Identification of Scientific Literacy of Elementary School Students in Central Lampung District

by Nina Kadaritna

Submission date: 14-Apr-2021 10:43PM (UTC+0700)
Submission ID: 1559105158
File name: Artikel_JPP_1.pdf (1.63M)
Word count: 5893
Character count: 34216

Vol. 10, No.1, pp. 133-145, 2020 DOI: 10.23960/jpp.v10.i1.202014

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jurnal.fkip.unila.ac.id/index.php/jpp/

Identification of Scientific Literacy of Elementary School Students in Central Lampung District

Nina Kadaritna[1], Undang Rosidin[2], Novinta Nurul Sari[2], Ismi Rakhmawati[3,*]

[1]Department of Chemical Education, Universitas Lampung, Indonesia

[2]Department of Physics Education, Universitas Lampung, Indonesia

[3]Department of Biology Education, Universitas Lampung, Indonesia

*Corresponding email: ismi.rakhmawati@fkip.unila.ac.id

Received: 09 March 2020 *Accepted: 10 April 2020* *Published: 11 April 2020*

Abstract: Identification of Scientific Literacy of Elementary School Students in Central Lampung District. Objective: Identify scientific literacy skills of elementary school students that can be actualized in the form of local government policies. **Method:** This descriptive study involved 36 schools with a total of 380 Elementary School students in Lampung Tengah District obtained using purposive sampling technique. Students examined with scientific literacy questions adapted from PISA (Programs for International Student Assessment) question items and scientific literacy data are analyzed descriptively. **Findings:** The research data shows that students who understand concepts of science are only 16.07%, misconcept are 8.6%, mistaken are 37.5%, and not understand are 37.8%. Elementary students who understand the concepts of science are still fewin all knowledge categories which are factual category 16.75%, conceptual 16.08%, and procedural 13.5%. **Conclusion:** Elementary students' scientific literacy in Central Lampung is still in the low category.

Keywords: scientific literacy, elementary school students, descriptive study.

Abstrak: Identifikasi Literasi Sains Siswa Sekolah Dasar di Kabupaten Lampung Tengah. ***Tujuan:*** *Mengidentifikasi kemampuan literasi sains siswa sekolah dasar yang dapat diaktualisasikan dalam bentuk kebijakan pemerintah daerah.* ***Metode:*** *Penelitian deskriptif ini melibatkan 36 sekolah dengan total 380 siswa Sekolah Dasar (SD) di Kabupaten Lampung Tengah yang diperoleh dengan menggunakan purposive sampling technique. Siswa diuji dengan soal literasi sains yang diadaptasi dari soal PISA (Programme for International Students Assessment) dan data literasi sains dianalisis secara deskriptif.* ***Temuan:*** *Data hasil penelitian menunjukkan bahwa siswa yang paham konsep sains hanya 16,07%, siswa yang miskonsep 8,6%, siswa yang salah konsep 37,5%, dan siswa yang tidak paham konsep 37,8%. Siswa SD yang paham konsep sains masih sedikit untuk semua kategori pengetahuan yaitu kategori faktual 16,75%, konseptual 16,08%, dan procedural 13,5%.* ***Kesimpulan:*** *Literasi sains siswa SD di Lampung Tengah masih dalam kategori rendah.*

Kata kunci: *Literasi sains, siswa sekolah dasar, penelitian deskriptif.*

To cite this article:

Kadaritna, N., Rosidin, U., Sari, N. N., & Rakhmawati, I. (2020). Identification of Scientific Literacy of Elementary School Students in Central Lampung District. *Jurnal Pendidikan Progresif*, *10*(1), 117-132. doi: 10.23960/jpp.v10.i1.202014.

INTRODUCTION

International literacy evaluation conducted by the OECD (Organisation for Economic Co-operation and Development) through the Program for International Student Assessment (PISA) showed that Indonesian students' scientific literacy scores are still low at level 1 and make Indonesia ranked on 60th out of 72 countries (Nugrahanto & Zuchdi, 2019). Level 1 criteria is students can use content and procedural knowledge to identify simple scientific phenomena, students can conduct structured scientific investigations with no more than two variables (OECD, 2019). The ability of scientific literacy in each country is different which is influenced by the country's education system. Different countries can implement rational education reforms based on their own cultural traditions and social realities using PISA data with care and prudence (Yang & Fan, 2019).

