ANALYSIS STUDENT'S LEVEL OF SCIENCE LITERACY IN CLASS X SMAN KHUSUS JENEPONTO

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ABSTRACT

This research is "quantitative research" which aims to describe student's level of science literacy in class X SMAN Khusus Jeneponto. Science literacy is understanding of science and how to aplicate in daily activity. Subject in this research is students class X in SMAN Khusus Jeneponto. Descriptive analysis showed an average score of student's level of science literacy in class X SMAN Khusus Jeneponto at the level of NSL (Nominal Science Literacy) and FSL (Functional Scietific Literacy) which students have to know concept, principle, theory, or science law but their understanding still on defenition and explanation so still feel difficult on problem solving and synthetic thingking.

Key Word: analysis, student's level, science literacy, quantitative research

INTRODUCTION

Physics is part of science which is expected to be a means of developing student's thinking ability and to explain the natural events that occur in our everyday life. It can be seen based on physics learning objectives by the government that students are able to master the concepts and principles of physics to develop the knowledge, skills and attitude of confidence that can be applied in everyday life (Depdiknas, 2003). The goal done is to create the impetus to work that "literate" scientifically and technologically in order to produce students who are capable that have the same science literacy ability to be able to survive in the global market.

The reports of the American Asssociation for the Advancement of Science (AAAS) in 1993, stated that science literacy is a major goal of science education. The meaning of science learning can be felt by students if they have high ability of science literacy. Science literacy is defined as understanding of science and its application to human live (Hurd, 1998).

However, some studies suggest that the average Indonesia public's ability of science literacy is still in the low category. This is proved from some of the factors that were foundamong others: based on data TIMMS (international study of mathematics and science) in 2011 stated that Indonesia literacy scores is not much different with Syria, Oman and Ghana which obtained lower score of literacy skills. In addition, global league table,

published by Pearson Education Firma in the end 2012 put the Indonesian education system at the lowest position with Mexico and Brazil (Hafid, 2014).

The fact is also reinforced on the news published in Tempo newspaper, that surveys Programme for International Study Assessment (PISA), which conducted every three years by the Organization for Economic Co-Operation and Development (OECD, 2003) (OECD, 2006) states that since 2000 Indonesia had always occupy the lowest position to get scientific literacy scores. In the results of PISA 2012, which was announced in December 2013, of the 65 countries that joined the survey program, the average Indonesian student's score of science literacy is 382 which is below the average, is 494, 496, and 501 for each field (Rizki , 2013).

The data is obtained based on the measurement results of PISA done that conducted in several schools in Indonesia. Results from PISA test is used for analysis and making specific policy recommendations. The question is whether the survey results obtained that applies in special schools. Indonesia has special school programs in some areas, one of them is SMAN Khusus Jeneponto located in Jeneponto, South Sulawesi. SMAN Khusus Jeneponto supported by the carrying capacity of a good school as follows infrastructure and facilities such as libraries and laboratories equipped and has professional educators. In addition, the SMAN Khusus

Jeneponto is also supported by a high intake of students as evidenced from the high average scores obtained by learning results 84.64. Higher average scores obtained can show that the learning process is carried out in the schools performing well. By its enforceability of the learning process in schools, should be able to produce students who have high literacy skills.

Science literacy is very close relation to the success of the learning process is implemented in schools on the cognitive and affective in the form of scores or learning outcomes. Soobard & Rannikmae (2011), states that the measurement capability developed science literacy students to identify learning outcomes of students in science subjects at school.

Based on background problems above, it conducted a study to examine how the image of science literacy skills of students entitled " Analysis Student's Level of Science Literacy in Class X SMAN Khusus Jeneponto". This research focus on "How the science literacy skills description of students in the class X SMAN Khusus Jeneponto?"

Purpose of this research is to knowing the science literacy skills description of students in class X SMAN Khusus Jeneponto.

