

Analysis of Students Science Literacy Skills in Full Day Junior High School

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Abstract

Measurement achievement of scientific literacy skills in students is very important to know the extent to which students have literacy science and become an international benchmark for the quality of a country education. The purpose of this study is to describe the achievement of scientific literacy skills of students in full day junior high school Semarang in science subject of solar system material. This research uses mixed method concurrent triangulation. In general, the tests results of science literacy skills achievement of students in junior full day school Semarang in middle category were a percentage score by an average 33.55%, namely science as a body of knowledge by 8.44%, science as a way of investigating by 4.41%, science as a way of thinking by 8.38%, Interaction of science, environment, technology, and society by 12.32%. Based on the results of research and discussion can be concluded that the achievement of scientific literacy skills of students in junior full day junior high school Semarang is middle category and necessary to increase the achievement of science literacy skills in students. System full day schools still have not been able to develop the quality of education and prepare students for the challenges of the development of the modern era. Hopefully this research could eventually become the latest reference achievement of science literacy skills of students in the education system full day school and become material evaluate for education so the result could be recommendation about the education system to improve science literacy.

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INTRODUCTION

In the science education, improving the quality of human resources is required to follow the growth and development of modern times. Science learning that should be done is learning to prepare capable students in the field of science and technology, so as to solve problems in real life (Depdiknas, 2011). The skills to implement or use scientific knowledge skills in everyday life is called scientific literacy.

The results of PISA 2015 survey, Indonesia showed an increase in achievement of 22.1 points, improvement of Indonesia's achievement in 2015 was sufficient to provide optimism though still relatively low compared with the OECD average (Kemendikbud, 2016). The largest increase occurred in scientific competence, from 382 points in 2012 to 403 points in 2015. This result put Indonesia in the rankings to 64th from 65th OECD member countries, rose to rank 64th form of 72th member countries in 2015 (OECD, 2016).

The survey results announced by the PISA revealed the average picture achievement of scientific literacy skills of students in Indonesia in general and comprehensive. This means that the results achievement of science literacy skills could be different if tested in a smaller scope. Considering that the curriculum used in Indonesia it is developed with the conditions of the educational unit, the potential and characteristics of the region, as well as local socio-cultural and students. Course also will give influence to aspects of learning which include the scientific literacy skills (Amri et al., 2013).

The most important thing from an international survey conducted by PISA is how the state of Indonesia, especially the principals of education conduct follow-up based on research results from the survey. Increased achievements must continue to be improved by improving the quality of education in Indonesia. Improvement in the quality of education will influence the economic level of a country (Winata et al., 2016).

In the education system in Indonesia, the latest in 2017, issued a policy Kemendikbud school five days and 8 hours of study a day commonly called a full day school. This program aims to prepare learners for the challenges of the development of the modern era (Permendikbud, 2017). Preparation of facilities need to be considered to support the implementation of full day school education system which of course it takes time and funds education budget is large enough. In addition to the facilities budget, the facilities are given government also includes assistance in training for principals, teachers and support staff members at the school (Zermeño et al., 2013).

Decision of the implement of the full day school must consider the cost of this program to the long-term benefits from the academic side (Brownell, 2017). Pros and cons occur from the implementation of the kemendikbud about the policy of full day school because it is considered that the full day school system would burden the child's physical and psychological, increasing the burden on teachers, infrastructure and facilities are not yet ready, and the different economic backgrounds (KPAI, 2016). But growth and development of science and technology is so fast that if it is not observed, then we will become victims, especially victims of science and technology.

For this reason, it is necessary to conduct an analysis achievement of scientific literacy skills of students in junior high school who has been implementing full day school in subject science of solar system material. The material of the solar system chosen for such material contextual, very closely with everyday life. Hopefully this research could eventually become the latest reference achievement of science literacy skills of students in the education system full day school and become material evaluate for education so the result could be recommendation about the education system to improve science literacy.

METHODS

This research uses mixed method concurrent triangulation that is used to describe achievement of scientific literacy skills of students. This research was conducted among students of class VII SMP Negeri 11 Semarang, Semarang SMP 12, and SMPN 27 Semarang who had been implementing full day school in science subject of solar system material.

