



Analysis of the Analytical Junior High School Deaf Students' Thinking Ability in SMPLBN Ungaran

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Abstract

This study aims to determine the ability of analytic thinking students especially deaf students. Analytic is included in thinking skills that lead students to become independent thinkers and able to demonstrate the quality of students' abilities. There are 3 stages in analytic thinking, namely differentiating, attributing and connecting. The method used in the study is mixed methods with concurrent strategies. The subject of this research is State Public High School for Deaf students. The improvement of students' analytical thinking ability is 0.22 and included in the low category. The results of the percentage value of deaf students for differentiating indicators was 56.94%, attributed to 43.05%, and linking by 71.11%.

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INTRODUCTION

Physics usually consists of concepts and symbols that require a coherent ability to solve problems. The concept of students' thinking is also needed to know the extent of the student's ability. Thinking skills needed by students are analytical thinking. Analytic thinking starts from the process of thinking step by step to solve problems in linking relationships and explaining the influence between variables so that students can choose information that is important and relevant based on the proposed problem (Darmawan, 2016). Students who have good analytical thinking skills are able to connect the content of the reading with the schemes they have (Resmiati, 2016).

Analytical thinking skills need to be developed because the ability to analyze includes in the cognitive domain and included in one of the learning objectives (Maghfiroh & Sugianto, 2011; Wenno *et al.*, 2016). Analytic is also included in thinking skills that lead students to become independent thinkers and able to demonstrate the quality of students' abilities (Widodo & Kadarwati, 2013). Students who have the ability or creativity in analyzing are usually also able to solve problems with different types of questions. The form of questions and the demands of different answers allows students to be able to analyze it in an appropriate way.

Based on the research of Tristiyanti & Afriansyah (2016), students who are trained with the problem solving process become more skilled at selecting relevant information, then analyzing information, and researching the results of the information. Analytic thinking is a process of thinking step by step in solving problems with evidence to choose important information (Darmawan, 2016). Analytical thinking is the ability to think to understand each part of a situation (Amer, 2005).

Analytical thinking deals with examining and breaking facts and thoughts into strengths and weaknesses. Analytical thinking activities have three categories of cognitive processes, namely differentiating, organizing, and attributing (Marthinu & Nadiroh, 2017).

Conventional learning is considered not optimal to foster analytical thinking skills. This situation requires interesting, creative, and innovative learning to develop the potential of students (Yuliono *et al.*, 2014). Learning in the classroom to guide students to analytic thinking can also use appropriate learning models such as problem-based learning. This learning model provides more control over learning than with conventional learning because it emphasizes real learning and motivates (Walker & Leary, 2009; Mahmudi & Sumarmo, 2011).

This problem-based learning trains deaf students to be more active in discussing with friends. During the learning process students can choose interesting problems to solve so that they become motivated to play an active role (Ngalimun, 2013). Deaf students despite the limitations of hearing or speaking, they must be trained to communicate well to develop their thinking skills. Based on observations at State Ungaran Public High School in the deaf class, teachers teach students with conventional methods even though the curriculum used is the 2013 curriculum. The learning process should be oriented towards students to learn from the environment (Haryadi *et al.*, 2015). Based on the above problems, a research was conducted to analyze the ability of analytic thinking of deaf students in problem-based learning models at SMPLBN Ungaran.

METHODS

The research method used is concurrent mixed methods strategy. The place of research was conducted at SMPLBN Ungaran. The research process is carried out by observing, conducting learning processes with problem-based learning models, and then analyzing students' analytical thinking skills.

The research sample was deaf students in class VIII at SMPLBN Ungaran. Sampling was done by purposive sampling technique. The instruments used in the study were syllabus, lesson plans, student discussion sheets, and questions.

RESULTS AND DISCUSSION

The study begins with observing at SMPLBN Ungaran to find out the conditions in the school. The next activity is to determine the sample used as the object of research. Students who are used as samples of the study will be given a pretest to determine the students' initial abilities. After that, learning is done in class and

given posttest questions to find out the students' final abilities.

