

Description of Students' Cognitive Levels Based on Bloom Taxonomy of Kinesthetic Learning Style at Grade 8th

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ABSTRACT

The qualitative research describes how cognitive students levels based on Bloom's Taxonomy have kinesthetic learning style at 8 grade of SMP Negeri 4 Pallangga, Gowa Regency, 2020/2021. The subjects in this research are students of VIII.1 Class which is 2 subjects, has the highest kinesthetic learning style score. The instrument is the researcher itself as the main instrument supported by questionnaire of learning style, essay question, and interview test designed by cognitive level based on Bloom's Taxonomy Indicators. Analysis steps are data analysis of learning style and cognitive style, SPLDV material. The analysis technique started with data condensation, data presentation, and conclusion. The research results represent. The students having kinesthetic learning styles occupy C1-C3 because students can remember, understand, and apply. And the other students occupy C1-C5 indicators because students can remember, understand, apply, analyze, and evaluate. So that, concluded that the most of students had fulfilled C1-C5 indicators and have been included in High Order Thinking Skill category in the Cognitive Level based on Bloom's Taxonomy.

Keywords: *Cognitive Levels, Bloom's Taxonomy, Kinesthetic, SPLDV.*

1. INTRODUCTION

Curriculum changes are based on changes in the flow of globalization. The government is required to be able to create advanced and developing learning. Therefore, quality human resources are needed to create a smart generation.

Mathematics is one of the subjects whose level/difficulty is regulated by the curriculum. Mathematics is a subject that is taught from elementary to secondary education. Mathematics has an important role in advancing human thinking. With this thinking power, human cognition can develop according to the circumstances. Surya [1] states that cognitive behavior at a higher or highest level is thinking. It is said so because thinking is recognized by manipulating several concepts, especially abstract concepts.

Based on the results of the researcher's initial visit to SMP Negeri 4 Pallangga and by comparing the situation of students in other schools (the visit was carried out in 2019) by

looking at the recap of grade VIII student report cards and asking students directly about how difficult it is to learn mathematics, the percentage of students said that 45% said that mathematics is quite difficult, 30% said that mathematics is complex, and 25% said that mathematics is easy and fun. This is due to the lack of students' reasoning power in understanding the form of math problems given so that most of them think that mathematics is complicated. Therefore, special attention is needed for the government and educators to work together to bring up students' cognitive processes so that they do not think that mathematics is difficult.

One theory that discusses the ability to think or cognitive processes is the theory put forward by Benjamin S. Bloom. This theory is known as Bloom's Taxonomy. Bloom's Taxonomy revision has two dimensions; the two dimensions are cognitive processes and knowledge. Where in the cognitive process dimension contains six categories, namely:

Remembering (C1), Understanding (C2), Applying (C3), Analyzing (C4), Evaluating (C5), and Creating (C6) [2]. Moreover, C1 to C3 is a low-level cognitive process. While C4 to C6 is a high-level cognitive process. Therefore, students can master high levels of thinking if students can master low levels of thinking. The revised Bloom's Taxonomy can be used as a reference in measuring students' thinking levels, starting from the lowest level of remembering to the highest level of creating.

One of the tools or methods that can measure students' cognitive abilities is to provide problem-solving questions. Siew [3] states that "problems that problem solvers can either resolve or seek a solution using the application of prior knowledge, rules, and procedures are categorized as routine problems. Meanwhile, non-routine problems are related to a real-life context and require problem solvers' critical and creative thinking skills to employ various strategies and approaches to solve."

In the students' thinking process, it will be seen how their behavior/attitude is remembering concepts in solving problems. Before students store information/knowledge in their minds, they need to receive information or expertise first. The way they receive lessons is called student learning styles. In general, each student has a different learning style. According to Nasution [4], learning style is a consistent style carried out by a student in capturing stimulus or information, remembering, thinking, and solving problems.

