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Specifications of Energy Module in Living Systems Integrate Religious Values Against Student's Scientific Literacy

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ABSTRACT

This study aims to analyze the specifications of energy modules in life systems integrating religious values on students' scientific literacy. The research method uses a quasi-experimental design with a one-group pretest and posttest, with 40 seventh grade students in a public junior high school as research subjects. An instrument to measure the increase in students' scientific literacy by using 25 multiple choice questions. The test is given two times, namely pre test (before learning using modules) and post test (after learning using modules). The data obtained were then analyzed using quantitative descriptive. The results of this study indicate that the application of energy modules in living systems integrating religious values is effective on the scientific literacy of students based on the average n-gain score of 0.45, which falls into the medium category. The scientific literacy competence of students in this study sequentially from the highest is to explain scientific phenomena with n-gain score 0,58, then interpret data and scientific evidence with n-gain score 0,46, and evaluate and design scientific investigations with n-gain score 0,26. Learning by using this module can improve students' learning outcomes by making learning situations more active so that it is easier to understand the concept of energy in living systems. The research concludes that the application of energy modules in life systems integrating religious values is effective on students' scientific literacy.

Keywords: Module, religious values, scientific literacy

INTRODUCTION

The initial study was obtained from the results of interviews with eight science teachers in a Junior High School in Bogor District who explained that the learning resources used were student books from the Ministry of Education and Culture and the science module developed by the Bogor District Forum of Subject Teachers (Musyawarah Guru Mata Pelajaran/ MGMP). The material in the book is packed with material, practical activities, and student exercises, while the material in the module contains a description of the material and practice questions without any practicum activities. This causes low student learning outcomes. From the results of tests with questions that contain scientific literacy with environmental pollution themes on 80 junior high school students, they obtained an average of 8.65%. Modules that are specifically based on scientific literacy and also have not yet integrated religious values, that are expected to guide students in obtaining science concepts and as provisions for students to increase faith in God, are not yet available.

The purpose of national education is to develop students' potentials to become a noble character who has faith and piety, following the competencies that must be achieved in learning based on the 2013 curriculum, which are the cognitive (knowledge), affective (attitude) and

psychomotor (skills) domains. Students are not only required to master knowledge but are also expected to be human beings who have noble, religious, and good social attitudes (Mulyono et al., 2017). This is in line with the strengthening of character education that is being intensively programmed by the government. One of them is character education by integrating religious values into the learning process. Religious values (spiritual attitudes) form the basis for the formation of other character values. If the students' religious grades are good, then the other character's values will be good too, so that they can form the personalities of students who have moral values. Obstacles encountered in the field to integrate religious values are the lack of teacher competence, and the limited learning resources, facilities, and infrastructure in schools. For Muslim students, the Qur'an becomes the main foundation in studying to form character. In addition to good character, students are also required to master science as a skill in the 21st century.

Improving student knowledge can be formed through learning that exercises the scientific literacy ability, while the formation of spiritual character is built by integrating religious values in learning activities in schools both in terms of teaching materials and learning processes so that students can apply them in their lives. The formation of a student's spiritual character can also be done by using an approach that integrates the Qur'an, Science, and character in learning (Winarto et al, 2018). The integration of religious values can be done through knowledge and understanding, and their application in everyday life (Miharja, 2015). Scientific truth in science that is integrated with the truth of revelation will produce a very accurate truth (Adawiyah, 2016). Scientific and spiritual qualities can be formed by the use of teaching materials that unite science literacy with religious values.

An analysis of the junior high school science teaching materials that have been published has been carried out, for example by Rusilowati (2014), Amalia (2017), and Ardianto and Pursitasari (2017). The results of the study indicate that the published teaching material includes the four aspects of scientific literacy, but the teaching material does not yet contain a balanced component of scientific literacy. Teaching material profiles analyzed are still focused on scientific knowledge, that is teaching materials that present facts, concepts, principles, laws, hypotheses, theories, models and questions that ask students to remember knowledge or information but contain a little investigation of the nature of science, science as a way of thinking and interacting with science, technology, and society. The same thing was also found by Sari (2015), the teaching material that was more emphasized aspects of scientific content, while aspects of the context and aspects of scientific competence were still lacking. Teaching material that does not yet contain a balanced component of scientific literacy has led to poor training of students' scientific literacy so the results of tests using low scientific literacy questions. Students learn more by recalling knowledge and information and rarely do lab work.

