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Detection of Accommodation and Assimilation Speed by Students of Grade VII in Learning Special Triangle

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Abstract. Each student is born as an individual with different abilities both in absorbing and processing information received. Students have different speeds in analysing the acquisition of new information or knowledge, some are low, medium and high. similarly the time required is short, there is also a long time. As he absorbs, processes, and analyses the information, he has adapted accommodation and assimilation within his cognitive structure. This study aims to determine the speed of assimilation and accommodation of VII grade students who are highly capable, medium, and low in learning special triangle. The approach used is qualitative by using task-based interview. The researcher interviewed the subject using interview guidelines that have been compiled and tested. The questions are intended to guide the subject in performing the assigned task as a way of recording the speed of the accommodation and assimilation process. The tasks assigned to the subject are triangular questions containing new concepts such as special triangle properties, triangular lines, triangular drawings and triangular lines, calculating the number of outside corners and special triangles, and calculating the area From a variety of special triangles. Another tool in this study was the stopwatch to detect the speed of accommodation and assimilation of each student. Data analysis was done by three stages: studying data transcript, data reduction, and coding. The results of this study were from obtained high-ability students detected quickly in the process of accommodation and assimilation.

Keywords: detection, accommodation, assimilation

1. Introduction

Jean Piaget, viewed intellectual growth as a process of adaptation¹. The form of adaptation performed by an individual is in the form of accommodation processes and assimilation of cognitive structures at the time of absorbing and managing information. Both processes work (cognitive structure) with new information, simultaneously to modify and adjust the schema (cognitive structure) with new information. Accommodation is the process of absorbing new experiences by modifying the existing scheme, even forming a completely new knowledge while assimilation is the process of absorbing new information and experience into the scheme owned[1].

This is in line with the disclosed Hudojo cognitive structure referring to the organization knowledge and experience that the students enable to capture new ideas or concepts.



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Based on the information obtained by the researcher at the time of the survey in grade VII Junior High School about mathematical material that is difficult to learn is the material of geometry, especially the material of triangle. Because they have not been able to grasp the broad concept, triangular lines, triangular properties, counting angles, counting the extent of triangles, even though they have been studied during elementary school. This initial knowledge can support the process of accommodation and assimilation in the construction of new knowledge to high school students of grade VII on the properties of special triangles, triangular special lines, triangular drawings and triangular lines, calculating the number of angles and angles outside the special triangle, and Copyright calculates the extent of the various special triangles to be constructed by the students. Thus, the purpose of this reseach is to detect the speed of accommodation and assimilation in grade VII students in learning the special triangle.

2. Literature Review

A person's cognitive development requires the process of accommodation and assimilation. In a person's intellectual development, a balance between accommodation and assimilation is required. This process is called equilibrium. Equilibrium is a mechanical self-regulation to regulate the balance of the accommodation process and assimilation.

The organizing system within the organism has two factors: schemes and adaptations. Schemes relates to the regular patterns of behavior of the organisms concerned and are accumulated from simple to complex behavior [3]. while adaptations are adjustments to the environment. Adaptations for students vary. Adaptation are done through the process of accommodation and assimilation. These two processes are often opposite, but cannot be separated [2].

To reach the highest period of equilibrium gradually, it is necessary for students to perform simultaneous operations on accommodation and assimilation processes [4]. At each period of intellectual development, students are equipped with a more comprehensive structure (complex thinking patterns). Each period occurs temporarily, although each period is more stable than the previous period. The likelihood of students' interaction with the environment increases, indicating that students are better prepared to assimilate external representation into a more integrated mental frame. The more students receive something in the environment, the greater stimulation of the development of their internal structures undergoes. Thus intellectual development in equilibrium becomes the motor of individual adaptation to the surrounding environment.

Accommodations are a process of enriching and modifying structures within the mental frame of mind as a result of new information requiring change. This modification involves rearranging the existing structure or construction of new information, to strengthen the students understanding by testing it in a new situation.

According to Piaget accommodation is the process of absorbing new information even forming new knowledge by changing the existing scheme⁵. Thus the accommodation is transforming the existing scheme into a new scheme.

In the accommodation, students are assumed to have early knowledge (scheme) when faced with a problem. Students form a mental frame of work to process and compile information by activating schemes, categorizing and differentiating. It then combines information and experience by modifying the scheme internally to shape, to organize, and to analyze information with new knowledge that students have in advance in order to gain new knowledge.

Assimilation is the process of absorbing new information and experiences into the scheme. In assimilation, students are assumed to have a scheme. When dealing with problems, then students form a mental frame of mind to organize and to process information by activating the scheme, categorizing and differentiating it. Then information and experience are combined by adjusting the scheme internally to shape, to organize, and to analyze information by linking existing knowledge to the new ones.

In scheme theory, knowledge is stored in the form of information consisting of mental constructions of ideas in which the knowledge possessed by students is arranged in a scheme that lies in our memories. And this scheme is becoming more widespread and growing as students learn.

3. Research Methods

This research uses a qualitative approach, it is to describe the process of accommodation and assimilation in studying special triangles by forming mental frames and combining information⁶.

The above thought process was chosen because in that way there could be a clear indication of the occurrence of accommodation and assimilation. The process of forming a mental frame of work was begun by activating the existing scheme, categorizing and differentiating. While the process of combining information is how to modify (accommodation process) and to adjust (assimilation process) of existing schemes.