There are three student learning styles, namely (1) visual learning style, which plays an important role in vision, this visual child must see the body language and facial expressions of the educator to understand the subject matter (2) auditory learning style, namely relying on his learning preferences through By ear, students who have an auditory learning style can learn faster by using verbal discussions and listening to what the educator says, and (3) kinesthetic learning styles, namely students learn through moving, touching, and doing, these students are encouraged to learn through experience by using various models, such as working in an oratory or learning in nature while playing [5]. There is no better or less good learning style because every student has a different learning style. The importance of analyzing the thinking abilities of students who have different learning styles is to find out how students with different learning styles are.

Departing from these problems, the authors conducted a study titled "Description of students' cognitive level based on Bloom's Taxonomy in

terms of Kinesthetic Learning Style in Class VIII SMP Negeri 4 Pallangga, Gowa Regency".

2. RESEARCH METHOD

This research is qualitative research using a descriptive approach. The study describes how students' cognitive level is based on Bloom's Taxonomy when viewed from the learning styles of students. This research was conducted at SMP Negeri 4 Pallangga, having its address at Bontobiraeng Panakkukang Village, Pallangga District, Gowa Regency. This research was conducted in the second semester in the 2020/2021 Academic Year, grade VIII.1, consisting of 29 students. Then two students were taken as subjects with a kinesthetic learning style. The instrument used in this research is the main instrument (the researcher herself). And the second instrument as a supporting instrument is learning style questionnaires, students cognitive tests, and Guidelines for interviews.

Learning style questionnaires for 29 students were held on Thursday, April 8th, 2021, using the google form. Further tests of cognitive level by 2 students were performed on 10 April 2021, followed by an interview process conducted on the 1st of 8 April 2021. The researcher consistently applied the health protocol of COVID-19.

In this study, to meet the validity of the data, the researchers did several things, namely; data credibility test, conducted with more diligent observation, triangulation used is technical triangulation; transferability test, which is carried out is to describe in detail the description of students' cognitive level (Bloom's Taxonomy stage) on the SPLDV material; dependability test is done by auditing the entire research process; confirmability test is done by digging up the actual data and not fabricating the data.

The data analysis technique used in this study is qualitative: with descriptive analysis. Data obtained from post-tests and interviews were then analyzed qualitatively using data analysis techniques proposed by Miles et al. [6], condensed data presentation, and conclusion.

3. RESEARCH RESULT

The description of the cognitive level of a subject with a learning style referred to in the study is how students can solve problems or find solutions is right based on cognitive levels of Bloom's Taxonomy that in terms of kinesthetic learning styles. The RAK1 and MFK2 are subjects with a kinesthetic learning style.

Table 1 Test and Interview Results Based on Cognitive Levels of Bloom's Taxonomy Subjects with Kinesthetic Learning Style

Writing test	Interview
C1-Remembering	
Subjects can write and distinguish the SPLDV form and the non-SPLDV form well (RAK1, MFK2).	Subjects can explain the form of SPLDV, and the form of non-SPLDV correctly can distinguish what is meant by coefficients, variables, and constants in the SPLDV equation and the non-SPLDV equation (RAK1, MFK2).
C2-Understanding	
Subjects can write down the terms of the SPLDV equation, but it is not complete (RAK1, MFK2).	Subjects can explain the terms of the form of the SPLDV equation using simple language (RAK1, MFK2).
C3-Applying	
Subjects can solve problems according to procedures/concepts (RAK1, MFK2).	The subject can prove that the SPLDV mentioned has a solution with the right process/procedure. Subjects can use other ways to prove the answer is correct (RAK1). The subject can prove that SPLDV has a solution with the right process/procedure (MFK2).
C4-Analyzing	
The subject can write down any known part, ask, make mathematical models, and solve problems well. (RAK1). The subject can write down any part that is known, asked, can make mathematical models, but in the calculation process, there are still errors (MFK2).	Subjects explained well; and did not check the answer before saying he was correct (RAK1, MFK2).
C5-Evaluating	

Writing test	Interview
The subject can analyze the problem well, relate it to the SPLDV learning material, the subject can correctly create a mathematical model, and the subject can conclude what possibilities can occur (RAK1). The subject cannot analyze the problem properly (MFK2)	The subject can analyze problems well, relate them to SPLDV learning materials, create mathematical models, and conclude what possibilities can occur correctly (RAK1). The subject does not understand the problem well (MFK2).
C6-Creating	
The subject solves the problem according to the procedure but is still wrong in concluding (RAK1) No answer was given (MFK2)	The subject can explain the problem well, but there are still errors in concluding (RAK1). No answer was given (MFK2)

4. DISCUSSION

Cognitive Level Ability Based on Bloom's Taxonomy Subjects with Kinesthetic Learning Styles (RAK1 and MFK2) in question is how to describe students' cognitive levels when viewed from a kinesthetic learning style.