METHODS

This was quantitative research which aims to describe the student's ability of science literacy in class X SMAN Khusus Jeneponto in the second semester of the academic year 2014/2015. The subjects were all students in class X SMAN Khusus Jeneponto as many as 40 students. The variable used in this research is the ability of science literacy that constrained operationally, is the scores achieved students after taking the ability test of science literacy are divided into five categories, namely: 1) Scientific illiteracy (SI), 2) Nominal Scientific Literacy (NSL), 3) Functional Scientific Literacy (FSL), 4) Conceptual Scientific Literacy (CSL), and 5) Multidimensional Scientific Literacy (MSL) (Bybee, 1997). Before coming up with result, assessment is validated by experts.

Data collection conducted after research by collecting all the scores as the results of measurement student's science literacy skills. Student's answer collected then examined by three (3) the examiner and analyzed by researcher to obtain research results are correct. Data science literacy scores of students were analyzed using quantitative descriptive analysis. This analysis is shown in the mean form, standard deviation

(SD), the maximum score, minimum score, variance, idel lowest scores, and maximum ideal score.

Tabel 1. Description of Science Literacy Ability for Each Level (Soobard, 2011; Bybee 1997; Schwartz, 2006)

Level	Description
SI	The students do not have the vocabulary or terms of science, scientific concepts, context and do not able to identify any questions or problems that can't answer anything on the answer sheet is provided.
NSL	The students agree with what is stated another person without any ideas of their own. In addition, because the understanding of learners is still limited so much misunderstanding (misconception).
FSL	Students can describe the meaning of concepts, principles, laws and theories right of textbooks in the form of basic facts but understanding is still very limited aspect of the definition and understanding.
CSL	The students begin to develop their understanding of concepts, principles, laws and theories in a scientific discipline. The students utilize the concept of interdisciplinary and demonstrate understanding and interconnectedness. The students have an understanding of the problem, justify answers with the correct information from the text, charts or tables. The students are able to analyze alternative solutions.
MSL	The students take advantage of a variety of concepts and demonstrate the ability to connect these concepts with everyday life. The students understand how science, society and technology are interrelated and influence each other. The students also demonstrate an understanding of the nature of science through his answer.

RESULT AND EXPLANATION

Based on the student's ability score of science literacy, the following will be presented the results of the descriptive analysis.

Table 2. Statistics of Science Literacy Test Results.

Statistics	Value Statistics
Number of subjects	40
Minimum ideal score	10
Ideal score maximum	50
Minimum score	15
Maximum score	29
Average score	25,30
deviation Standard	2,69
Variance	7,24

Table 2. above shows that from the maximum ideal score is entered gained an average score is 25,30 with a standard deviation 2,69 which means that any tendency of the data is in the range of between 22,51 ± 2,69 to 27,99. From the table also obtained the variance of 7,24 means that the variance to get to the left to right is 7,24.

Table 3. Frequency Distribution and Cumulative percentage from Students Answer.

Level	Frequency	Percentage (%)
Scinetific Illiteracy (SI)	20	5,00
Nominal Scientific Literacy (NSL)	185	46,25
Functional Scientific Literacy (FSL)	159	39,75
Conseptual Scientific Literacy (CSL)	35	8,75
Multidimentional Scientific Literacy (MSL)	1	0,25
Total	**400**	**100**

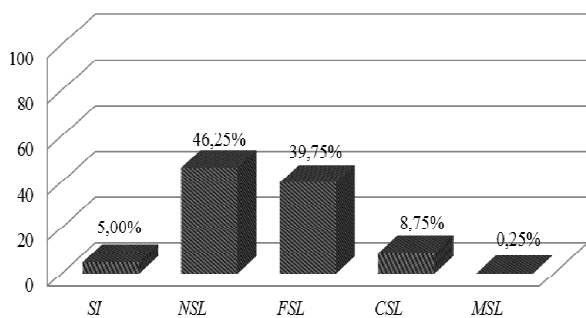Table 3. above can be presented in the form of a bar chart in Figure 1.