The results of the students' posttest were then analyzed to determine the improvement of students' analytical thinking skills and analytic thinking profiles. The increase in the average results of analytical thinking skills of deaf students can be seen in Figure 1.

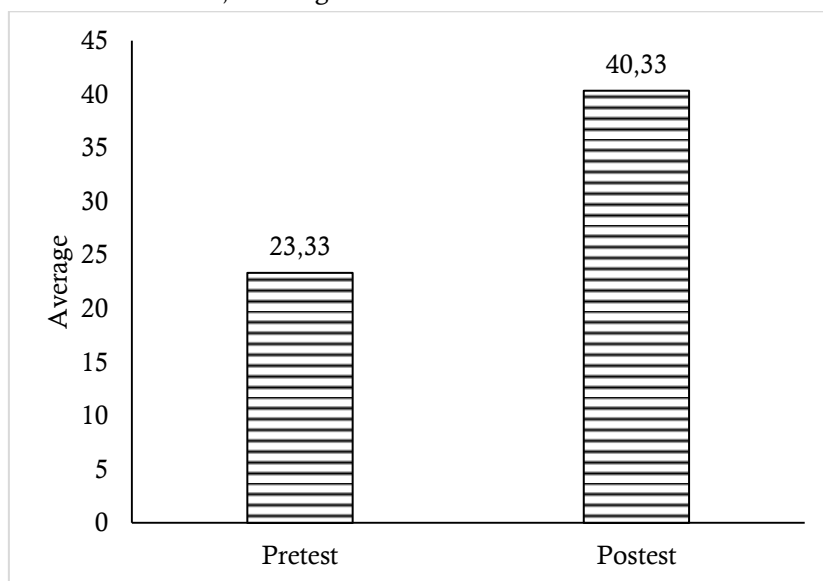


Figure 1. Average Improvement of Analytical Thinking Ability

Based on the data obtained, the average value of pretest and posttest students increased even though in a fairly low range. The gain value of analytical thinking ability is 0.22 and is low.

Student analytical thinking on problem-based learning shows an increase in student learning outcomes. Students can follow problem-based learning well and analyze every problem given by the teacher. Learning activities that start from showing a problem, then choosing the right way to solve the problem make students able to analyze optimally.

Students who previously were still lacking in terms of analysis, then they showed good

results. The initial ability of students who were previously low, can increase even with a slight increase. Analytic thinking has three indicators: differentiating, attributing, and connecting.

The results showed that the students' analytical thinking skills were in the low, medium and high categories. The ability of students is grouped by calculation based on the highest value and the lowest value of students' analytical thinking skills. Student test results obtained that the highest value of students for analytic thinking ability was 52 and the lowest value was 28. The profile of analytic thinking ability can be known based on high, medium, and low categories such as Table 1.

Table 1. Categorization of Analytical Thinking Ability

Categorization	Frequency	Percentage Value (%)
High	3	33.3
Medium	4	44.5
Low	2	22.2

Table 1 shows that the largest percentage of students' analytical thinking ability is in the medium category, which is 44.5%. Profiles of students' ability to think analytically can also be categorized in each indicator. The percentage of analytical thinking ability refers to three

indicators, namely differentiating, attributing, connecting. The percentage of pretest and posttest scores on analytical thinking skills based on analysis of problem-based learning for each indicator can be seen in Figure 2.