4.1. Remember

The two subjects with kinesthetic learning styles were able to explain the form of SPLDV and the form of Non-SPLDV correctly, accompanied by examples of each form of SPLDV and Non-SPLDV. The two subjects can also show differences between coefficients, constants, and variables. The two subjects can also show differences between coefficients, constants, and variables. During the interview process, both subjects could not sit still when asked. They reflexively move anything in their hands (such as moving a pen, moving their hands) when answering a given question. Therefore, at the cognitive level of the first level (remember), two subjects met the criteria for classifying can be a problem, that is where, according to Anderson and Krathwohl [2], the subject can recognize, recall, describe, and identify knowledge. The answers of the two subjects at this level were correct, both in written and oral form. Still, both subjects only found it difficult to explain directly (interviews) because they spoke slowly, so the researcher reiterated.

4.2. Understand

Secondly, levels of cognitive with kinesthetic learning styles can again explain that it is the correct answer given the terms of SPLDV. Even though it is in the form of a general equation, there are still incomplete conditions written, but both subjects can explain well what they mean. Therefore, at the second cognitive level (understanding), the two subjects met the criteria because they could explain again, accompanied by the requirements for the SPLDV equation, which according to Anderson and Krathwohl [2], the subject could classify, compare, interpret. The answers of the two subjects at this level were correct both in written and oral form. Still, both subjects only found it difficult to explain directly (interviews) because they spoke slowly, so the researcher reiterated. This is in line with the characteristics of the learning style. According to De Porter & Hernacki [7], one of the characteristics of the kinesthetic learning style is the lack of verbal activity.

4.3. Apply

Subjects with kinesthetic learning styles can solve the problem following the procedure/concept. The subject of RAK1 is sure that the answer given is correct, can prove that the equation mentioned has a set of solutions, and RAK1 can provide other alternative answers, thus confirming that the solution/set given is correct. For MFK2 subjects who are sure that the answer given is appropriate, the subject can prove the answer by obtaining a set of solutions, but the subject cannot prove it in any other way. Therefore, the two subjects met the criteria at the third cognitive level (applying) because they could solve the problem according to the procedure/concept. Moreover, the subject could carry out the procedure and implement it. Both subjects wrote down their answers still needed further explanation. This is in line with the characteristics of the learning style. According to De Porter & Hernacki [7], one of the characteristics of the kinesthetic learning style is that writing is usually not neat.

4.4. Analyze

At the fourth cognitive level of Bloom's Taxonomy, the two subjects with kinesthetic learning styles will be discussed in concluding the given problem. Both subjects can write down what is known, asked, mathematical models well for RAK1 subjects in writing and orally complete appropriately. While the

subject of MFK2 is in writing and verbally, there are still slight errors in the calculations, so the set of solutions given is still not appropriate. Therefore, at the fourth level cognitive level (analyzing), subject RAK1 meets the criteria because it can conclude appropriately. While the subject of MFK2 has not met the criteria. The answers of the two subjects at this level were correct, both in written and oral form. Still, both subjects only found it difficult to explain directly (interviews) because they spoke slowly, so the researcher reiterated.

