

Profile of Science Literacy Skill of Manjushri Junior High School Students in Padang

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ABSTRACT

This research purpose is to describe the science literacy skill of Manjushri Junior High School students in Padang. This research used descriptive method. This research is conducted at Manjushri Junior High School in Padang with class VIII students as sample that was determined by purposive sampling. The research instrument is science literacy test that consist of 40 objective test that includes basic and science competency of respiration and excretion system. Data analyzing is conducted by quantitative presentation. The result shows that the achievement of student science literacy test based on respiration system basic competency is 35.29%, based on excretion system basic competency is 33,13% and based on science competency is 34,25%. This shows that the scientific literacy skill of Manjushri Junior High School students in the low category.

Keywords: 21 century education, science literacy, science.

1. INTRODUCTION

Nowadays, education development growing so fast due to science and technology enhancement. It demanding education institute to develop new paradigm in creating breakthrough thinking process, concept arrangement and any action for preparing high competency human resources[34]. Education's purpose is to prepare students to face global challenge so that they can survive any obstacle that slow them down. One of the skills that is needed for them do that is science literacy [25].

Science literacy is a skill to understand and implementing concept and science process in solving scientific issue and problems in daily life. Based on *Program for International Student Assessment* (PISA) is defined as a skill to use science knowledge, identifying question, and summarizing case based on evidence in order for making a decision related to nature and any change that human activity towards nature[19].

Science literacy is important to be mastered for students. It has many benefits such as, ease students to face daily problems related to nature, health, economy and problems that demand mastery of science and technology development[4]. Based on explanation above it can be concluded that science literacy is fundamental things for students and need to be integrated with learning process especially science.

Science is a lesson that discuss about nature, creature and phenomenon that based on technology development. Science is very crucial for every aspects in our lives so it needs to be mastered in order for Indonesian people for reaching science literacy[32]. Science purpose is to help student developing science literacy, including basic

knowledge, critical thinking and skill to implement lesson in daily lives[11].

Science literacy can be measured through PISA study that is conducted by OECD (*Organization for Economic Cooperation and Development*) 3 times a year. PISA is a form of skill evaluation in reading, math, and science that is designed for 15 years old students. PISA's study in Indonesia from 2000-2015 can be seen as in Table 1 below[14,15,16,17,18,19].

Table 1. Indonesian Student's Science Literacy Skill Based on PISA Study.

Year	Average Score of Indonesian Student	PISA's Score Average	Ranking	Total Country Participant
2000	393	500	38	41
2003	395	500	38	40
2006	393	500	50	57
2009	385	500	60	65
2012	375	500	64	65
2015	403	500	62	70

In Table 1 can be seen that science literacy skill of Indonesian students getting low every year. Indonesian PISA score in 2015 in science competency is 403 that placed Indonesia in position 62 from 70 countries. It indicates that Indonesian students is not able yet in understanding concept and process of science and also implementing it in daily activity.

Same as what has been explained above, researcher commit to do observation to identify problems related to science literacy skill of 15 years old students. Observation and sampling is conducted in SMP Manjushri Padang. Based on interview with students it shows that they does

not have any knowledge about science literacy even a bit. Research that teachers never explain anything to students even giving them test and discourse related to it, that is why their understanding is low about science literacy[24]. Students confession is also supported by researchers interview with science teacher. Teacher did not comprehend it deeply. That is why students do not know anything about science literacy and discourse. Also, teachers evaluation instrument is C2 in knowledge aspect and do not go through science literacy.

Low score of students science literacy is also causes by curriculum demanding score that is lower than what it should be in 21th era. It is supported by what researcher found in a month that learning teaching process is good and based on curriculum but do not aim to science literacy. It cause by science literacy component is not complete like they do not discuss about science issue, interpreting science evidence, designing science observation and the relation of science, technology and people.

Based on research above it can be said that there is some problems in Indonesian's education. Lower science literacy students level is because they do not learn about it yet[28]. Science literacy target in school is different than what is needed nowadays[3].