Most of students in developed countries achieve high scores at level more than 2 with the highest criteria (level 6). Whereas the results of PISA tests for Indonesian showed that students have not yet reached level 6 and 60% of Indonesian students are at low and bad level (Fenanlampir, Batlolona, & Imelda, 2019) while science is really needed by students in their daily lives, especially in decision making, critical thinking, creative thinking, high level thinking, and solving the problems they face. Students have a reasonably good content knowledge but insufficient procedural and epistemic knowledge therefore they are unable to utilize them in problem solving activities (Bellová, Melicherèíková, & Tomèík, 2018). The low PISA score which is related to students is unusual for high order thinking skill (HOTS) type of questions which are dominating in scientific literacy questions that completed with diagrams, pictures, maps, tables, and charts (Anagnostopoulou, Hatzinikita, & Christidou, 2012). Likewise, the learning process in schools that still has not increased the scientific literacy of students because it still prioritizes cognitive outcomes compared to the science process (Widowati et al., 2017).

Science learning carried out so far tends to prioritize the completion of discussions of elementary school science materials for examinations, not the achievement of students' products, processes, and scientific attitudes (Apriani, Sudin, & Panjaitan, 2017). For this reason, educational reform is needed that prioritizes scientific literacy starting at the regional level then students are better prepared to face science literacy tests, especially if they are subjected to PISA. In addition, other research shows that scientific learning can improve students' scientific literacy skills in aspects of competence and knowledge (Asyhari, 2015) and the use of teaching materials based on scientific literacy is effective to improve learning achievement of elementary school students (Avikasari, Rukayah, & Indriayu, 2018).

The first step that can be done is by developing a scientific literacy test instrument which is tested on elementary school students. Science literacy consists of four competencies namely explaining phenomena scientifically, evaluating and designing scientific inquiry, interpreting data and evidence scientifically, while the knowledge categories are content, procedural, and epistemic (Becker, 2015; Gormally, Brickman, & Lut, 2012). The content fields of scientific literacy include physical systems, living systems, and space systems while the context of the life field consists of three categories: personal, local/national, and global (Becker, 2015).

Scientific literacy can improved by creative learning model which students are expected to be involved in the research process to identify problems, collect data, and use the data to solve problems (Jgunkola & Ogunkola, 2013; Kristyowati & Purwanto, 2019; Ratini, et al., 2018). Research on scientific literacy usually done only in one school and collect data separately in

fields of biology, physics, and chemistry based on one material topic or the area of expertise of researchers. For this reason, it is necessary to compile an integrated scientific literacy instrument for the three fields carried out in one district which involved all schools in one district as research population.

Scientific literacy instruments are needed to identify students' scientific literacy that can be utilized by teachers (Udompong, Traiwichitkhun, & Wongwanich, 2014), decision makers, and all education stakeholders as references in planning programs (She, Stacey, & Schmidt, 2018), evaluating education policies at the local level, formulating educational program priorities, and helping local government to identify the weaknesses and strengths of education in the area. However, elementary students' scientific literacy data in Central Lampung Regency has not yet been investigated so it is necessary to carry out local level scientific literacy tests to identify student scientific literacy that can be a reference for local governments to determine program priorities, especially in science education.

Central Lampung district has a human development index of 69.73 with the expectation age of school and the average length of school that continues to increase from 2014 to 2018 (Ernawati et al., 2019). In addition, South Lampung Regency has also used an education program budget of 15.89%, the Primary School Quality Assurance score of 5.5, and school B accreditation reached 73.5% (Ernawati et al., 2019). This is an opportunity to increase student scientific literacy starting from the regional level in collaboration with the Educational Institution and Education Personnel.

METHODS

Our descriptive research begins with planning in a group discussion forum with Central Lampung Balitbangda (Regional Research and Development) to analyze local goverment needs related to elementary school students' scientific literacy and the results of research needed by the regional department (Figure 1). This study explores social problems experienced by a number of individuals, specific data, analyzes data inductively, and interprets data descriptively (Fraenkel, Wallen, & Hyun, 2011). Then a literature review is conducted to compile scientific literacy instruments followed by compilation of questions based on the PISA question criteria (scientific competence, content, and context) with the dimensions of knowledge using Bloom's Taxonomy (factual, conceptual, and procedural) (as cited in Darmawan & Sujoko, 2013). The questions that have been compiled are then tested for validaty and reliability, the results become a reference for revising elementary level scientific literacy questions (Figure 1). The revised science literacy questions are then used for elementary school students' scientific literacy tests in Central Lampung Regency.

The population of this study is all grade VI elementary school students in Central Lampung Regency. The sampling technique uses purposive sampling with the number of schools sampled fulfilling the percentage of 15% for each district in Central Lampung Regency. Schools used as research samples are 30 public elementary schools and 6 private elementary schools with a total of 380 students.