Data collection techniques used in this study is observation, interview, and test essay about scientific literacy skills in the amount to 15 items in the science subject solar system material. The question of scientific literacy is adopted from four aspects: (1) science as a body of knowledge; (2) science as a way of investigating; (3) science as a way of thinking; (4) the interaction between science, environment, technology, and society (Chiappetta et al., 1993; Rusilowati et al., 2015).

Then the score achievement of scientific literacy skills was analyzed using equation (Arikunto, 2012):

$$P = \frac{\sum A}{\sum N} \times 100\%$$

Information:

- P = Percentage achievement of science literacy skills
- $\sum A$ = Total score achievement of science literacy skills
- $\sum N$ = Total maximum score achievement of science literacy skills

The percentage score achievement of scientific literacy skills is then interpreted in three categories as presented in Table 1 (PISA, 2015).

Table 1. Interval Achievement of Science Literacy Skills

Interval	Category
66.6% < P =	High
100% 33.3% < P	Middle
= 66.6%	Low
0% < P = 33.3%	

RESULTS AND DISCUSSION

The results and discussion analysis research the achievement of scientific literacy skills of students in full day junior high school randomly coded A, B, and C to represent the school category of low, medium, and high based on the minimum completeness criteria (KKM) for each school. Data from the analysis achievement of scientific literacy skills based on scientific literacy tests on students is then made percentage which is presented in Figure 1.

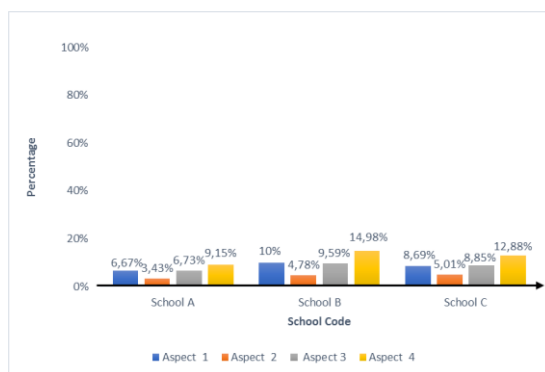


Figure 1. Percentage Achievement of Science Literacy Skills

Information:

- Aspect 1: Science as a body of knowledge.
- Aspect 2: Science as a way to investigate.
- Aspect 3: Science as a way of thinking.
- Aspect 4: The interaction between science, environment, technology, and society.

Figure 1 shows that the results achievement of science literacy skills of students for school A is low category that is an average percentage by 25.98%. Percentage achievement of scientific literacy skills of science as a body of knowledge gets score by 6.67%, science as a way of investigate gets score by 3.43%, science as a way of thinking gets score by 6.73%, and interaction between science, environment, technology, and society by 9.15%.

The results achievement of science literacy skills of students for school B in the middle category that is an average percentage by 39.35%. Percentage achievement of scientific skills of science as a body of knowledge by 10%, as a way to investigate the science by 4.78%,

science as a way of thinking by 9.59%, and interaction between science, environment, technology, and society by 14.98 %.

The results achievement of science literacy skills of students for school C in the middle category that is an average percentage by 35.43%. Percentage achievement of the literacy skills of science as a body of knowledge by 8.69%, science as a way of investigating by 5.01%, science as a way of thinking by 8.85%, and interaction between science, environment, technology, and society by 12.88%.

When viewed from several aspects of scientific literacy, the three classes experience differences in the achievement of scientific literacy skills in each aspect, namely.

Science as a body of knowledge

Science as a body of knowledge is one of of scientific literacy profile with emphasis on displays, discussing or asking questions to remember information about facts, concepts, principles, laws, theories, and each other.

The great achievement of science literacy skills as a body of knowledge of each junior high school has a different percentage of scores. For the largest percentage achievement of scientific literacy skills of students is found in the category B junior high school by 10%, for the middle percentage achievement of scientific literacy skills of students is found in junior high school C category by 8.69%, then for lowest the percentage achievement of scientific literacy skills of students is found in the category A junior high school by 6.67%.