4.5. Evaluate

At the fifth cognitive level of Bloom's Taxonomy, the two subjects with kinesthetic learning styles will discuss their ability to assess, deny, or support an idea and provide reasons that can strengthen the answers obtained correctly. RAK1 subjects in writing and orally can analyze problems well, relate them to SPLDV learning materials, create mathematical models, and correctly conclude what possibilities can occur. While the subject of MFK2 in writing cannot analyze the problem and relate it to the SPLDV learning material, it cannot make a mathematical model, even though the subject can conclude what possibilities can occur without the SPLDV element being used. Therefore, at the fifth cognitive level (evaluation), the RAK1 subject has met the criteria for being able to assess, deny, or support an idea and provide reasons that can strengthen the answers obtained correctly, which according to Anderson and Krathwohl [2] is subject can evaluate and check. While the subject of MFK2 has not met these criteria. The answers of the two subjects at this level were correct, both in written and oral form. Still, both subjects only found it difficult to explain directly (interviews) because they spoke slowly, so the researcher reiterated. This is in line with the characteristics of the learning style. According to De Porter & Hernacki [7], one of the characteristics of the kinesthetic learning style is the lack of verbal activity.

4.6. Create

At the sixth cognitive level of Bloom's Taxonomy, the two subjects with kinesthetic learning styles have not designed a different way to solve problems or combine information into appropriate strategies and provide conclusions. RAK1 subjects can state what is known, question: can make mathematical models, carry out the completion process but

there are errors so that the solutions given are not correct. As for MFK2 subjects, they can say what they know and what they are asking, but they have difficulty making mathematical models so that no solution is obtained. Therefore, at the sixth cognitive level (creating), the two subjects did not meet the criteria because they had not designed a different way to solve problems or combine information into appropriate strategies and provide conclusions. According to Anderson and Krathwohl [2], Bloom's sixth cognitive level is creating, namely generalizing and producing (looking for other ways). The answers of the two subjects at this level were correct, both in written and oral form. Still, both subjects only found it difficult to explain directly (interviews) because they spoke slowly, so the researcher reiterated. This is in line with the characteristics of the learning style. According to De Porter & Hernacki [7], one of the characteristics of the kinesthetic learning style is the lack of verbal activity.

Based on the research results on the six cognitive levels conducted on the two subjects, there are similarities between the two subjects, namely the two subjects could not be calm during the interview process. Both subjects are thinking (expressing what they know) using reflex movements, and answering interview questions, namely by movement. This is in line with the research results conducted by Ishartono, Naufal, et al. [8] that subjects with kinesthetic learning styles learn through moving, touching, and doing things. This kinesthetic can not stand sitting for a long time to listen to the lessons, but it is better if the learning process is accompanied by physical activity. Students with kinesthetic learning styles speak slowly, respond to physical attention, touch people to get their attention, stand close when talking to people. According to Nithiya et al. [9], kinesthetic learning is needed by students with kinesthetic learning styles because it allows for better understanding and effective information retention, especially among students who do not adapt to conventional teaching and learning techniques, group learning, and learning, also, standard textbook.

Table 2. Similarities and Differences in Bloom's Taxonomy Cognitive Levels in Each Subject

Students' Cognitive Level Based on Bloom's Taxonomy	RAK1	MFK2
C1 – Remember Subjects with kinesthetic learning styles can explain the shape and form SPLDV non-	√	√

Students' Cognitive Level Based on Bloom's Taxonomy	RAK1	MFK2
SPLDV appropriately accompanied by the respective sample SPLDV form and non SPLDV.		
C2 – Understanding Subjects can explain again that the answer given is correct according to the SPLDV requirements.	√	√
C3 – Apply Subjects can solve problems according to procedures/concepts.	√	√
C4 – Analyzing The subject can conclude the given problem.	√	×
C5 – Evaluate The subject can assess, deny, or support an idea and provide reasons to strengthen the answers obtained correctly.	√	×
C6 – Creating Subjects can design a different way to solve problems or combine information into appropriate strategies and provide conclusions.	×	×

5. CONCLUSION

Based on the results of research and discussion, the conclusion in this study is the level of cognitive students based on Bloom's Taxonomy if the learning styles kinesthetic include some students were able to remember, understand, apply, analyze, and analyze to evaluate. Students with kinesthetic learning styles most had *High Order Thinking Skills levels* because they meet the cognitive indicators based on Bloom's Taxonomy (C1 - C5).

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