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Saminan[1]; Endah Muliana[2]; Agus Wahyuni[3]
[1,2,3]Syiah Kuala University, Banda Aceh, Indonesia

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STUDENTS' THINKING STYLE IN ANALIZING PHYSICS CONCEPT THROUGH THE KINEMATIC GRAPHICS

Saminan[1]; Endah Muliana[2]; Agus Wahyuni[3]
[1,2,3] Syiah Kuala University, Banda Aceh, Indonesia
Contributor Email: saminan2011@yahoo.com

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Abstract

Students' thinking style is influential in learning outcomes, but teachers have not yet focused on the teaching and learning process, resulting in students having difficulties in receiving the material, especially in the study of analyzing physical concepts through graphs on the concept of kinematics. Therefore, knowing the student's thinking style especially for the physics teacher is a very important effort to achieve teaching success. This study aims to determine the students' thinking style in analyzing physical concepts through graphs on kinematics concepts. The approach used in this study is a qualitative approach with a type of descriptive research. Subjects in this study were students of class X Mipa1 and X Mipa2. Data collection instruments in this study were questionnaire, observation and documentation. The questionnaire used was in the form of a closed questionnaire adapted from the Quantum Learning book written by Bobbi DePorter and Mike Hernacki, The results of this study indicated that the concrete sequential thinking style (S1) was 27 %, abstract sequential thinking style (S2) was 14%, random abstract (A1) was 34%, concrete random thinking style (A2) was 25%.

Keywords: *Thinking Style; Analyzing Physical Concepts; Kinematics Graph.*

A. Introduction

Physics is the science subject which is important and must be understood by elementary school students up until College. Based on the initial observation that researchers did at SMAN 2 Darul Makmur, Nagan Raya, researchers found that students in general are less active and less motivated studies the physics subjects. Most students consider subjects physics lesson that is very difficult to understand.

The difficulty often occurs on understanding concepts, formulas, and figures. Students lack the willingness to learn for success or achievement learns. Many students do not give good results in learning.

Many students do not give good results in learning. Though physics is not material to memorize, but rather requires reasoning and understanding of the concept. Consequently, if given the test, students have difficulties and students consider the concept and principles of physics are very complicated and less desirable.

Students of SMA Negeri 2 Darul Makmur Department of Mathematics and Science (MIPA) in class X are generally only learn when facing exams, this is due to lack of power when the students' understanding of the material in the classroom, not their teachers on the individual characteristics of particular styles of student thinking.

Based on the results of the evaluation, showed that there are still many students who have not reached the minimum completeness criteria. It is caused by several factors, one of which has not been effective learning process. The learning process has not been effective due to non-compliance with the thinking styles of students to the methods or models of learning.

However, a person's ability to understand and absorb the lessons is certainly different levels. This difference is an issue for the school, especially for teachers who come into contact with the students in the learning process.

Based on the results of previous studies indicate that the thinking styles of students to manage and organize information differently. Each

student has a different of thinking styles so that the levels of understanding of the specifics are different.

The products of the thinking styles in the form of intelligence that is also different for each student. This intelligence is largely determined by one's habits in organizing and managing information obtained through the style of thinking.

There are four aspects of the style of thinking that concrete sequential, abstract sequential, random abstract and random concrete. People who are included in the two categories of "sequential" tend to have the left-brain dominance, while those who think "random" is usually included in the category of right brain".

So whatever way is chosen, differences in thinking styles that show the quickest and best way for every student to be able to absorb, organize and manage information," Dedy (2013), Hartono (2015), DePorter dan Henarcki (2008).

Furthermore, Students' thinking style who are given treatment with structural analysis with the number of the 35 students consisting of the concrete sequential thinking style 11 students or 31%, abstract sequential thinking style 8 students, or 23%, concrete random thinking style 7 students or 20%, and random abstract 9 students or 26%.

The largest percentage (31%) groups of students are on a concrete sequential. In classroom learning objectives with semiotic analysis with 35 students consisting of concrete sequential 7 students or 20%, sequential random 7 students or 20%, concrete random 9 students, or 26%, and random abstract 12 students or 34%. The largest percentage (34%) of students in the group with random abstract, Mujahideen (2012).