Although science learning at full day junior high school emphasizes the content aspect, but in the test results achievement of scientific literacy skills in science aspects students as a body of knowledge is still low because during the questions given are only memorized by a material. While the matter of scientific literacy is how students can answer problems and phenomena by using the learning material obtained. As Siswanto (2014) said that the learning process is carried out more in the transfer of knowledge with the lecture method in the classroom and problem exercises as mastery

of concepts. Certainly, the students will find it difficult if given a scientific literacy problem because of how to solve a different problem with the usual problem.

Science as a way to investigate

Science as a way to investigate requires students to answer questions through the use of material, requiring students to answer questions through the use of charts or tables, requiring students to make calculations, requiring students to explain answers, and involving students in experiment or thinking activity.

The great achievement of scientific literacy skills as a way to investigate each junior high school has a different percentage of scores. For the largest percentage of achievement of scientific literacy skills of students is found in the category C junior high school by 5.01%, for the middle percentage achievement of scientific literacy skills of students is found in the category B junior high school by 4.78%, then for the lowest percentage achievement of scientific literacy skills of students is found in the category A junior high school by 3.43%.

Science as a way to investigate is the aspect that has the lowest average score because students must use high thinking activities and investigate discourses and phenomena in answering question. High thinking activities are difficult and tiring, but if done continuously with proper guidance by the teacher, students will get used to it and feel easy to do it. Similarly, Nisa et al. (2015) and Wiyanto et al. (2017) that students need high-level thinking to answer questions in a scientific investigation or the procedures needed to obtain evidence, draw conclusions, and demonstrate understanding of scientific concepts.

The literacy skills of science in the aspect of science as a way to investigate has the lowest average score, surely this must be a concern for all of us especially science teachers. This is presumably due to the lack of involvement of students in experiments or thinking activities, in learning science the teacher gives a practicum is still less than optimal. The results of the practicum given more questions about the

concept of science, still lacking in emphasis on the results of aspects of its relationship in everyday life. In the research of Amri et al. (2017) that there is an increase in the profile of scientific literacy as the investigation process is very significant when compared to others, this can be caused because when the learning process students are directly involved in the experimental process.

Science as a way of thinking

Science as a way of thinking describes how the process of thinking and reasoning students in solving a problem. This category is used if the purpose of the problem is to describe how a scientist conducts experiments, emphasizes the empirical nature and objectivity of science, illustrates the use of assumptions, shows how science runs on inductive and deductive considerations, and provides a cause and effect relationship.

The great achievement of scientific literacy skills as a way of thinking for each junior high school has a different percentage of scores. For the largest percentage achievement of scientific literacy skills of students is found in the category B junior high school by 9.59%, for the middle percentage achievement of scientific literacy skills of students is found in the category C junior high school by 8.85%, then for the lowest percentage achievement of scientific literacy skills of students is found in the category A junior high school by 6.73%.

The teacher must give as many opportunities as possible for students to think and hone the skills of the mind. Habitual and more detailed discussion in the section of material to hone the skills of the mind can be a emphasize the empirical nature, illustrates the use of assumptions, and provide examples of causation in daily life (Cristina et al., 2016). It also, students can do so by being directly involved in various activities, such as class discussion, problem-solving, as well as experimenting. So students are not only passive object with the memorized burden of various kinds of science learning material (Mundilarto, 2013).

Interaction science, environment, technology, and society

Interaction profile of science, environment, technology, and society is more emphasis on the skills of about the influence or impact of science on environment and society. Describing the use of science and technology for environment and society, showing the negative effects of science and technology for environment and society and discuss the issues of social and environmental related to science or technology, and mention careers and jobs in the field science and technology.

The great achievement of literacy science skills in the interaction of science, environment, technology, and society of each junior high school has a different percentage of scores. For the largest percentage achievement of scientific literacy skills of students is found in the category B junior high school with 14.98%, for the middle percentage achievement of scientific literacy skills of students is found in the category C junior high school with 12.88, then for the lowest percentage achievement of scientific literacy skills of students is found in the category A junior high school by 9.15%.