Furthermore, we developed instrument of scientific literacy consists of 45 questions that includes 24 basic competences for science elementary, 3 scientific competencies (explain phenomena scientifically; evaluate and design enquiry; interpret data and evidence), 3 knowledge categories (factual, conceptual, and procedural), 3 content areas (physical systems, living systems, earth and space system), and 3 context items (personal, local/national, and global). Instrument used diagnostic test Two-Tier Multiple Choice (TTMC) which consist of two levels, first level is multiple choice question and

second level is reason for level one answer (Tüysüz, 2009). Scientific literacy questions were tested on 30 6th grade students at Bandar Lampung Elementary School. The results of the trial instrument were then analyzed to obtain a reliability score, the difference in the matter, the level of difficulty, the quality of the distractor, and the correlation value. Based on the results of the trial, 15 items were revised following by the distractor.

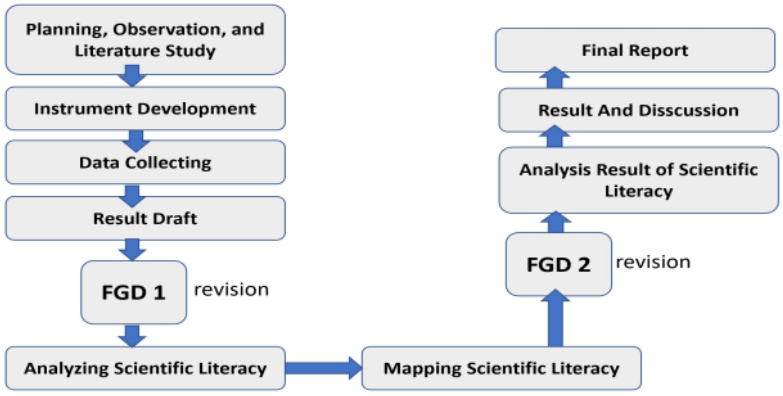

Figure 1. The stages of elementary school students' scientific literacy research

On the research stage, scientific literacy instrument was given to 380 children from 36 different elementary schools in Central Lampung. The test result data were analyzed based on the answers chosen by students for each number of questions. The types of students' answers are then categorized into understanding concepts, misconceptions, mistaken, and not understanding concepts (Tüysüz, 2009) in table 1.

Data analysis uses percentages that leads to grouping of the results of students' scientific literacy tests so that proper data analysis can be obtained. Percentages are obtained by dividing the number of each category of students divided by the total number of students for each question. In addition, total percentage for each category are obtained from total percentage of each category divided by total question. Next step is

Tabel 1. Categories of students' answers

Answers Type	Explanation	Category
Correct-Correct reason	Student answer correct on the first and second stage	Understanding
Correct-False reason	Student answer correct on the first stage and false answer on second stage	Misconception
False-Correct reason	Student answer false on the first stage and correct answer on the second stage	Mistaken
False-False reason	Student answer false on the first and second stage	Not undertanding

the presentation of data in bar chart and identifying quality of scientific literacy of elementary school students in Central Lampung.

■ RESULTS AND DISCUSSION

The results of scientific literacy tests in elementary school students shows only 16.07% students understand the concepts as shown in Table 2. Level misconceptions varied from 24 basic competence in science. Other study showed level misconceptions varied between concepts and some patterns in level and type of misconceptions (Thompson & Logue, 2006). The highest percentage of students who understand the concept is only 43.88% for question number 9 (biological material). If viewed in terms of the questions, question number 9 is in the level of competence "interprete data and evidence", where students are asked to provide solutions or ways that *Ani must do so as not to get diarrhea again* based on explanation presented on the text. However, the data presented in text is descriptive so students are easier to analyze.

The same fact found in Turkey which shows scores 47.72% of the maximum score in moderate level of scientific literacy, only a few number of students to be able to identity the scientific components of many complex situations (Ozdem, Cavas, Cavas, Cakiroglu, & Ertepinar, 2006). This shows that teacher still need to attempt some pedagogical complexities associated with constructing an understanding of scientific literacy in their own class and change learning strategies which provided investigation, hypothesis, and verification activities that can be solutions are inquiry strategies, Argument Driven Inquiry (ADI) and Science, Technology, Engineering, Mathematics (STEM) (Herlanti et al., 2019; Smith et al., 2012).

Table 2. Average percentage of student answers' categories

Category	Percentage
Understanding	16.07
Misconception	8.61
Mistaken	37.50
Not Understanding	37.80

Meanwhile, the maximum percentage of students experiencing misconceptions is 34.69%, that is, in question number 14 (biological material). If traced, the question number 14 is a type of question with the competency level "evaluate and design inquiry", where students are asked to put forward their opinions about a condition and reasons that support their opinions, students must evaluate whether their opinions are correct and design reasons that strengthen their opinions.