Based on the above reasoning, the researchers noticed that the thinking styles of students is one factor that can affect student learning outcomes.

B. Method

The approach used in this study is a qualitative approach with a type of descriptive research. Subjects in this study were students of class X Mipa1

and X Mipa2 totaling 52 students. Data collection instruments in this study were questionnaire, observation and documentation. Data analysis techniques used in the study treated with the formula percentages and descriptive analysis.

C. Research Finding

The results obtained in the research can be seen in the distribution table, as for students with Concrete Sequential Thinking Style (S1), Abstract Sequential Thinking Style (S2), Random Abstract Thinking Style (A1), and Concrete Random Thinking Style (A2) can be seen in the following table:

1. Concrete Sequential Thinking Style (S1)

No.	Students' Thinking Styles				Category
	S1	S2	A1	A2	
1	44	24	40	12	S1
2	48	16	28	36	S1
3	44	32	28	16	S1
4	44	16	28	32	S1
5	44	32	24	20	S1
6	40	16	36	28	S1
7	40	28	36	16	S1
8	36	20	32	24	S1
9	44	16	48	12	S1
10	40	16	36	28	S1
11	40	20	36	24	S1
12	40	20	28	32	S1
13	40	12	32	36	S1
14	44	16	32	28	S1

Source: SMA Negeri 2 Darul Makmur, 2016 (data processed)

Table 1 Students' thinking style in analyzing the concepts of physics through kinematics graphs categories to Concrete Sequential (S1).

Based on table 1 suggests that students who use sequential cconcrete thinking style (S1) 14 students or 27%. When the teacher gives the student a question about analyzing the concepts of physics through kinematics graphs, shows that students with S1 tend to have more than one alternative given planning problem resolution.

2. Abstract Sequential Thinking Style (S2)

Data obtained from research results are compiled in the form of a table of distribution as follows:

No.	Students' Thinking Styles				Category
	S1	S2	A1	S1	
1	28	36	24	32	S2
2	20	40	24	36	S2
3	24	44	28	24	S2
4	20	40	28	24	S2
2	24	36	20	40	S2
6	28	36	32	24	S2
7	8	52	20	40	S2

Source: SMA Negeri 2 Darul Makmur, 2016 (data processed)

Table 2 Students' thinking style in analyzing the concepts of physics through kinematics graphs categories to Abstract Sequential (S2).

Based on Table 2 shows that students who use the abstract sequensial thinking style (S2) 7 students or 14%. When the teacher gives a matter of analyzing the concepts of physics through kinematics graphs, shows that students with S2 tends to analyze a problem given the complete and ordered but in a way that is understood the students themselves.

3. Random Abstract Thinking Style (A1)

Data obtained from research results are compiled in the form of a table of distribution as follows:

No.	Students' Thinking Styles				Category
	S1	S2	A1	S1	
1	40	20	44	16	A1
2	36	16	40	28	A1
3	32	28	44	16	A1
4	28	32	36	24	A1
5	36	28	40	16	A1
6	28	32	40	20	A1
7	28	32	36	24	A1
8	28	32	36	24	A1
9	40	20	44	16	A1
10	36	24	40	20	A1
11	36	24	40	20	A1
12	28	32	36	24	A1
13	28	32	44	16	A1
14	32	28	36	24	A1
15	32	32	36	20	A1

16	28	32	36	24	A1
17	32	16	44	36	A1
18	40	20	44	36	A1

Source: SMA Negeri 2 Darul Makmur, 2016 (data processed)

Table 3 Students' thinking style in analyzing the concepts of physics through kinematics graphs categories to Random Abstract (A1).

Based on table 3 suggests that students who use random abstract thinking style (A1) 18 students or 34%. When the teacher gives a matter of analyzing the concepts of physics through kinematics graphs, shows that students with A1 tend to solve the problem is complete, and respond in accordance with the known facts.