This can be caused because in science learning teachers still have not emphasized students in applying and connecting learning material in daily life. The tendency to rely on memorization results in the inability of students to place science and connect phenomena in daily life will not develop optimally (Muspikawijaya et al., 2017). Students should not only be required to memorize learning material but can also apply concepts, principles, laws or theories of learning in daily life so that the material that has been obtained by students in school is more tangible and the learning material is easier to understand and remember.

Overall, the data on the results achievement of scientific literacy skills of students in three full day junior high schools in Semarang to do percentages presented in Figure 2.

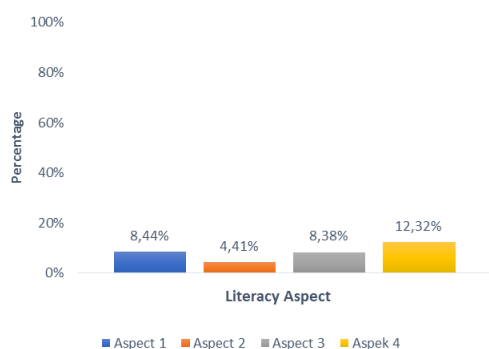


Figure 2. Percentage Achievement of Science Literacy Skills

Information:

Aspect 1: Science as a body of knowledge.

Aspect 2: Science as a way to investigate.

Aspect 3: Science as a way of thinking.

Aspect 4: Interaction between science, environment, technology, and society.

Figure 2 shows the test results achievement of scientific literacy skills of students in three full day school junior high schools of Semarang in the middle category with a percentage of the average value of 33.55%. Aspect 1 shows the percentage of science scores as the body of science by 8.44%, aspect 2 shows the percentage of science scores as a way to investigate by 4.41%, aspect 3 shows the percentage of science scores as a way to think by 8.38%, aspects 4 shows the percentage of the interaction score between science, environment, technology, and society by 12.32%.

The overall acquisition of the results achievement test of scientific literacy skills of students tend to be low with a percentage of the average score of 33.55% which is close to the low category at intervals of $0\% < \% = 33.3\%$ that is, only a difference of 0.15% with a low category. The results of this study are in accordance with what has been done by Rusilowati et al. (2016) in his research on developing an instrument for assessing scientific literacy on the theme of the cycle also suggested that the profile of scientific literacy skills of students from all aspects of scientific literacy was below 50%. Sukowati et al. (2017) in his study also stated that the average value of scientific literacy abilities of students still tended to be low

in all four aspects of scientific literacy. This reinforces the evidence that the scientific literacy skills of students in Semarang still needs to be improved.

Low achievement of science literasi skills at full day school Semarang Middle school is caused by students who cannot understand the problem well due to lack of experience and habitual work on scientific literacy problems. This is supported by the results of observations and documentation when learning takes place which shows that there has never been an evaluation tool that contains scientific literacy in classroom learning.

Based on the results of interviews with some of the students, showed that students could not understand the questions well, students in the learning process of science in full day junior high school has never been given about scientific literacy, and in the learning process of science teachers have never been asked or discuss about discussed the problem which contains scientific literacy. Although some students while still in elementary school had never worked on scientific literacy, but when given a question of scientific literacy they still find it difficult to understand. This means that it needs more in-depth discussion and is more accustomed to working on scientific literacy questions so that students can understand scientific literacy issues. They still found it difficult to understand.

The habit of working on scientific literacy problems other than through an evaluation tool can also LKPD charged through the provision of scientific literacy. But at the time of the science learning process the teacher only gave LKPD as in the BSE textbook (Electronic School Book), in the LKPD it was considered still not containing the discourse or problems contained in everyday life so that students were only accustomed to solving memorized questions. In the end, students will experience difficulties in applying science learning material in everyday life to solve various problems that occur.

CONCLUSION

Based on the results of research and discussion can be concluded that the achievement of scientific literacy skills of students in junior full day junior high school Semarang is middle category and necessary to increase the achievement of science literacy skills in students. System full day school still have not been able to develop the quality of education and prepare students for the challenges of the development of the modern era. Hopefully this research could eventually become the latest reference achievement of science literacy skills of students in the education system full day school and become material evaluate for education so the result could be recommendation about the education system to improve science literacy.

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