Figure 1. Graph Percentage of Student's Answer Based on Ability Level of Science Literacy

Figure 2 shows that student's answers in class X dominated the NSL level as many as 185 answer, or 46,25% and FSL levels as many as 159 answer or 39.75% of the total answers in class X.

This percentage indicates that students were generally only able to know the concepts, principles, theories, or laws of science correctly but their understanding is very limited on the definition aspects so they feel difficult in problem solving and synthetic thinking. It can be seen from a few students answers who just know the concept or specific laws that apply to question acquired from physics lessons at school but does not be able to explain more about the causes, reasons and impact. Another percentage also indicates that students in

some form of question (matter) had a lot of misunderstanding (misconseption) if given science literacy question that requires high analytical, as in item number 10 on the noon topic. It is shown from the majority of students who were not able to answer correctly on the answer sheet provided so give big contributing on NSL level.

Students will have difficulty to answer about the ability of science literacy in MSL level because at this level requires answers which demands of students not only understand the concepts, laws and theories of science but in need of some concepts and demonstrate the ability to connect these concepts in daily life. Students should also understand how science, society and technology are interrelated and influence each other. This is evidenced from the data obtained that is why only one person who are able to answer to the MSL level or 0.25% of total answers on the item number 9 (starlight).

Table 4. Distribution of Score Average of Science Literacy Ability for Every Item.

No	Topics	Score	Average
1	Climb Mount 1	116	2,90
2	Climb Mount 2	129	3,23
3	Climb Mount 3	94	2,35
4	Newton's Law	118	2,95
5	Energy	88	2,20
6	Temperature and Heat	106	2,65
7	Temperature and Heat 2	89	2,23
8	Energy	85	2,13
9	Optics	113	2,83
10	Noon	74	1,85
	All Items	1012	2,53

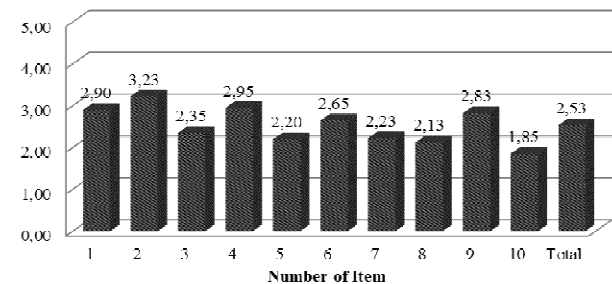Table 4. above can be presented in the form of a bar chart in Figure 2.

Figure 2. Graph Average Student's Score for Each Item

Based on figure 2, shows that the average students ability of science literacy for 10 items tested question gained an average of 2.58. These results indicate that the ability of science literacy from 10 items question are between NSL and FSL level. Previous research

conducted by Soobard & Rannikmae (2011), which is "assessing the student's level of science literacy using interdisciplinary scenario" concluded that all student's answer that were tested are generally included in FSL level as many as 54% of all student's answers class X.

Table 5. Percent of Student's Answer Based on Ability Level of Literacy Science for Each Item

No	Topics	Student's Answer (%)				
		Scientific Illiteracy (SI)	*Nominal Scientific Literacy (NSL)*	*Functional Scientific Literacy (FSL)*	*Conseptual Scientific Literacy (CSL)*	*Multidimentional Scientific Literacy (MSL)*
1	Climb Mount 1	2,50	5,00	92,50	0,00	0,00
2	Climb Mount 2	0,00	15,00	47,50	37,50	0,00
3	Climb Mount 3	0,00	67,50	30,00	2,50	0,00
4	Newton's Law	5,00	37,50	15,00	42,50	0,00
5	Energy	5,00	72,50	20,00	2,50	0,00
6	Temperature and Heat	0,00	35,00	65,00	0,00	0,00
7	Temperature and Heat 2	10,00	57,50	32,50	0,00	0,00
8	Energy	7,50	72,50	20,00	0,00	0,00
9	Optics	5,00	15,00	75,00	2,50	2,50
10	Noon	15,00	85,00	0,00	0,00	0,00