4. Concrete Random Thinking Style (A2)

Data obtained from research results are compiled in the form of a table of distribution as follows:

No.	Students' Thinking Styles				Category
	S1	S2	A1	S1	
1	24	32	28	36	A2
2	24	32	28	36	A2
3	24	36	20	40	A2
4	36	20	12	52	A2
5	32	24	28	36	A2
6	32	24	20	44	A2
7	36	20	12	48	A2
8	24	36	20	40	A2
9	28	28	24	40	A2
10	24	32	28	36	A2
11	20	40	8	52	A2
12	28	28	24	40	A2
13	28	32	20	40	A2

Source: SMA Negeri 2 Darul Makmur, 2016 (data processed)

Table 4 Students' thinking style in analyzing the concepts of physics through kinematics graphs categories to Concrete Random (A2).

Based on table 4 showed that students who use concrete A2 13 students or 25%. When the teacher gives a matter of analyzing the concepts of physics through kinematics graphs, pointed out that students in the A2 tend to resolve problems incomplete, citing information that it knows is

slowly and in its own way, the information is pronounced almost the same as the given problem but incomplete.

D. Discussion and Result

Based on the research that has been done research data obtained through a questionnaire distributed to students of class X MIPA 1 and X MIPA 2 at SMAN 2 Darul Makmur, so in this section the researcher will discuss the results of these studies. As for the discussion of research by the authors examine the problem can be explained as follows.

Data showed that students have a way manage and organize different information. It is influenced by two factors, namely internal and external factors, as proposed by Slameto (2003: 54), "the factors that affect the learning of many kinds, but are classified into two categories, namely internal factors and external factors. Internal factors are factors that exist within the individual that is being studied, whereas the external factor is a factor which is beyond the individual". Therefore, teachers should use teaching methods taking into account the students' thinking styles. Teachers should not only create a teaching environment that was dominant in the style of thinking.

Learning activities of students influenced by a variety of factors, such as motivation, maturity, relationships with student teachers, verbal ability, level of freedom, security, and communication skills of teachers.

If the factors above are met, then through learning students can learn well, Mulyasa (2005). The teacher should create an environment of teaching in different ways, access information on each style of thinking. In order for the factors that affect student learning resolved. Thus, students were delighted with the presence of the learning method of thinking style and trying to adapt to the style of thinking.

Based on the results of the data analysis the style of thinking students who serve as research subjects for each style of thinking can be seen in the graph and the explanation is as follows.

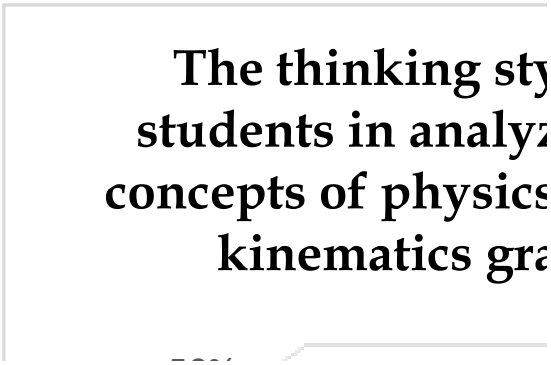

Figure 1 The percentage of students' thinking styles in analyzing the concepts of physics through kinematics graphs.

1. Concrete Sequential Thinking Styles (S1)

Based on Figure 1 can be seen that students with concrete sequential thinking styles (S1) in analyzing the concepts of physics through kinematics graphs 52 students, 14 students or 27% on S1. Students with sequential concrete thinking style hold on reality and process information in a way that is orderly, linear and sequential. Based on observation, students using S1 this notice and remember facts, information, formulas, and special rules. They always do the task on time, well planned and do not like things that are sudden, they do not like piling tasks. The best way of learning is to record and memorize. It is similar with the words written by DePoter and Henarcki (2008), "realistic, orderly, directly on issues, practical, precise, regular, perfectionist, hard work, planners, expecting a referral, alert (caution), like practicing, finish the job, and working on".

Students with sequential concrete thinking styles do something without having to procrastinate and always be aware of the time. Where it can be seen on the basis of the results obtained from students learning the value of analyzing the concepts of physics trough kinematics graphs subject (Straight Motion Regularity and Straight Motion Change Regularity) obtained the results that there were 8 students categories include both incoming students, 4 categories and 2 students entering category less, though undergraduates may given the fact information,

formulas, and special arrangements with ease but still there are students who entered the category less, this is due to the learning Physics inclined to something abstract, not only based on formulas only.

