong | • Your level of confidence is at a normal level, tends to be rather strong. |
| Average Weak | • Your level of confidence is within normal limits, tends to be rather weak.<br>• You tend to feel hesitant, worry about the impressions you have on others and have an inferiority complex. |
| Weak | • Self-confidence becomes entry point of trouble for you.<br>• You often worry about the impression you have on others.<br>• You should approach life's problems with a sense of self-confidence and non-emotional attitude. |

### 2.3 Data Analysis

Data analysis was carried out after data was obtained about tests of material understanding ability to analyze the data obtained by identifying learning obstacles from the viewpoint of ontogenic origin, didactical origin, and epistemological origin. In other hand, the self confidence questionnaire was analyzed by the level of self confidence and its interpretation.

From the results of data analysis from various instruments triangulation of data is carried out to check the data error.

## 3 RESULT AND DISCUSSION

### 3.1 Learning Obstacle (Understanding Learning) Understanding Papuan Student Materials at Linear Algebra Courses

On this material understanding test, researchers identified learning barriers that emerged in Papuan students related to the material systems of linear and matrix equations in Linear Algebra courses. This identification uses a marking scheme made by researchers based on the steps of the answer by setting each item about the score 10. So the total score of this test is 70. Item number 1 has 2 steps, item number 2 has 4 steps, item number 3 has 3 steps, item number 4 has 4 steps, item number 5 has 6 steps, item number 6 has 6 steps, and item number 7 has 2 steps.

This test was given to 13 Papuan students who had taken the Linear Algebra in academic year 2014/2015 and 2015/2016 from class of 2011 to 2013. The results of this material understanding test can be seen in the table below.

TABLE 5
THE RESULT OF MATERIAL UNDERSTANDING OF PAPUAN STUDENTS

| Number | Students Code | District | Ethnic | Score |
|---|---|---|---|---|
| 1 | S1 | Tolikara | Lani | 4 |
| 2 | S2 | Tolikara | Dani | 0 |
| 3 | S3 | Tolikara | Lani | 0 |
| 4 | S4 | Tolikara | Lani | 7 |
| 5 | S5 | Sorong Selatan | Tehit | 7 |
| 6 | S6 | Sorong Selatan | Saifi | 4,5 |
| 7 | S7 | Puncak Jaya | Lani | 2,5 |
| 8 | S8 | Puncak Jaya | Lani | 8,5 |
| 9 | S9 | Puncak Jaya | Lani | 1 |
| 10 | S10 | Puncak Jaya | Lani | 6 |
| 11 | S11 | Tolikara | Lani | 0 |
| 12 | S12 | Tolikara | Lani | 4,5 |
| 13 | S13 | Tolikara | Lani | 0 |
| | Score Average | | | 3,46 |

Based on the table above it appears that the average material understanding ability score is 3.46 from 70 with a range of 0.67 to 8.5. This score is very low compared to the total score, which is capable of mastering the material around 5%. Thus it can be said that all students have difficulty in solving questions related to understanding the material given. In fact, there were 4 students who could not answer the questions given at all.

When viewed from the answer steps, there are many steps that cannot be solved properly. For more complete data can be seen from student scores in the student difficulty table based on the steps below.

TABLE 6
LEARNING OBSTACLES OF PAPUAN STUDENTS ON MATERIAL UNDERSTANDING BASED ON THE ANSWER STEPS

| Number | Answer Steps | The Average Score of Steps | The Average Score of Number Item | Understanding Indicators |
|---|---|---|---|---|
| 1a | 1 | 0,96 | 1,23 | Interpret |
| 1b | 2 | 1,5 | | |
| 2a | 1 | 0,15 | 0,11 | Exemplify |
| 2a | 2 | 0,08 | | |
| 2b | 3 | 0,19 | | |
| 2b | 4 | 0 | | |
| 3 | 1 | 0 | 0,03 | Classify |
| | 2 | 0,08 | | |
| | 3 | 0 | | |
| 4a | 1 | 0 | 0 | Summarize |
| 4b | 2 | 0 | | |
| 4c | 3 | 0 | | |
| 4d | 4 | 0 | | |
| 5 | 1 | 0 | 0,05 | Conclude |
| | 2 | 0 | | |
| | 3 | 0 | | |
| | 4 | 0 | | |
| | 5 | 0 | | |
| | 6 | 0,31 | | |
| 6 | 1 | 0 | 0 | Compare |
| | 2 | 0 | | |
| | 3 | 0 | | |
| | 4 | 0 | | |
| | 5 | 0 | | |
| | 6 | 0 | | |
| 7 | 1 | 0 | 0,10 | Explain |
| | 2 | 0,19 | | |