According to the table 5, stated that question number 1 (Climb Mount 1), number 2 (Climb Mount 2), and number 3 (Climb Mount 3) are in higher category than other question. This is because the topics discussed on the question concerning science in general and often encountered in everyday life. In question number 4 showed that the students ability of science literacy in class X dominated the CSL level, that was 42.50%. This is due to discuss on the involving of newton laws of physics are the sciences was recently studied in class X on the competence "applying Newton's law as a fundamental principle of dynamics for straight motion, vertical motion and circular motion. Furthermore, the number 5, it appears that the students ability of science literacy in class X dominated on NSL level, that was 72.50%. This indicates the low ability of students in this item. It was learned in class XI on the competence "analyze relationship between effort, energy changes, and the law of conservation of mechanical energy. While number 6 and 7 appears that the studen's ability of science literacy in class X was high. Based on the table 4 total score obtained were 106 and 89. This was because the matter is discussed regarding the science of physics, namely temperature and heat that was recently studied in class X on the competence "to analyze the effect of heat on a substances and analyze how heat transfer". Number 8 was seen that the student's ability of science literacy predominantly at the NSL level, it was 72.50%. This was because energy was discussed regarding science of physics that learned in class XI on the competence "to analyze the relationship between effort, energy changes,

and the law of conservation of mechanical energy". Number 9 was seen that the student's ability of science literacy in class X was 113. This was because optics was discussed regarding the science of physics, learned in class X on the competence "applying optical devices in everyday life". Furthermore, the number 10, it appeared that the majority student in class X experiencing misconceptions seen from the low total score , that was 74. This was because this matter involves the science of physics learned in junior high school with the basic competencies describe the distribution of motion of the earth, moon, and artificial satellites as well as the effect of interaction. At number 10 the real answer was because the tilt of 23 ° earth but most students to answer because the Earth's rotation and revolution of the sun.

Based on the final school exam obtained from the physics teachers seen that in general the matter at the level of C2 (understanding) and C3 (applications). The matter generally requires a response in the form of decription meaning of concepts, laws, theories, and principles of physics and how its application in the form of a matter of calculation. From these explanations it appears about the teachers gave exam was a matter that fall into the category of FSL that is a matter which generally requires a response in the form of description and understanding of concepts, laws, theories, and principles of physics material learned in class. This indicates that the average response tenth grade students at SMAN Khusus Jeneponto is in the FSL category because in general about the teachers gave when the exam is a matter that is at the level of FSL. Soobard & Ranniknae

(2011) stated that the questions which usually give the teacher during the exam is a question that requires a response at the FSL level. The statement was also supported by Bybee (1997) which concluded that the level of FSL is the level that is usually assessed in school examinations. Based on the results if the data obtained from the study subjects, it can be said that the answers of students at this level have mendekti levels required students to carry out the test well. Results obtained bertolakbelakang of basic competencies that should be achieved in any standard of competence of each semester. Standards and basic competencies dominated on the application of physics in everyday life.

If referring to the standard of competence and basic competences to be achieved should the learner is able to answer the science literacy as well and not just limited to the level of FSL. This is because the learning objectives set by subject teachers only reside on a single concept or a partial and very rarely deliver relevant content in everyday life. It is powered from the semester exam tests obtained from subject teachers of physics.

The above results contrast with science literacy assessment systems that need answers compounded by combining the concepts of physics with other physics concepts to arrive at MSL level. Delivery of lessons by teachers who carried partially caused knowledge to the students are also separated from one concept to another. This causes the students are only able to answer questions on the level of science literacy to FSL and difficult to reach the level MSL which require a more complex answer.

CONCLUSION

Based on above results, it was concluded that student's ability of science literacy in class X SMAN Khusus Jeneponto was between level Nominal Scientific Literacy (NSL) and Functional Scientific Literacy (FSL) which the students in general were able to know the concepts, principles, theories, or the laws of science correctly but understanding is still limited to the aspects of defenition and understanding.

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