There are some tips that can be done by S1: more build organizational strength, find out in detail what is needed, divide duties in several stages and organize a quiet working environment, DePorter and Hernacki, (2008).

So, the best tips in the sequential concrete thinking must set realistic daily activities, plan realistically before, how long does it take for a given job, and split a job with multiple stages, in order to the work completed on time.

2. Abstract Sequential Thinking Style (S2)

Based on Figure 4.1 can be seen that the students with the abstract sequential thinking styles (S2), in analyzing the concept of physics trough kinematics graphs only 7 students or 14%, S2 facts known of problems are given. Based on observations, at the stage of completion of analyzing the concepts of physics through kinematics graphs, the first thing to do is describe the situation and asked for understanding the issues.

Learning styles do with reasoning ability, students who have a abstract sequential thinking style tend to be critical and analytical because these students have a strong imagination. It can be seen based on student learning outcomes derived from the value of analyzing the concepts of physics through kinematics graphs subject (Straight Motion Regularity) and (Straight Motion Change Regularity) obtained the result that there are three students were categorized as good, two students in the category of pretty and 2 students in the category of less, based on a questionnaire statement "I prefer to learn by reading" S2 students prefer to learn by reading. In general, students getting on or information in the abstract and does not require a concrete demonstration.

There are some tips that can be done by S2: more train of logic, grow kecerdasaan and analyze those that relate to the students, DePorter and Hernacki, (2008).

So, the best tips S2, thinking in concepts and analyze information. These students are easy to see important things, S2 thought process is logical, intellectual and rational.

3. Random Abstract Thinking Style (A1)

Based on Figure 4.1 can be seen that students with random abstract thinking style (A1), in analyzing the concept of physics through kinematics graphs 18 students or 34%, shows a fact known to randomly and incomplete.

Random abstract thinking style in general these students are not regular, and scheduling so painful for them, the lessons are presented sequentially or systematically does not appeal to them.

It can be seen based on student learning outcomes derived from the value of analyzing the concepts of physics through kinematics graphs subject of Motion Straight Regular and Straight Motion Change Regularity obtained the result that there are two students who are categorized as good, 15 students in the category enough and 3 students in the category of less, although students use A1 takes a long time to process information, but still there are two students who fall into either category, this is due to other factors that affect learning outcomes such as the style of thinking, interest and motivation.

There are some tips that can be done by A1: using the ability to cooperate with others, know how strong emotions affect his concentration, build strength learn by association, be wary of the time because often ignore it, and use visual cues, DePorter and Hernacki, (2008). so, best practices in A1 is preferred to resolve problems based on experience, adaptable, caring and love to complete the work by imagining or fantasizing.

4. Concrete Random Thinking Style (A2)

Based on the figure 4.1 it can be seen that students with concrete random thinking style (A2), in analyzing the concepts of physics through kinematics graphs 13 students or 25%, A2 did not shows what was asked then pronounce the known facts part of division.

A2 does not utter the known facts in sequence as in the problem. A2 students like to try something new in their own way, they were able to complete several jobs at once, but the results are not as expected.

This can be seen on the basis of the results obtained from students learning the value of analyzing the concepts of physics through of graphs kinematics subject Motion Straight Regular and Straight Motion Change Regularity obtained the result that there are 3 students were categorized as good, 10 students in the category enough and no student is categorized less.

There are some tips that can be done by A2: using divergent capabilities they have, preparing to solve the problem and seek the support of people around, DePorter and Hernacki, (2008). So, the best tips in A2 is start new things, like the challenge, curious, and adventurous.

E. Conclusion

The results of this study indicated that the concrete sequential thinking style (S1) was 27 %, abstract sequential thinking style (S2) was 14%, random abstract (A1) was 34%, concrete random thinking style (A2) was 25%. From this study it can be concluded that there were differences in the thinking styles of students in analyzing the concepts of physics through kinematics graphs at SMA Negeri 2 Darul Makmur, Nagan Raya.

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