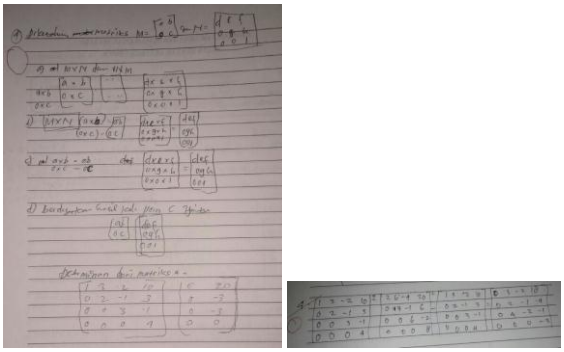
Interesting things that can be observed from the table above are questions number 4 and number 6 which have a score of 0, which means that none of the students managed to answer the number correctly, not even one step in the correct answer. This shows that students do not yet have the ability to "summarize" and "compare". In other words, all students have learning difficulties in "summarizing" and "comparing". Item number 4 and number 6 are as follows:

4. Given matrices $M = \begin{bmatrix} a & b \\ 0 & c \end{bmatrix}$ and $N = \begin{bmatrix} d & e & f \\ 0 & g & h \\ 0 & 0 & i \end{bmatrix}$.
   a. Matrix $M$ and matrix $N$ , include what type of matrix?
   b. Calculate the determinant of matrix $M$ and matrix $N$ ?
   c. Based on question a) and question b), what is your conclusion?
   d. Based on your conclusion on question c), calculate the determinan of matrix A, $A = \begin{bmatrix} 1 & 3 & -2 & 10 \\ 0 & 2 & -1 & 3 \\ 0 & 0 & 3 & -1 \\ 0 & 0 & 0 & 4 \end{bmatrix}$!

6. If matrix $A = \begin{bmatrix} 2 & 1 \\ 3 & -1 \end{bmatrix}$ and matrix $B = \begin{bmatrix} 1 & 0 \\ 3 & 5 \end{bmatrix}$, which statement below is true:
   (i) $(AB)^{-1} = A^{-1}B^{-1}$, or (ii) $(AB)^{-1} = B^{-1}A^{-1}$

In this discussion, item number 4 will be discussed as an example. These items expect students to be able to: a) identify the types of matrices given (order matrix 2 and order matrix 3), b) determine the determinants of the matrices, c) give conclusions about the determinant of the matrix based on the type of matrix, and d) calculate the matrix order 5 using conclusions obtained from points c). The purpose of this item is that students are able to summarize statements into the fact that "the determinant of the upper triangular matrix is the product of the diagonal entries".

From the 13 students, there were 5 people who did not write answers. The test presents answers but is wrong. Examples of student answers can be seen in the figure 1 below.



(a) (b)

Fig. 1 The example of students answer for number item 4

Fig. 1 shows the answers of students indicate that it is likely that students are unable to capture the information and questions given. In addition, these students have knowledge of the concept of matrices and the concept of matrix determinants is very minimal. It is even possible that they do not know what determinants are by definition and how they are calculated.

In fig. 1(a), the answers written are very not answering the question. The language of mathematics, writing matrix symbols and operations that want to be done wrong. This student does not realize that the symbols must be written with the correct rules according to the agreement. The student is trying to answer the type of matrix by multiplying, then to answer the follow-up questions consistently answer with multiplication operations. But even this multiplication operation is not a multiplication operation on the matrix. In other words the student is careless in multiplying the matrices. There is no logical statement or mathematical idea in this answer.