Teaching material that can support the learning process and oriented to scientific literacy is needed because students have the potential to have readings in which there is scientific information supported by data, facts, scientific phenomena in the environment, so students have new experiences during learning. One of the teaching materials that can help students understand a subject matter is a module. Modules are learning tools that are made systematically to help students understand the material and achieve basic competencies (Ali, 2015; Latifah, 2015). While according to Prastowo (2014), a

Module is a book written with the aim that students learn independently without or with the guidance of a teacher, so modules are teaching materials specifically designed as a medium for independent learning or with the help of teachers for students to achieve certain basic competencies, learning by using modules can be used to train students according to their abilities and interests.

The energy module in this life contains scientific literacy, which includes: (1) science as knowledge, teaching material in this category explains facts, theories, laws, concepts, and models that require students to recall knowledge and information, (2) Science as a process of inquiry, this category reflects aspects of student activities such as observing, measuring, classifying, drawing conclusions, taking data, making calculations, experimenting and so on, (3) Science as a way of thinking, this category tells a scientist how his struggle to find a theory and a phenomenon that requires students to think, 4) The interaction between science, technology, and society. Teaching material on this aspect explains applications related to energy in living systems with their benefits and negative impacts.

Science literacy is human activity in making decisions to make changes to nature by using scientific knowledge (PISA, 2003), while scientific literacy, according to PISA (2015) is a person's ability to engage with issues related to science and the reflection of science as citizens country. Individuals who have the ability of scientific literacy are individuals who can overcome problems by using scientific knowledge. The development of scientific literacy can be built by developing literacy by reading, writing, and discussing (Setyaningrum, 2014; Tomas & Ritchie, 2014; Pelger & Nilsson, 2015). Van Zee, et al. (2013); Wibowo (2018); Allison & Goldston (2018); Sudjito, et al (2018) also revealed that literacy could also be developed through aspects of learning containing scientific literacy.

Based on the results of PISA 2018, the scientific literacy ability of Indonesian students ranks 74th out of 79 countries, aka sixth from the bottom. In the science category, Indonesia received a score of 396, far below the average OECD score of 489. One of the factors causing the low scientific literacy of students in Indonesia is unbalanced teaching materials contain a component of scientific literacy. Teaching materials that contain a balanced proportion of scientific literacy are 42% for the science knowledge category, 19% for scientific inquiry, 19% for the scientific category as a way of thinking, and 20% for interaction between science, technology, and society (Wilkinson, 1999). To increase scientific literacy, students need teaching materials that contain scientific literacy in a balanced way.

Analysis of various articles that have been published in various journals on science modules based on the integration of Islam and science has also been carried out by Faizah & Mubin (2018), Latifah (2016), and Anggraini (2018), the results of the study found that the use of modules ineffective learning improves student learning outcomes. Research on teaching materials containing scientific literacy was also conducted by Safitri et al. (2015), and Rostikawati and Permanasari (2016), that found that teaching materials can increase students' scientific literacy Integrated science teaching materials developed by Firmansyah (2014) and Puspaningtyas (2015) can also increase student scientific literacy. Integrated science pocketbooks containing scientific literacy developed by Pangestu (2013) are also effective in improving student learning outcomes.

Several studies have developed teaching materials based on scientific literacy and integrating religious values shows effectiveness against scientific literacy and learning outcomes, as well as

student religious values. This reinforces the importance of developing energy modules in living systems to internalize religious values, especially for use in Islamic-based schools. The compilation of modules that integrate the Qur'an and hadith is under the objectives of national education to form smart and noble students.

This study aims to determine the energy module specifications in living systems integrating religious values and scientific literacy of students. This module is compiled based on scientific literacy according to categories according to Chiappetta, namely (a) Aspects of science as knowledge, which contains a description of concepts, theories, and facts, (b) Aspects of science as a process of investigation, which contains the activities of conducting experiments of a material, (c) aspects of science as a way of thinking, contains about the figures of science find a theory and phenomenon that invites to think and (d) aspects of the interaction of science, technology, and society, contains the application of technology from the material about the benefits and negative impacts in everyday life. Each learning activity in the module contains all four aspects of scientific literacy that are integrated with Al-Qur'an verses and hadith relating to sub material. The limitation of this study measures the scientific literacy competence of students before and after using modules. Competencies used based on PISA 2015 are (1) Explaining the phenomena of science, (2) Evaluating and designing investigations, (3) Interpreting data and scientific evidence.