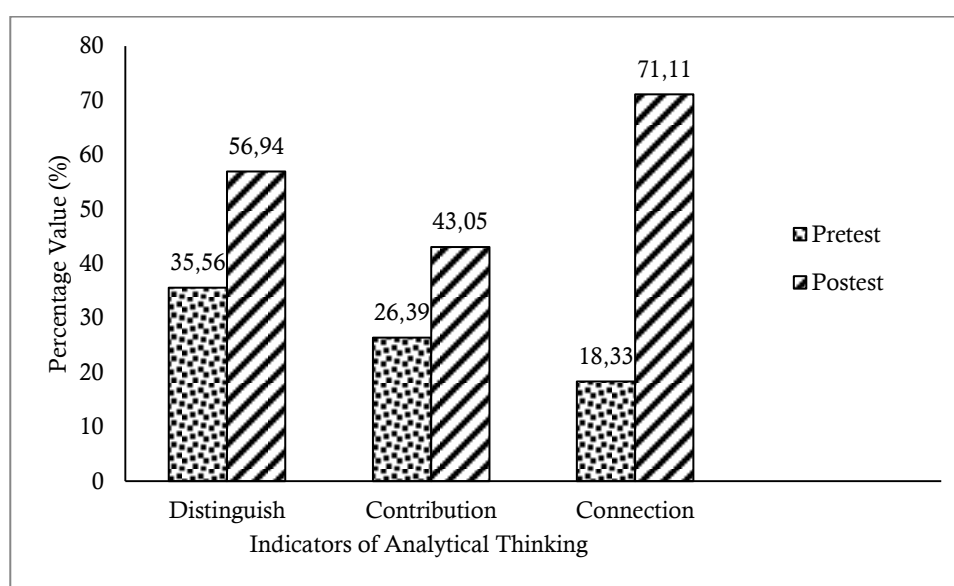
**Figure 2.** Analysis of Achievement of Students' Analytical Thinking Ability Indicators

Figure 2 shows that the pretest value of analytic thinking ability on the indicator connects to get the largest percentage followed by an increase in the results of student posttest. Based on these data, it can be seen that the students' greatest analytical thinking ability is the linking indicator.

Based on the analysis, each indicator shows a significant difference after students learn with problem-based learning. Based on the results of the study it can be seen that in achieving the indicators of analytic thinking students show significant results. The highest achievement of student indicators is on differentiating indicators but only experienced a

slight increase. An indicator that has the least achievement is connecting.

The analytic thinking process of students at the differentiating stage experienced a significant increase due to the use of problem-based learning models. Students are interested in the learning provided by observing pictures and videos that are directly related to the real world. Deaf students are enthusiastic when in class and tend to follow the learning process well. The material presented by the teacher can be absorbed for a long time by students and is able to connect between the material provided.

The process of observing it can help students more easily understand the material

because of their lack of hearing. Severe deaf students can still follow learning in the problem solving process and are able to distinguish ways of solving problems by discussing with their peers even with sign language. The other side for students who still have hearing or mild hearing impairments can follow the learning well even though the ability is below normal students. Based on this, it can be concluded that deaf students can follow the learning process and the ability to think analytically on differentiating indicators has a higher increase compared to other indicators.

The second indicator is that which means to interpret. Activities on this indicator are students able to know about cause and effect. After students can collect and differentiate the types of information received, students include explanations of the pieces they collect. Students are able to interpret and maintain consistency even with moderate percentage results. The ability of students like this is indeed due to external factors that influence or in the material itself. This is like in research (Salma *et al.*, 2016) which explains that physics learning which is usually a symbol is the cause of students' errors in interpreting.

The third indicator is linking which refers to the ability of students to connect something they have learned between information received and a causal relationship. Students with disadvantages are still able to connect between information and distinguish which information they will choose to solve each problem. The ability to analyze students is also assisted by the existence of student worksheets done during learning. This worksheet makes learning more effective (Falah *et al.*, 2017). This worksheet trains students to improve analytic thinking. Moreover, understanding natural phenomena builds students to think better (Fu'adah *et al.*, 2017).

CONCLUSIONS

Students' analytical thinking ability increases with problem-based learning models. Deaf students are able to analyze a problem in

accordance with the indicators assessed even though their scores are still low. Based on the analysis, it shows that the linking indicator is the highest among the other indicators. The use of a learning model that invites active students to make the learning atmosphere enjoyable. Students can discuss with their friends even though they are still having trouble hearing things. During the learning process they do not have to listen to the teacher's explanations but exchange ideas with their peers.

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