However, the findings indicate that there are still many students who experience misconceptions in expressing their reasons. Misconception students answer correct but give false reason such as *I will close my nose when people smoke around me and breath through the mouth; I stay away from smoke because uncomfortable.* Other research also found the same result 66.2% of students were able to link science concepts with other disciplines and were able to write scientific definitions, but they still experienced misconceptions and difficulties in understanding concepts and connecting them with initial knowledge (Fakhriyah, Masfuah, Roysa, Rusilowati, & Rahayu, 2017; Thompson & Logue, 2006).

Furthermore, the maximum percentage of students who misconcepted was 61.22% in question number 11 (biological material) and did not understand the concept was 62.24% in question number 23 (chemical material). If traced, question number 11 is a type of question that is at the level of competence "explain scientifically phenomena", where students are required to

understand and explain a phenomenon or symptoms of a disease and how to prevent it. While question number 23 is a type of question that is at the level of competence "interprete data and evidence", where students are asked to explain the characteristics of a homogeneous mixture based on pictures that show the mixture. So, overall the number of elementary school students who understand the concept still low because it is less than 50%. The profile of scientific literacy ability in other studies shows similar finding, i.e., scientific literacy mastery is still below 60% for all categories (Fu'adah, Rusilowati, & Hartono, 2017). In addition, teachers in United Kingdom also found 130 misconceptions such as *stones grow or taller people older than shorter* which children bring to science class (Pine, Messer, & John, 2016). The students have been able to analyze or interpret simple data, but many students tend to get difficulties when analyzing discourse that contains more complex data. The number of students who misunderstood even did not understand the concept was more than 50%. They have not been able to determine the label of an event or phenomenon based on the characteristics of the symptoms indicated.

The maximum percentage of students who understand the concept is only 25.53%, namely in question number 2 (biological material). If viewed in terms of the questions, question number 2 is in the level of competence "interprete data and evidence", where students are asked to provide conclusions based on the data in the table. So students feel easier to analyze +such question. If the average value is taken, then the average percentage of students who understand the concept of the whole problem given is only 3.07%. There are no students who understand the concepts of questions 26 to 45 (physics material). That is, the private elementary school students' understanding about physics material is very weak.

Meanwhile, the students who experienced misconceptions were only 17.02%, namely in question number 3 (biological material). If traced, question number 3 is a type of question with the level of competence "evaluate and design inquiry", where students are asked to express their reasons that support their opinions, meaning that here they must evaluate whether their opinions are correct and whether their reasons support their opinions. The percentage is indeed better than the findings of elementary school students. However, the results of the analysis of public and private elementary students lead to a conclusion that the students still have many misconceptions in the causal relationship of a phenomenon or event.

Furthermore, the maximum percentage of students with wrong concepts is 78.72% in question number 1 (biological material) and not understanding the concept is 93.62% in problem number 7 (biological material). Unlike the findings of public elementary school students, private elementary school students also have a lot of problems with biological and chemical material problems. If traced, questions number 1 and 7 are types of questions that are at the level of competence "explain scientifically phenomena", where in question number 1 students are asked to provide solutions as an effort to deal with the problems presented in discourse or stimulus. While in question number 7, the students are asked to provide benefits from animal body anatomy. So, overall the number of students who understand the concept is still small because it is less than 30%. They have been able to analyze or interpret simple data, but many students tend to find difficulties when analyzing discourse that contains more complex data. The number of students who do not understand the concept is more than 75%. They have not been able to determine the label of an event or phenomenon based on the characteristics of the symptoms indicated. They tend to have difficulty in explaining

the scientific phenomenon and better at identifying scientific issue indicators and using scientific evidence (Wulandari & Sholihin, 2016).

Conceptual understanding of state and private elementary school students is based on four criteria understanding concepts, misconceptions, wrong concepts, and not understanding concepts. The percentage of students who understand the concepts in the factual, conceptual, and procedural problem categories are shown in Figures 1, 2 and 3, respectively.

Problem number 2 in Figure 2 contains material about the types of natural resources that are included in the level 3 (factual knowledge category). The results indicate that the students have not been able to compare facts about the number of population that is more or less. Question numbers 2 and 3 regarding the types of natural resources presented fact using animal data in Lolobata National Planting and level 2 (question number 3). The results of the analysis of student answers indicate that learning in schools rarely presents factual data. Therefore, the students are