METHODS

The research method used was quasi-experimental, which refers to Sugiyono (2012). Quasi-experimental research is used to determine whether there is an effect of the treatment imposed on the subject under study. The design used is one group pretest and posttest design. The effect of the treatment can be seen from the difference in the results of the pretest (before treatment is given) and posttest results (after treatment is given). The target of the study consisted of 40 seventh grade students in a public junior high school in Bogor district.

Student scientific literacy is assessed using multiple-choice science literacy questions. The scientific literacy test instrument is 25 multiple-choice items consisting of 12 questions with indicators of the ability to explain scientific phenomena, six questions with indicators of ability to evaluate and design scientific investigations, and seven questions with indicators of ability to interpret data and scientific evidence. Questions are made based on material from each learning activity in the module.

Student answers were analyzed using the percentage technique per literacy competency (Purwanto, 2009). The percentage of scientific literacy competencies is categorized according to Table 1.

Table 1. Percentage of students' scientific literacy categories

Percentage	Category
86-100%	Very good
76-85%	Good
60-75%	Average
55-59%	Poor
≤ 54%	Very poor

Analysis of module effectiveness uses normalized gain or gain score. The gain score is an analysis technique to determine the effect of using modules on students' scientific literacy. N-gain is obtained from the difference between the value of the pretest and posttest values. The results of the N-gain calculation are then interpreted into the three categories presented in table 2.

Table 2. N-Gain Value and its category (Sugiyono, 2009).

N-Gain	Category
d < 0,3	Low
0,3 ≤ d ≤ 0,7	Medium
d ≥ 0,7	High

Analysis of whether or not effective use of modules on student scientific literacy can be seen from the results of N-Gain calculations. The module's effectiveness is low, medium, or high according to the results of data analysis.

RESULTS AND DISCUSSIONS

Increased student scientific literacy can be seen from the difference in the results of the pretest and posttest. The pretest is carried out at the beginning of learning before using modules, then posttest after learning to use energy modules in living systems integrating religious values to be applied. The average values of pretest and posttest and N-gain are presented in Table 3.

Table 3. Average score of Pretest and Posttest

Number of Students	Average			Category
	Pretest	Posttest	N-gain	
50	30	61	0,45	Medium

The results of the analysis of scientific literacy pretest data on energy material in living systems with an average pretest value of 30. The initial knowledge students have before learning is low because students still do not understand the material in the test. After learning is carried out, students using the module based on scientific literacy integrated religious values are given posttest science literacy using the same problem. The results of data analysis obtained an average posttest value of 61 and N-gain score 0.45 in medium category. From these data an increase in the average value of the results of students' scientific literacy posttest. This is the same as the research of Firmansyah (2014), Safitri et al. (2015), Puspaningtyas (2015), Rostikawati and Permanasari (2016), who found that teaching materials with scientific literacy can improve students' learning outcomes.

The assessment of students' scientific literacy in this study is limited to three competencies, namely explaining scientific phenomena, evaluating and designing experiments, and interpreting data and scientific evidence. The acquisition of research data related to scientific literacy in each category was obtained by using the percentage per literacy competency technique from Purwanto (2009). This percentage is obtained by comparing the value obtained by each student with the maximum value and finding the average value of literacy ability achievement for each category.

Table 4. N-gain scores for the scientific literacy category

Scientific Literacy Category	Score Percentage		N-gain	Interpretation
	Pretest (%)	Posttest (%)		
Explaining scientific phenomena	34, 04	72,29	0,58	Medium
Evaluating and designing experiments	16,25	37,92	0,26	Low
Interpreting data and scientific evidence	30	62,14	0,46	Medium

Based on Table 4, the increase in scientific literacy in the category of "explaining scientific phenomena" has N-gain score 0,58 with a medium category. While the scientific literacy category "evaluating and designing experiments" gets N-gain score 0,26 with low category, and the category "interpreting data and scientific evidence" has N-gain score 0,46 with medium category. The results showed the highest category of scientific literacy was the category of "explaining scientific phenomena", this is following the results of a study from Tjalla (2008), while the

lowest category was "evaluating and designing experiments".

The ability of scientific literacy in the category of "explaining scientific phenomena" has N-gain score 0,58 with a medium category. This competency is highest compared to other scientific literacy competencies. Research finds students more easily understand scientific phenomena because they relate to their daily lives. This shows that learning science teaches more knowledge than practice, so students connect more knowledge gained to explain and interpret a phenomenon that is encountered. The results of the study are similar to the findings from Wulandari and Solihin (2016), the ability of junior high school students' scientific literacy on the indicator of "explaining scientific phenomena" is sufficient. This illustrates the ability of students to explain scientific phenomena is not classified as good criteria. Wahyuni et al, (2018), factors affecting the achievement of students' scientific literacy skills include a lack of student interest in reading and teaching materials that do not yet have scientific literacy.