In fig. 1(b), students immediately answer point d) without answering points a), b), and c) to see the relationships. This student is not able to write the symbol of the matrix correctly. The way to do this is to multiply the entries of matrix A with real numbers 2. The idea used is very illogical. This student has knowledge of matrices and elements on the topic that is very minimal, even said to be nonexistent.

From the answer above, we can find the existence of a learning obstacle caused by ontogenic origin (the initial cause of the child concerned), didactical origin (the initial cause of how to teach the science), and the epistemological origin (the initial cause because of science itself).

Learning obstacle because ontogenic origin can be seen

from students who cannot recall information about the types of matrices, how to determine the order matrix determinant 2 and order matrix determinant 3, and how to determine the matrix determinant of a triangular matrix. The inability of these students to recall the information they have received in lectures is most likely due to their non-optimal cognitive development.

Learning obstacle because didactical origin can be identified from the answers of students who are unable to write answers with the correct mathematical language. This might happen because the process of delivering material types of matrices, matrix determinants, and determinants of triangular matrices has not been optimally conveyed to students. The tendency of students to absorb slow learning material indeed causes teachers to repeat the material several times. But this also cannot be done continuously because of the limited time and energy of the instructor to maximize the ability of students. Learning obstacle because epistemological origin is not found from the answer above.

Most of students have difficulties in material understanding related to interpret, exemplify, classify, compare and explain. On this occasion, which will be taken as an example of discussion, is the ability to interpret, model and classify. For the ability to interpret, students tend to be able to solve the problems given. The following are questions number 1 related to the ability to interpret and its answer.

1. Given linear equation systems as follows:

a. $\begin{cases} 5y = \frac{3}{2} \\ 3x + 10y = -9 \end{cases}$ b. $\begin{cases} x - y + z = 1 \\ 2x + 2y - 3z = 1 \\ -3x + 4y + z = 2 \end{cases}$

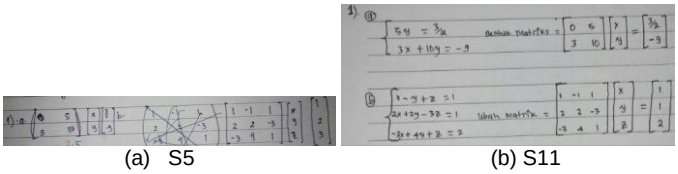
Write the augmented form of two linear equation systems above!

Below is the key answer of number by answer steps.

TABLE 7
THE KEY ANSWER OF NUMBER 1

| Number Item | Answer Steps | Answer Key |
|---|---|---|
| 1a | 1 | a. $\left[\begin{array}{cc\|c} 0 & 5 & \frac{3}{2} \\ 3 & 10 & -9 \end{array}\right]$ |
| 1b | 2 | b. $\left[\begin{array}{ccc\|c} 1 & -1 & 1 & 1 \\ 2 & 2 & -3 & 1 \\ -3 & 4 & 1 & 2 \end{array}\right]$ |

This question item expects students to be able to present linear equation system of two variables and linear equation system of three variables into other form, namely augmented matrix. Many students are able to solve this problem. From the 13 students, 8 of them were able to answer partially correctly or there was a correct logic. For examples are the answers from the sample S5 and sample S11 which can be seen in the figure below.



(a) S5 (b) S11

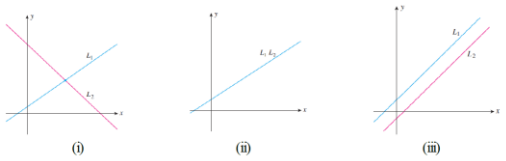
Fig. 2. The example of students answer for Number Item 1

From the fig. 4, the student was able to capture that the linear equation system can be presented in the form of a matrix. They already have the correct logic by presenting their answers to the matrix, namely the coefficient matrix, but not the form of augmented matrix. Most likely the student did not know the term of augmented matrix and its representation. However, they have the correct interpretation that to solve linear equation system can be done with the concept of matrices.