The subject of this research was the students of grade VII SMPN 16 Surabaya, because at that age students can think logically and can use concrete operations to form more complex operations.

The process of collecting data was obtained by interview based on task⁷. This interview is used to capture information about the description of accommodation and assimilation of the subject as a material to draw conclusions.

In the interview steps, the students were given the task to work on, at the same time they were also interviewed in relation to the work done. The results and other possibilities arose from the impact of the question posed. When conducting the interview and observing student activities, recording speed read the task to complete it by using stopwatch.

Transcripts of data obtained from the interview were analyzed. The data obtained that were not needed were reduced by using the framework of the process of thinking was done accommodation and assimilation. After that, encoding each student who was high, medium and low.

From the analysis, if there were still many inconsistencies with the frame of mental frame it would be re-peated of the process of accommodation and assimilation on the same students according to the level of ability. This was done to see if the mental frame of work remained the same as before or different. If the mental frame of mind remained the same, then the process of accommodation and assimilation of different classes with high-ability students, medium, and low was done. This was done to see if in different classes the formation of a mental work frame remained the same or different.

From the results obtained, it could show information about the speed of accommodation and assimilation of students of grade VII in learning special triangle.

4. Research Results

From the interview and check the prerequisite materials with the mathematics teacher of grade VIIA (random class selection) SMPN 16 Surabaya, the following results are obtained: (a) The teacher informs the material to be learned and recalls the material that the previous students have acquired, without observing the cognitive, affective and psychomotor abilities, (b) The teacher checks the prerequisite materials at the beginning of the lesson activity and in the lesson only performs sampling, questioning and feedback activities, (c) The learning strategy used is lecture, discussion and cooperative jigsaw type, (d) Assessment is done on written tests, frequently asked questions and assignments. To see students' activeness, the teacher asks the students to work on the questions in front of the class, (e) There is no grouping in both learning and judgment. And the final activity of teaching the teacher to provide feedback in the form of questions to do or task / homework.

The analysis of the results of job-based interviews with high-ability students consisted of 9 students is quickly detected in the accommodation process and assimilation in completing four triangle tasks namely H33 (high group no absent 33) (10 minutes 12 seconds), H35 (10 minutes 20 seconds) H3 (11 minutes 22 seconds), H9 (11 minutes 45 seconds), H20 (11 minutes 49 seconds), H26 (11 minutes 57 seconds), H7 (12 minutes 5 seconds), and H12 (12 minutes 23 seconds). In medium group consisted of 19 students are detected rapidly in the accommodation process and assimilated in completing four triangle tasks: M11 (12 minutes 37 seconds), M32 (12 minutes 39 seconds), M36 (12

minutes 47 seconds), M25 (12 minutes 59 seconds), M30 (13 minutes 11 seconds), M4 (13 minutes 25 seconds), M2 (13 minutes 48 seconds), M22 (13 minutes 52 seconds), M27 (13 minutes 56 seconds), M23 (14 minutes 5 seconds), M29 (14 minutes 12 seconds), M24 (14 minutes 22 seconds), M16 (14 minutes 27 seconds), M15 (14 minutes 39 seconds), S19 (14 minutes 41 seconds)), S38 (14 minutes 45 seconds), M13 (14 minutes 49 seconds), M8 (14 minutes 57 seconds). And the results of interviews from a low group of 10 students are detected quickly in the accommodation process and assimilated in completing four triangle tasks namely L5 (16 minutes 15 seconds), L21 (17 minutes 20 seconds), L37 (17 minutes 49 seconds), L34 (18 minutes 31 seconds), L28 (18 minutes 55 seconds), L31 (18 minutes 55 seconds), L14 (19 minutes 37 seconds), L6 (19 minutes 40 seconds), L10 (19 minutes minute 53 seconds).

While the results of a task-based interview with a group of high, moderate and low-ability students are obtained in the following results: The first task, the students activate the scheme with the activity of measuring the angular and side lengths of the triangle using a protractor and ruler. They know that in determining the magnitude of the arc should be measured. The way of measuring using a protractor arc starts from 0° according to what has been studied in elementary school. In addition, the students measure the length of the side of the triangle to know the same side of the length or not and then distinguish each triangle so that it can categorize the nature of the triangle. They also activate the scheme with the activity of grouping a pointed, blunt and right-angled triangle based on its large angle. The other grouping activities are equilateral triangles, equilateral triangles and any triangles.

The second task, in measuring the large angle and doing the schematic angle summation is activated. The number of angles equal to 180° , less than 180° and more than 180° are distinguished. Then students repeat the measurement because students remember and know in advance in primary school that the number of triangle angles is 180° . By modifying the scheme of triangles of either triangle tapered, blunt, right-angled, equilateral, equal foot and any number of angles 180° .

The third task, the students activate the scheme about the lines that exist in the triangle. Students categorize high lines forming right angles with triangle sides. Students remember that the high line equals to the height of the triangle, and the triangle can be made another high line. Students adjust the scheme that the high line is a line that can be pulled from a vertical angle to the side of the triangle in front of it.

The fourth task, the students activate the scheme about the base and height of the triangle and considering the area of the triangle. Students categorize the area of the triangle obtained from the base and height of the triangle, and the students remember that the area of the triangle is obtained from the base and height of the triangle. Students adjust the scheme that the area of the triangle is half of the yield of the base and height of the triangle.

5. Conclusions

Based on the description above it can be concluded that the high-skilled students took less time to accomplish their tasks while the lower-skilled ones needed longer time.

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