The scientific literacy ability of the "evaluating and designing experiments" category has N-gain score 0,26 with low categories. This competency is the lowest compared to other scientific literacy competencies. The results of this study indicate that students rarely conduct experiments in studying science. So that students' abilities in designing and conducting experiments are low because learning is carried out more theory than practice. Following the results of the study of Dewi (2012), showing competence "planning scientific research" in the field of science students in the medium category. Another cause is that science teaching materials are currently still focused on knowledge and have not involved many students in experimental activities.

The achievement of literacy ability on the indicator "interpreting data and scientific evidence" has N-gain score 0,46. This shows the ability of students to interpret the data and scientific evidence contained in the scientific literacy test instrument used in this study is still lacking. In learning activities, students often have difficulty in interpreting data and scientific evidence and concluding. This competency can be trained with field trip learning such as the results of Dinata's research (2014), showing the results of a greater scientific literacy test.

The low score of students' scientific literacy is because students are not accustomed to the problems of scientific literacy that have a lot of stories so that it requires sufficient time to understand the questions. According to Anggraini (2014), what causes the low mastery of science literacy is students are not accustomed to working on problems that use discourse. The literacy ability of students is also influenced by the classroom environment, family support, and the ability or readiness of students to receive learning (Khoiruddin et al., 2017). Scientific attitudes, school curricula, and student backgrounds also influence students' scientific literacy abilities (Ainina, 2016). The use of teaching materials in learning activities is included in the school curriculum.

From the results of the study, the ability of scientific literacy from the pretest has increased after the posttest. The use of energy modules in living systems integrating religious values effectively increases student scientific literacy in the medium category. Following the results of research from Safitri et al. (2015), Budiningsih et al. (2015), A. D. Paramita and A. Rusilowati (2016), and Cristina and Rusilowati (2016), it is found that students who use teaching materials based on scientific literacy experience increased scientific literacy skills. This is also relevant to the research of Firmansyah (2014) which develops integrated science teaching materials that can improve students' scientific literacy skills. Based on

the results of this study, students' scientific literacy skills can be improved by using scientific literacy-based modules that internalize religious values.

CONCLUSIONS

Based on the results of the study, it can be concluded that students' scientific literacy has increased with N-gain score 0.45 in medium category. The scientific literacy competencies of students in this study sequentially from the highest are "explaining scientific phenomena" with N-gain score 0,58, then "interpreting data and scientific evidence" with N-gain score 0,46 and "evaluating and designing experiments" with N-gain score 0,26. The existence of energy modules in living systems based on scientific literacy with science as knowledge, science as a way to investigate, science as a way of thinking and interacting with science, technology and society that integrate religious values is urgently needed to train students' scientific literacy.

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REFERENCES

Adawiyah, R., & Wiisudawati, A. W. (2017). Pengembangan Instrumen Tes Berbasis Literasi Sains : Menilai Pemahaman Fenomena Ilmiah Mengenai Energi. *Indonesian Journal of Curriculum*, *5*(2), 112–121.

Ainina, V.Q.2016.Hubungan antara Rasa Ingin Tahu Biologi dengan Kemampuan Literasi Sains.(Skripsi) Semarang: Jurusan Pendidikan Universitas Negeri Semarang.

Ali, M., Sunarno, W. & S. (2015). Pengembangan Modul IPA Berbasis Karakter Islami Melalui Pendekatan Santifik Pada Tema Rotasi dan Revolusi Bumi Sebagai Implementasi Kurikulum 2013. *JURNAL INKUIRI*, *4*(2), 57–67.

Allison, E. & Goldston, M.J. (2018). Modern Scientific Literacy : A Case Study of Multiliteracies and Scientific Practices in a Fifth Grade Classroom. *Journal of Science Education and Technology*, 270-28.

Andriani, N. &, & Ismet. (2017). Analisis Kategori Literasi Sains Untuk Konten Fisik Pada Buku. *Prosiding Seminar*, Nasional Pendidikan IPA.Palembang: (53), 664–672.