Based on that information, researcher decided to describing science literacy skill of students grade VIII by doing science literacy test by arranging literacy aspects on certain competency that is respiration and excretion system. Students science literacy profile is important to be revealed because it is needed for next step that is to know what is the causes and need to do to solve it. Based on problems above, researcher do the research with the title "Profile of Science Literacy Skill of Manjushri Junior High School Students in Padang".

2. METHODS

Researcher uses descriptive method. Research is conducted in SMP Manjushri Padang with grade VIII as sampling. The sampling itself is taking by using *purposive sampling technique*. Research instrument is science literacy test which consists of 40 objective questions that include science aspects in excretion and respiration system. Data analyzing is by quantitative percentage based on average score. Data validation is by using *triangulation technique*. Source data is used to analyze students science literacy skill.

3. RESULT AND DISCUSSION

3.1. Result

Data comes from respondents that are students and teacher through test and interview. The result shows that student's

science literacy skill is categorized as low level based on average score. The data can be seen in Table 2 and 3.

Table 2. Result of Science Literacy Test Based on Basic Competency.

No	Basic Competence	Average Score
1	Respiration system	35,29
2	Excretion system	33,13
Total		68,42
Average		34,21
Category		Low

Table 3. Result of Science Literacy Test Based on Science Competency.

No	Science Competency	Average Score
1	Explaining scientific phenomenon	31,22
2	Evaluating and designing scientific research	34,45
3	Intepreting data and evidence	37,10
Total		102,77
Average		34,25
Category		Low

3.2. Discussion

3.2.1. Achievement of Students' Literacy Skill Based on Total Score

The result shows that the material about science literacy is not maximized yet in the school. It shows that they do not have any knowledge about science literacy. Teachers never explain anything to students even giving them test and discourse related to it, that is why their understanding is low about science literacy. The study itself is not oriented to science literacy knowledge so that is why their skill is low in it.

Student's confession is also supported by researchers interview with science teacher. Teacher did not comprehend it deeply. That is why students do not know anything about science literacy and discourse. It also causes by curriculum demanding score that is lower than what it should be in 21th era. It is supported by what researcher found in a month that learning teaching process is good and based on curriculum but do not aim to science literacy. It causes by science literacy component is not complete like they do not discuss about science issue, interpreting science evidence, designing science observation and the relation of science, technology and people and also any discourse related to explanation above.

One of the factors that make science literacy skill in Indonesian getting low is lack of material that involve science process such as formulating science question in

observation, using knowledge to explain scientific phenomenon and summarizing everything based on the fact that they achieved before[5].

The low students level of science literacy skill is also caused by in their entire time in school they never face test of that. The causes of students lack of skills in science literacy is that they do not get used with it[31]. Based on interview with students there are many differentiations between science test and science literacy test. Students said that science literacy test is different than science test. In science literacy it needs comprehension with higher level rather than common science and there is also a long discourse text when science test question is rather shorter. Those differentiations make students got problem in doing the test.

Teacher also said that she never do science literacy test before. Research that one of factors affects students achievement in doing science literacy test is that whether they never face the test before or not[8].

Thus, can be stated the causes of students low score in science literacy is that learning teaching that teacher conducts is not science literacy based so that students do not have idea of what they are going to answer when they are given science literacy test. When the need to do the test they got problems because science literacy test need higher level critical thinking.

The effort that can be done in order to solve those problems is to arrange learning material that consists of science literacy aspects. Science literacy is to prepare students that understand science so teacher need to prepare science literacy-based material[26]. Teachers, school and education institute need to improve education for students with science literacy-based[31].

The implementation of Two Stay Two Stray with help of visual media has been proven that it able to improve students understanding of science literacy rather than direct teaching. Other than that, the implementation of SETS is also able to improve students science literacy skill[12]. SETS method is really effective in improving students skill in each categories; science as knowledge, science as investigation way, science interaction, technology, and people[27,33].