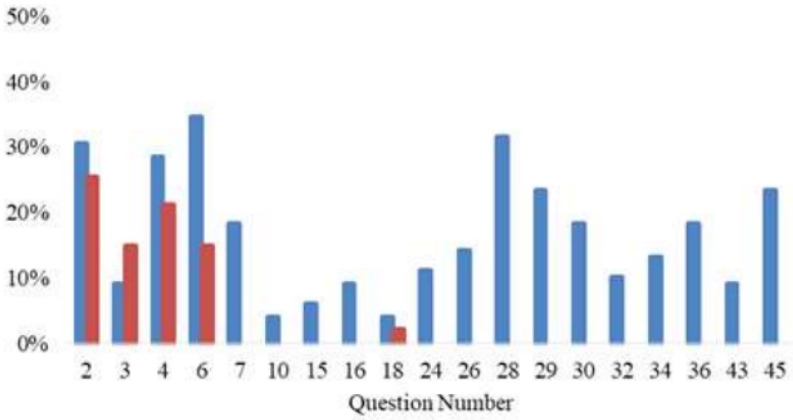

Figure 2. Percentage of public (blue) and private (red) elementary school students' conceptual understanding in the factual problem category

not accustomed to reading the tables presented in the questions. Question number 7 belongs to level 1 (factual knowledge). The analysis of the answers shows that the students have not been able to mention the function of body parts in daily life. In question number 18 regarding animal breeding, very few students understand the concept. Question number 18 is easy because it belongs to level 1 (factual knowledge), but many students are wrong in answering it because of the lack of understanding of the terms vivipar, ovipar, and ovovivipar.

In problem number 26, the percentage shows that only a small proportion of students from the public elementary school understand the concept of gravity, and even elementary school students from private schools understand the concept of gravity. In fact, if traced, the problem is at level 1 where students are asked to show their factual knowledge by giving examples of phenomena related to gravity. That is, students do not understand the concept of gravity in relation to facts and phenomena in everyday life. In question number 28, the results show that none

of the students from the private elementary school understood the definition of style. Problem number 28 is the simplest problem that requires students to recall their memories about the definition of style. More than half of the total sample has a misconception about the definition of force. This indicates that learning science has not directed students about the concepts and definitions of styles that students must understand and remember. While the problem number 29 is still in the material about force, students are asked to observe the picture and explain what they understand about the effect of force on the motion of objects. None of the students from private elementary schools understood the concept. In addition, there were significant differences between public and private elementary school students in the concept of understanding concepts in questions number 28 and 29, the percentage shown by public elementary school students showed better results in terms of concept understanding. This indicates there are differences in the learning process or learning experience gained by students.

For questions number 30 and 32, Figure 2 indicates that there are still many public and private elementary school students who do not yet understand the types of energy resources both renewable and non-renewable, and do not yet understand alternative energy sources. The possibility that occurs in the learning process is that students have not been directed to these materials. Meanwhile, question number 34 in Figure 4.10 indicates that learning that has been carried out in public elementary schools around this material has not been optimally emphasized

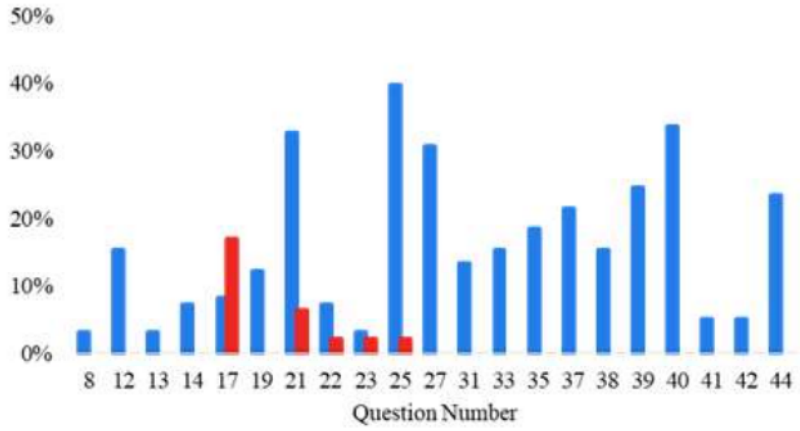

Figure 3. Percentage of public (blue) and private (red) elementary school students conceptual understanding in the conceptual question category

The ability of students in answering question number 8 in Figure 3 about the human digestive system which belongs to the level 2 conceptual knowledge category is almost entirely incomprehensible to the concept. These results indicate students do not understand the function of the digestive organs presented in the form of images. Figure 3 shows that question number 13 about spinal health material is included in the level 3 conceptual knowledge category. There are only a few public and private elementary school students who understand the concept. This shows students have not been able to analyze common spinal abnormalities and how to look after them.