Andriani, N., Saparini, & Akhsan, H. (2018). Kemampuan Literasi Sains Fisika Siswa SMP Kelas VII Di Sumatera Selatan Menggunakan Kerangka PISA (Program for International Student Assesment). *Berkala Ilmiah Pendidikan Fisika*, *6*(3), 278–291. https://doi.org/10.20527/bipf.v6i3.5288

Anggraini, Gustia. 2014. Analisis Kemampuan Literasi Sains Siswa SMA Kelas X di Kota Solok. *Prosiding Mathematics and Sciences Forum*. Bandung. p. 161-170 http://e-journal.ikip veteran.ac.id/index.php/jipva

Anjarsari, P. (2014). Literasi Sains Dalam Kurikulu da Pembelajaran IPA SMP. *Prosiding Semnas Pensa VI "Peran Literasi Sains"*, Surabaya: 602–607..

Asyhari, A. (2017). Literasi Sains Berbasis Nilai-nilai Islam Dan Budaya Indonesia. *Jurnal Ilmiah Pendidikan Fisika Al-BiRuNi*, *06*(April), 137–148. https://doi.org/10.24042/jpifalbiruni.v6i1.1584

Budiningsih, T.Y., Rusilowati, A., & Marwoto, P. (2015). Pengembangan Buku Ajar IPA Terpadu Berorientasi Literasi Sains Materi Energi dan Suhu. *Journal of Innovative Science Education*, *4*(2), 34–40.

Chiappetta, E.L., D.A Fillman, & G.H. Sethna. 1991. *A Method to Quantify Major Themes of Scientific Literacy in Science Textbooks*. Journal Of Research In Science Teaching, 28(8): 713-725.

Cristina, A., & , Rusilowati A, & S. (2016). Pengembangan Bahan ajar IPA Terpadu Berbasis Literasi Sains Bertema Aplikasi Konsep Energi Dalam Kehidupan. *Unnes Physics Education Journal Http://Journal.Unnes.Ac.Id/Sju/Index. Php/Upej*, *5*(1).

Dewi, NR.(2012).*Kompetensi Mahasiswa IPA dalam Merencanakan Penelitian Ilmiah Bidang Sains. Journal.unnes.ac.id*

Dinata, AN., Yusuf, HA. & Amprasto. (2018).*Pengaruh Field Trip Terhadap Kemampuan Literasi Sains dan Sikap Sains Siswa SMA Pada Materi Ekosistem.* Indonesian Journal of Biology Education, 1(1): 8-13.

Faizah, S.N. & Mubin, M.2018.Pengaruh Modul Tematik Berbasis Integrasi Islam dan Sains Pada Tema Energi dan Perubahannya Terhadap Hasil Belajar Siswa MI Murni Sunan Drajat Lamongan. Jurnal Penelitian Pendidikan IPA, 3 (2)

Fatkhurrohman, M.A. & Astuti, R. K. (2017). Pengembangan Modul Fisika Dasar I Berbasis Literasi Sains. *Pancasakti Science Education Journal*, *2*, 163–171.

Firmansyah, E.(2014).*Rekonstruksi Bahan Ajar IPA Terpadu pada Tema Lemari Pendingin Berbasis Literasi Sains*.(Tesis).Bandung: Universitas Pendidikan Indonesia.

Fu'adah, H., Rusilowati, A. & H. (2017). Pengembangan Alat Evaluasi Literasi Sains untuk Mengukur Kemampuan Literasi Sains Siswa Bertema Perpindahan Kalor dalam Kehidupan. *Lembaran Ilmu Kependidikan*, *46*(September), 51–59.

Latifah, Sri.(2015).Pengembangan Modul IPA Terpadu Terintegrasi Ayat-ayat Al-Qur'an Pada Materi Air Sebagai Sumber Kehidupan.*Jurnal Ilmiah Pendidikan Fisika Al-BiRuNi.*

Maturradiyah, N. & Rusilowati, A. (2015). Analisis Buku Ajar Fisika Kelas XII di Kabupaten Pati Berdasarkan Muatan Sains Literasi. *Unnes Physics Education Journal*, *4*(1).

Miharja, F. J. (2016). Literasi Islam & Literasi Sains Sebagai Penjamin Mutu Kualitas manusia Indonesia di Era Globalisasi. *Prosiding Seminar Nasional II Tahun*, 1010–1018. Malang: Universitas Muhammadiyah.