Another way that can be done for practicing students for science literacy is by doing science literacy question by implementing evaluation instrument with science literacy-based. Teachers need recommendation for implementing science literacy-based evaluation for practicing students doing literacy test[29,30]. One of the evaluation instruments with science literacy-based that can be implemented in classroom is by using metacognitive test with science literacy based[21].

3.2.2. Achievement of Student's Science Literacy Based on Basic Competency

Basic competency that is observed in this is KD 3.9 analyzing respiration system in human and understand what bothers respiration system and effort to keep

respiration system in a good condition and KD 3.10 understand excretion system in human and understand its disturbance and efforts to keep it healthy. Combination average based 45,39. That score shows that Manjushri students in Class VIII Junior High School skill in understanding those two basic competency is still in low level category.

If talking about minimal passing grade that was determined by Depdiknas so learning teaching process is not good yet. The student achieve goal if mastered 75% of competency or at least got minimal score 75[2]. Based on observation in each school those KD already learned by students. Then science literacy test will be held after mid-semester. It means that hopefully they will be able to get a good result because they have prepared and get used to it. A bit different in reality because student's science literacy is still low. Students said the test is harder than test that teacher give before. That is why it affects student's science literacy score.

The low student's achievement due to their lack of knowledge about what their teacher teach them. One of the factors that make student's science literacy skill low is that there are some terminologies that is students do not understand it yet[23]. If analyzed by in *SLA*, students have learned almost all of the concept. Thus, it means that students comprehension is still low.

Competency that get the highest score is KD 3.9 about respiration system. Thus, students have a good mastery skill in respiration system rather than excretion. They said respiration system material is easier when excretion is more abstract for them, like kidney structures. Respiration system easier because it rather simple while excretion is a bit complicated like learning mechanism include urine production.

Students behavior toward both materials, they favoured respiration system than excretion due to they tend to like material that is simple, not complex and not abstract. It can be said that students is a bit lazy to do a critical thinking so it makes their critical thinking is low. Junior High School student's critical thinking categorized as low-level. It occurs due to learning style that is remembering text, rather than developing thinking skill so students will be lack of skill in aspire their own opinion or idea, lack in analyzing and also depends on others rather than have confidence in their own decision[13,23]. Students skill in analyzing is low so that they feel so hard in answering science literacy test[37].

Students lack of skills in critical thinking will cause bad effects on education world. That is why teacher needs to guide students to develop critical thinking so that they can analyze problem and then solve it with easy and guide them to make their own decision.

Student's critical thinking need to be developed because by mastering it students will be able to differentiate what is right and what is wrong, appearance and reality, fact and opinion, knowledge and belief. By having critical thinking skill, students will be able to solve problem by wise decision and able to improve their cognitive achievement. Students who have critical thinking will have ability to

solve problems wisely and also improve student's cognitive skill[9].

Based on explanation above, the causes of students lack of skill in science literacy based on basic competency is that they do not understand the material deeply whether it is excretion or respiration system that teacher taught them and also lack of critical thinking is the causes.

One of the efforts that can be done by the teacher is that introducing science concept to students through reading science text[20]. Direct activity, group collaboration which support science text and field visiting by using those step hopefully students will understand science concept they are learning[10].

Another effort that teacher can apply is by implementing teaching method which can develop students critical thinking. It is recommended for teacher to implement real life problems and guide their students to solve problems rationally. The teaching method that recommended is *Problem Based Learning* (PBL). PBL method has been proven to be able to growing up students critical thinking and creativity and guide them to find solution of certain problems[1].

3.2.3. Students Science Literacy Achievement Based on Science Competency

Science competency that researcher observe in this research consists of 3 aspects those are explaining scientific phenomenon, evaluating and designing scientific finding and interpreting data and scientific evidence. The research shows that students science literacy achievement is not maximal yet. It can be seen from science literacy average score based on 3 aspects above.

