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Epistemological Obstacle on Triangle And Quadrilateral Topic

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Abstract— One of the basic material in geometry is triangle and quadrilateral topic. It should be mastered by students before learning the next topic in geometry. In consequence, it becomes an essential topic. In fact, there are still students who have difficulties. That difficulties can be caused by learning obstacle during learning process. This discussion only focused on the students' epistemological obstacle in learning triangle and quadrilateral topic. This study aims to identify the students' epistemological obstacle based on errors when they answered the written test given. Five questions in written test were given to 25 grade VII students in one of junior high schools in Sumedang. This study used qualitative approach where data were analyzed with triangulation method from result of the test and the students' interview. This research showed that the limitation of context in introducing triangles and quadrilateral was able to caused learning obstacle for the students. Furthermore, it caused the students having difficulty in solving the similar problem with different context in triangle and quadrilateral topic.

Keywords— *Epistemological obstacle, triangle and quadrilateral*

I. INTRODUCTION

Basically, formation of knowledge occurs really complex among teachers, students, and knowledge system. Therefor the teacher, the students, and the n so that learning process can be effective and efisien. This is one known as metapadedidaktik [2]. However the teacher frequently find the situation that is happened in the classroom is not match with the teacher's goal. This mismatch can be affected by leaning obstacle, namely new knowledge that is adapted appropriately based on the previous knowledge [1]. Meanwhile Brown described an obstacle as a way of knowing that is related to productivity or success [3]. Learning obstacles that experience by student are caused by variety of learning of students which cannot be facilitated by the teacher during the learning process.

Furthermore, Brousseau also divide the learning obstacles into three types. The first one is Ontogenic Obstacle, namely obstacle that is related to the stages of mental development of the students. The second one is Didactical Obstacle namely obstacle that is related to result of instruction from the teacher (Brousseau refers it as didactical engineering). And the last one is Epistemological Obstacles namely obstacle that is related to the origin of the concept [1]. knowledge system become one of subsystem from system of interaction[1]. In classroom, teacher should create meaningful learning process where it is a part of important preparation. The teacher needs to identify and analysis learning situatio

For the purpose of this research, authors will focus on describing the epistemological obstacle only.

Geometry is one of crucial topic that must be learned by students in the schools. When the students learn about topic of geometry, they will learn about analysis [4]. Topic of geometry in this research is triangle and quadrilateral topic. In this topic, we still find learning obstacles particularly for our students. In the other hand, level of geometrical thinking of the students in junior high school is generally still in level two based on Van Hiele's Level [5]. Several previous researches showed that epistemological obstacle occurs because of finding fact coming from previous learning design [6]. Other than that the students also forgot to do division operation to two multiplication of height and base when they applied the formula in determining area of triangle [7]. Learning obstacles usually experienced by the students come from textbook which was used in the classroom [8]. To make learning process in the classroom effective and efisien, the teacher requires to identify and analysis that obstacles namely epistemological obstacle.

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Based on that description above, authors would like to show the existence of the epistemological obstacle trough identification process. In the next time, this research can be developed to Didactical Design Research.

II. METHOD

Didactical Design Research consists of three main stages namely, Prospective or didactical situation analysis, metapedadidaktik, and retrospective [9]. This research is the first stages of Didactical Design Research, namely didactical situation analysis.

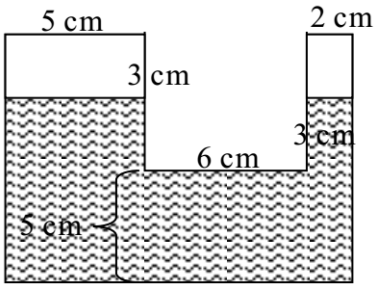
This research used qualitative approach to describe and explain regarding the epistemological obstacles that was identified in learning process particularly in triangle and quadrilateral topic. Participants in this research were 25 7th-grade students in one of junior high school in Sumedang. All students who participated in this research have learned triangle and quadrilateral topic. Each student was given five questions about triangle and quadrilateral topic then researcher analysis the student's answers to know student's error. Furthermore, errors that were appeared from the student's answer were identified based on epistemological obstacle. After that, the students who experienced the epistemological obstacle were interviewed with in-depth interview. It is intended to identify what learning obstacles were going on.

In this study, researcher only describe one of five questions namely question number five because the researcher only identified the epistemological obstacle in this question.

III. RESULT AND DISCUSSION

After analyzing and identifying the student's answer, the researcher find out the student who experienced the epistemological obstacle. It was identified from the error when the student answer the questions. It can be seen based on Figure 1 below.

Number one.
Look at the following figure!



Calculate the circumference and area of the shaded area!

Figure 1. Question number five.

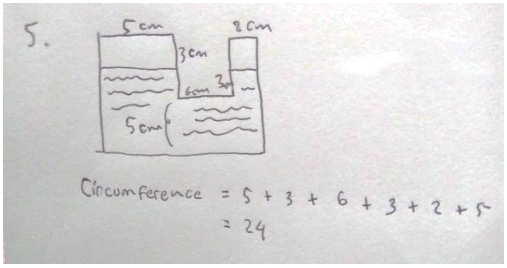


Figure 2. Student's answer in question number two.

Based on the student's answer on Figure 2, the researcher found that the student did an error for answering the question of number five. The student's answer showed that the student did not understand about the meaning of the question so that the student were not able to answer the question correctly. The student only summed up all of the numbers from the figure showed on the question. Other than that, the student ignored the information on the question regarding shaded area.

To deepen the student's error related to question number five, the researcher did in-depth interview to the student. Table 1 below showed the interview process.

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Table 1. Interview process

Researcher	Could you explain your answer in number five?
Student	I tried to answer the circumference of quadrilateral by summing up all of the numbers in the question
Researcher	Did you see the shaded area in the question?
Student	Yes of course
Researcher	What is relation the shaded area in that figure in number five?
Student	All was similar with the quadrilateral

Based on the student's answer in interview process, the student seemed not to understand about the meaning of the question in number five. The student only interpreted the figure in number five as a quadrilateral as usual. The student did not realized that the shaded area in the question as an additional information in answering the question.

The researcher identified that the student only knew about quadrilateral as figure that have four sides. Therefore, when the student was given the different problem but still in the same context, the student cannot solve the problem. The student were more familiar with the simple quadrilateral.

IV. CONCLUSION

From the result of the discussion above, the researcher made a conclusion related to epistemological obstacles which was experienced by the students. Epistemological obstacles identified may occur during application of formula. The limitation of the context when the students learned the triangle and quadrilateral topic. It can cause obstacles to the students.

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