For question number 17 regarding the water cycle with the level 2 conceptual knowledge category, there are many public and private elementary school students who do not understand the concept. This shows the ability of students to make predictions using the analogy of the water cycle with drawings is still not good. The ability of students to answer literacy tests number 19 which includes conceptual knowledge level 2 is also not good. There are still many students who choose wrong even though the answers are related to the root function in water absorption. In addition, question number 23 regarding mixtures included conceptual knowledge of level 1. However, the results showed that most elementary students did not understand the concept. This shows that students do not yet understand the concept of homogeneous mixed substances, even though the questions are already equipped with images of beaker filled with solution.

If traced in Figure 3, question number 25 contains material about the friction force, where students are asked to explain the concept of friction force which is associated with phenomena that exist in everyday life. Meanwhile, problem number 27 contains material about magnetic force. In questions 25 and 26, a significant gap is found in the concept of understanding concepts. The diagram shows that public elementary students have a better understanding of concepts than private elementary students, because none of the private elementary students understand the concept of style. This is supported by a significant gap in the misconception criteria, where the percentage of private elementary schools in the misconception criteria is indeed higher than for public elementary students. This indicates that learning science in the material about the style is not optimal. Problem number 31 contains material about changing the form of energy. The percentage of understanding the concept is still low. This indicates learning in public and private elementary schools has not yet discussed the changes in the form of energy associated with their application in daily life, because if observed, the percentage of understanding of the concept of public elementary school students is still quite low. Problem number 35 contains material about the properties of light. Understanding the concepts between public and private elementary students can be said to be the same. It can be seen that the percentage of the conceptual understanding criteria between the two schools is not significantly different. However, the percentage of the concept of understanding concepts is still low, so there needs to be a change in the learning process when discussing the properties of light. To overcome this we need interesting learning media that can demonstrate waves, sound, and light to improve student understanding (Sudarmani, Rosana, & Pujianto, 2018).

Question numbers 37 and 38 contain the same material that is about heat transfer, where question number 37 is about conduction, while question number 38 is about radiation. Question number 37 asks students to give examples of objects that can conduct heat, while question number 38 asks students to give examples of phenomena, that is, heat transfer by radiation. The diagram shows that the number of state elementary school students who understand the concept is higher than that of the private elementary school, but is accompanied by the percentage of the number of state elementary school students on the wrong concept criteria which is also higher than that of the private elementary school. The biggest percentage of the two types of schools lies in the criteria of not understanding the concept. This indicates that learning has not emphasized examples of heat transfer in daily life. For question number 33 contains material about the properties of sound. Only a few public elementary school students

understand the concept, while none of the private elementary school students understand the concept of the material. The biggest percentage lies in the criteria of misconception and not understanding the concept. This indicates that there needs to be a change in the learning process and an emphasis on the material. Meanwhile, Problem number 40 contains material about the effect of heat on changes in the shape of objects. The diagram shows that many public elementary school students understand the concepts of temperature and heat, although there are still a few students who experience misconceptions. However, not in line with the percentage shown by private elementary students, none of them understood the concept of the material. Most elementary students are more misconceptions and do not understand the concepts. Characteristics of question number 40 is actually students are asked to analyze that if an ice is given heat, then the heat will be used ice to melt in a certain time. If not enough heat is given, then only a portion of the ice will melt. That is, there needs to be an emphasis on the concepts of temperature and heat in the learning process.

Figure 4 shows level 2 that there are only a few students who understand the concept in question number 1 which belongs to the category of procedural knowledge. The questions about endemic fish conservation that are procedural in problem investigation cannot be answered by most of the students. The results of the analysis of students' answers to problem number 9 about diseases of the digestive including procedural knowledge level 2 shows the ability of students to maintain health related to the digestive system which is still not good. Problem number 11 regarding the health of the circulatory system with the type of procedural knowledge shows the ability of students who are still lacking in terms of procedures for maintaining a healthy circulatory system.

CONCLUSIONS

Misconceptions identified in every basic competence in scientific literacy test. The number of students who misconceptions even did not understand were more than 50%. The students have not been able to determine the label of an event or phenomenon based on the characteristics

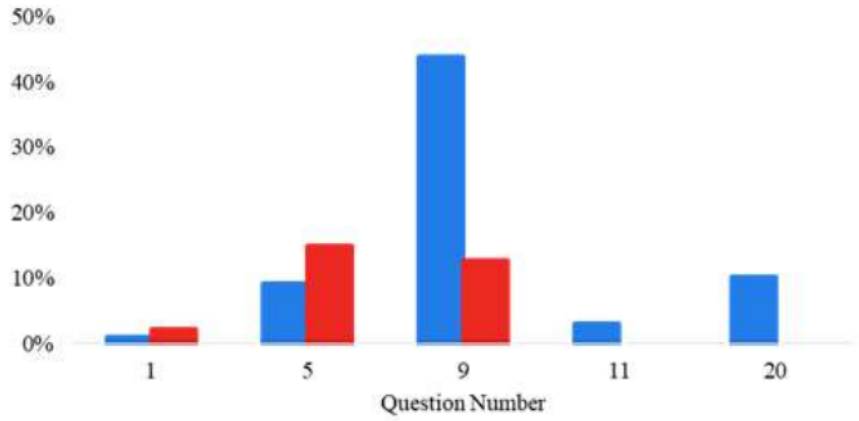

Figure 4. Percentage of public (blue) and private (red) elementary school students' conceptual understanding in the procedural question category