It is hard for students to explain scientific phenomenon because they rarely get trial from teacher to test their skill about that so they will get trouble in doing test about science literacy test in explaining scientific phenomenon aspect. Then material in syllabus also do not related with explaining scientific phenomenon, teacher only explain it in the level knowing phenomenon so that is why students have problem in doing the test about it.

The causes of weak in score average of explaining scientific phenomenon is also due students attitude that they have less interest in reading book and they are too lazy to read long discourse. The causes of students have less interest in reading is that their interest in it is very low, it causes them to feel bored easily in reading and make them in a rush in reading[22,26,27].

The causes of students low of average score in explaining aspect is that they usually used to remember things so if they are asked to comprehend things carefully they will not be able to do it well. Even if their teacher frequently teaches them theories but in real life they are not able to explain scientific phenomenon. Students get used with theories but they are not able to implement it in real life because the material is easily to be forgotten by them so many of them make mistakes in answering science literacy test[36].

Based on explanation above, it can be stated that the causes of their low score based on science competency aspects is that explaining scientific phenomenon because teacher rarely test their students, low of interest in reading and also memory problem. Thus, those factors make explaining scientific phenomenon as science competency that have the lowest score in science literacy test so that the way that students can do is that to be more interest in reading and also by practicing science literacy question.

The next low score on science literacy test is in aspects of evaluating and designing scientific observation. The causes is that their skill in science literacy is low. New learning way that involves science literacy activity is really crucial in order to make students get used with science literacy such as identifying scientific problem[35].

The causes of lack of score in evaluating and designing scientific observation causes by students are not actively involved in doing experiment and critical thinking in learning teaching process. The causes of lack of score in evaluating and designing scientific observation causes by students are not actively involved in doing experiment and critical thinking and also lab work is not maximum yet[7].

One of the factors that make students lack of ability in scientific observation aspect is that their frequency in doing lab work is not enough and are demanded to memorize theory is almost time. In general, science learning teaching process should be students-centered rather than waste time by memorizing theories and also minimize fact-taking activity and focus on getting concept and spending time in laboratory or field study[12,29].

Based on explanation above it can be concluded that the causes of students low skill in science literacy based on science competency aspect is that their ability in science process is low and also they are not involved actively, and also they are not trained to do critical thinking in a phenomenon. Those factor make make evaluating and designing scientific as science competency that has grade the second lowest score in science literacy test.

One of efforts that can be done by the teacher is that teachers need to let students to enhance their critical thinking skill. Students is able to do that by involved actively in various activity like group discussion, problem-solving, and also doing experiment so that students will not be passive object who focus on memorizing certain science theory anymore[7].

The next competency in science literacy test is interpreting scientific data and evidence. Based on the data in Table 3, the highest competency score is that in interpreting scientific data and evidence, and the lowest score is explaining scientific phenomenon. It shows that students have a better ability in interpreting data and scientific evidence rather than explaining, evaluating, and designing scientific observation.

Students ability in interpreting data and scientific evidence shows that students have ability in transform the data from many representation, analyzing and interpreting then making the right conclusion, identifying assumption, evidence and logical discourse in text then differentiate between argument based on evidence theory from different sources, even though interpreting data and scientific

evidence is the highest average score is the the higher than evaluating and designing scientific phenomenon aspect, but normally it is categorized as low.

4. CONCLUSION

Students skill of SMP based on basic and science competency is categorized as low. The factor that causes it is that learning teaching process that is conducted by the teacher is not science literacy-based, their understanding about respiration and excretion system is still low, critical thinking skill, interest in reading is still low, forgetful and lack of involvement in doing experiment in learning teaching process. The solution is that by implementing learning teaching method with science literacy based and guiding them to enhance skill in critical thinking, involve-actively in certain activity such as group discussion, problem-solving, and also doing experiment, so that they are not only learn conceptually but also experimentally.

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