The learning obstacle that might arise from the answer above is that students are unable to recall what augmented matrix is. In addition, the ability to use mathematical language in writing also has errors, as is done by the S5 which does not write a sign equal to (=) in writing the matrix of coefficient. The obstacles that occur in these students can be caused by the weakness of students in storing information and remembering. This obstacle is included in ontogenic origin. Despitefully, it was possible because in the previous lecture the term augmented matrix was not introduced. This is included in the didactical origin.

For the ability to exemplify and classify there are several students who have answers with the correct logic. Related items pointing out and classifying can be seen in the following.

2. Look at the pictures below!



(i) (ii) (iii)

The pictures above are graphs represent the solution of linear equation system. Graph (iii) represents linear equation system case with have no solution.

a. What if the graphs are like graph (i) and graph (ii)?

b. An example for linear equation system case with have no solution is $\begin{cases} 2x + 3y = 6 \\ 2x + 3y = 5 \end{cases}$. Give an example of linear equation system that satisfied by graph (i) and graph (ii)?

3. Given matrices below:

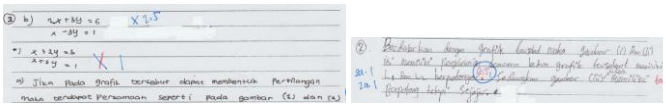
$$A = \begin{bmatrix} 1 & 2 \\ 0 & 2 \end{bmatrix}, B = \begin{bmatrix} -6 \\ 0 \\ -1 \end{bmatrix}, C = \begin{bmatrix} -2 & 3 \\ 1 & 0 \\ 4 & -1 \end{bmatrix}, \text{ and}$$

$$D = \begin{bmatrix} 0 & -1 & 4 & 2 \\ -2 & 3 & -3 & 0 \end{bmatrix}$$

If we want to multiply two matrices from the matrix

$A, B, C$ and $D$, identify which matrices can be multiplied and also can not be multiplied! Give examples of matrix calculation that can be multiplied.

Item number 2 expects students to capture by recognizing the graph that the system of linear equations has three possible solutions, namely a single solution, an infinite solution, and no solution. Then, they can provide a system example of linear equations for all three possible solutions. From the 13 students only 3 people were able to provide answers that had the correct logic of a small part. Like the sample work results S8 and S13 as follows.



(a) S8 (b) s13

Fig. 3. The example of students answer for Number Item 2

The S8 sample cannot answer correctly or has the correct logic for the question being asked, but can provide the correct linear equation system control for a single type of solution. Most likely, the student concerned is only able to remember the usual form of linear equation system, which has a single solution, so it does not know the form of linear equation system that has a finite solution. For example, S13 can capture the intent of the problem and be able to describe the meaning of the system solution of linear equations that are presented in the form of graphs on graphs (i) and graphs (ii) by looking at the position of both lines and. However, this student is not able to distinguish the type of solution. In addition, a system example of the requested linear equation is also not given.

Learning obstacle that appears for the above case are ontogenic origin and didactical origin. Ontogenic origin appears when students are unable to identify the type of linear equation system of two variables settlement from the graph given. Most likely they were unable to recall this topic. In case of origin it is most likely that the types of solutions of a system of linear equations are not of great concern to the teacher when this material is delivered in lectures.

Based on the explanation above we can see that most of students in STKIP Surya Tangerang, Indonesia have epistemological obstacle, especially because of ontogenic origin and didactical origin. This result similar to study conducted by Moru [12] that also found the epitemological obstacle in understanding of limit concept at undergraduate level. One of the finding of this study is research subjects have different idea with researcher in communicating mathematical idea.

Another study which found the epistemological obstacle is Sierpinska [13]. Her finding was she divide an epistemological obstacle into heuristics obstacle and rigouristic obstacle related to limit. Sierpinska found that there were four sources of epistemological obstacle [12], these are: scientific knowledge, infinity, function and real number.