of the symptoms indicated. The overall number of elementary school students who understand the concept of science is still low (less than 30%). Students are able to analyze or interpret simple data, but many students find difficulties when analyzing discourse that contains more complex data. The students have been able to analyze or interpret simple data but many of them find difficulties when analyzing discourse that contains more complex data. They have not been able to determine the label of an event or phenomenon based on the characteristics of the symptoms indicated. The researchers expected that future studies creatively modify learning model that suitable for students in Central Lampung district to enhancement of scientific literacy.

■ ACKNOWLEDGMENTS

The author would like to thank the Central Lampung Regency Research and Development Agency (Balitbangda) for the funding provided for this research, also thanks to the Dean of the Faculty of Teacher Training and Education, University of Lampung who have conducted this research collaboration.

■ REFERENCES

Anagnostopoulou, K., Hatzinikita, V., & Christidou, V. (2012). PISA and Biology school textbooks: The role of visual material. *Procedia - Social and Behavioral Sciences*, *46*, 1839–1845. https://doi.org/10.1016/j.sbspro.2012.05.389

Apriani, S., Sudin, A., & Panjaitan, R. L. (2017). *Penerapan Contextual Teaching and Learning (CTL) untuk meningkatkan keterampilan proses sains pada materi perubahan sifat benda* [Application of Contextual Teaching and Learning (CTL) to improve science process skills on material changes in the nature of objects]. *Jurnal Pena Ilmiah*, *2*(1), 401–410. https://doi.org/10.17509/jpi.v2i1.10675

Asyhari, A. (2015). *Profil peningkatan kemampuan literasi sains siswa melalui pembelajaran saintifik* [Profile of increasing students' scientific literacy skills through scientific learning]. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, *4*(2), 179. https://doi.org/10.24042/jpifalbiruni.v4i2.91

Avikasari, A., Rukayah, R., & Indriayu, M. (2018). The influence of science literacy-based teaching material towards science achievement. *International Journal of Evaluation and Research in Education (IJERE)*. https://doi.org/10.11591/ijere.v7i3.14033

Becker, F. G. (2015). *Description of the released unit from the 2015 PISA collaborative problem solving assessment, collaborative problem-solving skills, and proficiency levels*. Washington: OECD.

Bellová, R., Melicherèíková, D., & Tomèík, P. (2018). Possible reasons for low scientific literacy of Slovak students in some natural science subjects. *Research in Science and Technological Education*, *36*(2), 226–242. https://doi.org/10.1080/02635143.2017.1367656

Creswell, J. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los angeles: SAGE.

Darmawan, I. P. A., & Sujoko, E. (2013). *Revisi taksonomi pembelajaran Benyamin S. Bloom* [Revised learning taxonomy of Benjamin S. Bloom]. *Satya Widya*, *29*(1), 30. https://doi.org/10.24246/j.sw.2013.v29.i1.p30-39

Ernawati, Y., Pambudi, A., Pratama, A., Aditama, A., Devi, K., Nadia, P., … Miftahussururi.

(2019). *Neraca pendidikan daerah 2019* [Regional education balance 2019]. Retrieved from https://npd.kemdikbud.go.id/

Fakhriyah, F., Masfuah, S., Roysa, M., Rusilowati, A., & Rahayu, E. S. (2017). Student's science literacy in the aspect of content science? *Jurnal Pendidikan IPA Indonesia*, *6*(1), 81–87. https://doi.org/10.15294/jpii.v6i1.7245

Fenanlampir, A., Batlolona, J. R., & Imelda, I. (2019). The struggle of Indonesian students in the context of TIMSS and Pisa has not ended. *International Journal of Civil Engineering and Technology*, *10*(2), 393–406.

Fraenkel, J., Wallen, N., & Hyun, H. (2011). *How to design and evaluate research in education*. New York: Mc Graw Hill.

Fu'adah, H., Rusilowati, A., & Hartono, H. (2017). *Pengembangan alat evaluasi literasi sains untuk mengukur kemampuan literasi* [Development of a science literacy evaluation tool to measure literacy skills]. *Lembaran Ilmu Kependidikan*, *46*, 51–59.