### 3.2 Level of Selfe Confidence of Papuan Students in Linear Algebra Course

In this study, the subjects who were given the questionnaire were 13 students with an age range of 21-24 years. The level of confidence that emerges from these students is strong, average weak, and weak. In general, the average age of the study subjects was 22.5 years and the total score was 59.2. The average age and total score refer to table 8, then the average level of self confidence of students is at average weak level. For complete data can be seen in the table below.

TABLE 8
THE LEVELS OF SELF-CONFIDENCE OF PAPUAN STUDENTS IN LINEAR ALGEBRA COURSE BASED ON AGE

| Number | Students Code | District | Ethnic | Age (Years) | Total Score | The Levels Of Self-Confidence |
|---|---|---|---|---|---|---|
| 1 | S1 | Tolikara | Lany | 21 | 51 | Average Weak |
| 2 | S2 | Tolikara | Dani | 23 | 46 | Average Weak |
| 3 | S3 | Tolikara | Lany | 23 | 58 | Average Weak |
| 4 | S4 | Tolikara | Lany | 22 | 96 | Weak |
| 5 | S5 | Sorong Selatan | Tehit | 22 | 15 | Strong |
| 6 | S6 | Sorong Selatan | Saifi | 24 | 64 | Weak |
| 7 | S7 | Puncak Jaya | Lany | 24 | 63 | Weak |
| 8 | S8 | Puncak Jaya | Lany | 23 | 74 | Weak |
| 9 | S9 | Puncak Jaya | Lany | 23 | 41 | Average Weak |
| 10 | S10 | Puncak Jaya | Lany | 21 | 67 | Average Weak |
| 11 | S11 | Tolikara | Lany | 23 | 50 | Average Weak |
| 12 | S12 | Tolikara | Lany | 21 | 61 | Average Weak |
| 13 | S13 | Tolikara | Lany | 23 | 84 | Average Weak |
| Average | | | | 22,5 | 59,2 | Average Weak |

If we observed further, from the table above only 1 student or 7.7% have a strong level of confidence, 7 students or 53.8% with a weak average level of confidence, and 5 students or 38.5% who have a level his confidence is weak.

Lauster states that someone who has an inferiority complex can be caused by several reasons [11]. One of the most obvious causes is physical disability. Furthermore, in social life, inferiority can be seen from shame, confusion, excessive humility, great fame, high desire to show off, and a high desire to be praised. On the other hand, excessive self-confidence does not always have positive meaning. This type of person tends to act arbitrarily and can even cause conflict (hostility) with other people. This resulted in them having more opponents than friends.

Psychologists argue that humans have two ways to cover up their inferior sense of surrender and compensation. Giving up means inferiority is seen as an improvement in the self-confidence that has been achieved [11]. Compensation is defined as taking steps or forms. For example, American runner Wilma Rudolph was exposed to polio during childhood. Rudolph was one of the Rome Olympic champions in 1960 from the track and field sprinter who tried to overcome his inferiority by overcoming his weaknesses. In this case, Rudolph had physical disability and had the desire and ability to undergo training. Another way to compensate for weakness is to develop other abilities perfectly. For example, someone who is lacking or weak in the field of sports can have extraordinary results in intellectual activity with perseverance carried out. With compensation done, self-confidence will rise.

If a person does not succeed in raising his self-confidence by direct training or by developing other talents, he will

commit self-deception as well as others [11]. The form of compensation made in this case is stubborn, dogmatic, opposing, and frightening. This type of self-confidence is dishonest and easy to shake.

## 4 CONCLUSION

Papuan students who take classes in Linear Algebra course at STKIP Surya in academic year 2014/2015 and 2015/2016 have learning obstacle in their material understanding ability in interpreting, exemplifying, classifying, summarizing, comparing, and explaining, which relatively low because the students' ability to think are still low and undeveloped (ontogenic origin) and the influence of the learning process experienced by students from the beginning to the present (didactical origin).

The level of self-confidence of Papuan students who take classes in Linear Algebra course at STKIP Surya in academic year 2014/2015 and 2015/2016 is average weak level which means that the level of confidence is within normal limits, tends to be rather weak, tends to feel doubtful, worry about the impression that is caused to others and have an inferiority complex.

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