Gormally, C., Brickman, P., & Lut, M. (2012). Developing a test of scientific literacy skills (TOSLS): Measuring undergraduates' evaluation of scientific information and arguments. *CBE Life Sciences Education*, *11*(4), 364–377. https://doi.org/10.1187/cbe.12-03-0026

Herlanti, Y., Mardiati, Y., Rahmawati, R., Putri, A. M. K., Jamil, N., Miftahuzzakiyah, M., … Sugiarti, S. (2019). Finding learning strategy in improving science literacy. *Jurnal Penelitian Dan Pembelajaran IPA*, *5*(1), 59. https://doi.org/10.30870/jppi.v5i1.4902

Jgunkola, B. J., & Ogunkola, B. J. (2013). Scientific literacy: Conceptual overview, importance and strategies for improvement. *Journal of Educationai and Sociai Research*, *3*(1), 265–274. https://doi.org/10.5901/jesr.2013.v3n1p265

Kristyowati, R., & Purwanto, A. (2019). *Pembelajaran literasi sains melalui pemanfaatan lingkungan* [Learning scientific literacy through the use of the environment]. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *9*(2), 183–191. https://doi.org/10.24246/j.js.2019.v9.i2.p183-191

Nugrahanto, S., & Zuchdi, D. (2019). Indonesia PISA result and impact on the reading learning program in Indonesia. *Advances in Social Science, Education and Humanities Research*, *297*, 373–377. https://doi.org/10.2991/icille-18.2019.77

OECD. (2019). PISA 2018 insights and interpretations. *OECD Publishing*, 64. Retrieved from https://www.oecd.org/pisa/PISA 2018 Insights and Interpretations FINAL PDF.pdf

Ozdem, Y., Cavas, P., Cavas, B., Cakiroglu, J., & Ertepinar, H. (2006). An investigation of elementary students' scientific literacy. *Journal of Baltic Science Education*, *9*(1), 6–20.

Pine, K., Messer, D., & John, K. S. (2016). Research in science and technological education childrens' misconceptions in primary science: A survey of teachers ' views. *Science*, *5143*, 37–41. https://doi.org/10.1080/02635140120 04624

Ratini, Muchtar, H., Suparman, M. A., Tamuri, A. H., & Susanto, E. (2018). The influence of learning models and learning reliance on students' scientific literacy. *Jurnal Pendidikan IPA Indonesia*, *7*(4), 458–466. https://doi.org/10.15294/jpii.v7i4.12489

She, H. C., Stacey, K., & Schmidt, W. H. (2018). Science and Mathematics literacy: PISA for better school education. *International Journal of Science and Mathematics Education*, *16*. https://doi.org/10.1007/s10763-018-9911-1

Smith, K. V., Loughran, J., Berry, A., & Dimitrakopoulos, C. (2012). Developing scientific literacy in a Primary School. *International Journal of Science Education*, *34*(1), 127–152. https://doi.org/10.1080/09500693.2011.565088

Sudarmani, Rosana, D., & Pujianto. (2018). Lesson learned: Improving students' procedural and conceptual knowledge through Physics instruction with Media of wave, sound, and light. *Journal of Physics: Conference Series*, *1097*(1). https://doi.org/10.1088/1742-6596/1097/1/012033

Taylor, S., Bogdan, R., & Devault, M. (2016). *Introduction to qualitative research methods*. New Jersey: Wiley.

Thompson, F., & Logue, S. (2006). An exploration of common student misconceptions in science. *International Education Journal*, *7*(4), 553–559.

Tüysüz, C. (2009). Development of two-tier diagnostic instrument and assess students' understanding in chemistry. *Scientific Research and Essays*, *4*(6), 626–631.

Udompong, L., Traiwichitkhun, D., & Wongwanich, S. (2014). Causal model of research competency via scientific literacy of teacher and student. *Procedia - Social and Behavioral Sciences*, *116*(2001), 1581–1586. https://doi.org/10.1016/j.sbspro.2014.01.438

Widowati, A., Widodo, E., Anjarsari, P., & Setuju. (2017). The development of scientific literacy through nature of science (NoS) within inquiry based learning approach. *Journal of Physics: Conference Series*, *909*(1). https://doi.org/10.1088/1742-6596/909/1/012067

Yang, W., & Fan, G. (2019). Post-PISA education reforms in China: Policy response beyond the digital governance of PISA. *ECNU Review of Education*, *2*(3), 297–310. https://doi.org/10.1177/2096531119878557

Identification of Scientific Literacy of Elementary School Students in Central Lampung District

ORIGINALITY REPORT

11%	9%	6%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

2%

★ zombiedoc.com

Internet Source

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		