Mulyono,Y.et.al.(2017).Implementasi Kurikulum 2013 Mata Pelajaran Biologi Terintegrasi Keislaman Di Madrasah Aliyah (MA): Model Evaluasi CIPPO. *Jurnal Transformatif (Islamic Studies)* 1 (2)

Nawawi, S. & Wijayanti, T. (2018). Pengembangan asesmen biologi berbasis keterampilan berpikir kritis terintegrasi nilai Islam Development of biological assessment based critical thinking skills integrated with Islamic Values. *Jurnal Inovasi Pendidikan IPA*, *4*(2), 136–148.

Paramita, A. D., Rusilowati, A., & Sugianto. (2016). Pengembangan Bahan Ajar Berbasis Literasi Sains Materi Suhu dan Kalor. Skripsi. Semarang: Universitas Negeri Semarang, *500*, 58–67.

Pelger, S. & Nilsson, P.(2015). Popular Science Writing to Support Students ' Learning of Science and Scientific Literacy. *Res Sci Educ*.

Permatasari, P. & Fitriza, Z. (2019). Analisis literasi sains siswa madrasah aliyah pada aspek konten , konteks , dan kompetensi materi larutan penyangga. *EKJ Edukimia*, *1*(1), 53–59.

Perwitasari, T., Sudarmin, & Linuwih, S. (2016). Peningkatan Literasi Sains Melalui Pembelajaran Energi dan Perubahannya Bermuatan Etnosains Pada Pengasapan Ikan. *Jurnal Penelitian Pendidikan IPA*, *1*(2), 62–70.

Puspaningtyas, A.A., Rusilowati, A., & Nugroho, S.E. (2015). Pengembangan Bahan Ajar IPA Terpadu Berbasis Literasi Sains Bertema Perubahan Zat Di Lingkungan. Skripsi.Semarang: Universitas Negeri Semarang.

Rohmiatun, N., Prasetyo, A.P.B., & Pribadi, T. . (2017). Pengembangan Buku Saku Bernuansa Islami Materi SIstem Reproduksi Manusia. *Journal of Biology Education*, *6*(1), 31–37.

Rostikawati, D. A. &, & Permanasari, A. (2016). Rekonstruksi Bahan Ajar dengan Konteks Socio-Scientific Issues pada Materi Zat Aditif Makanan untuk Meningkatkan Literasi Sains Siswa. *Jurnal Inovasi Pendidikan IPA*, *2*(2), 156–164.

Rubini,B., Ardianto,D., Pursitasari, I.D. & Permana,I.2016.Identify Scientific Literacy From Yhe Science Teachers' Perspective.Jurnal Pendidikan IPA Indonesia 5 (2) (2016) 299-303

Safitri,A.D., Rusilowati, A. & Sunarno.2015.Pengembangan Bahan Ajar IPA Terpadu Berbasis Literasi Sains Bertema Gejala Alam. Unnes Physics Education Journal, 4(2)

Salamah, P. N., Rusilowati, A. & S. (2017). Pengembangan Alat Evaluasi Materi Tata Surya untuk Mengukur Kemampuan. *Unnes Physics Education*, *6*(3).

Sari, D. L., Rusilowati, A., & Linuwih, S. (2015). Pengembangan Bahan Ajar IPA Terpadu Berbasis Literasi Sains Bertema Perpindahan Kalor Dalam Kehidupan. *Unnes Physics Education Journal*, *4*(3).

Sarkar, M. & Corrigan, D. (2014). Bangladeshi science teachers ' perspectives of scientific literacy and teaching practices. *International Journal of Science and Mathematics Education*, 1117-1141.

Satria, A.A., A.M, Juhri. & Achayani. (2017). Pengembangan Modul Biologi Berbasis Saintifik. *Jurnal Lentera Pendidikan Pusat Penelitian LPPM UM METRO, 2*(2), 153–163.

Sholihah, N. dan Kartika,I.(2018). Pengembangan Modul IPA Terintegrasi dengan Ayat Al-Qur'an dan Hadits. Lentera Pendidikan , 21 (1): 12-22

Sudjito, D. N., Natalia, R. K., & Hastuti, S. P. (2018). Integrated Science Kearning Using Scientific Approach In Junior High Schools in Semarang Regency. *Indonesian Journal of Science and Education*, *2*(April), 69–74.

Tjalla, Awaluddin. 2010. *Potret Mutu Pendidikan Indonesia Ditinjau dari Hasil-hasilStudi Internasional.* http://repository.ut.ac.id/2609/1/fkip201047.pdf

Tomas, L. & Ritchie, S.M (2014). The Challenge of Evaluating Students ' Scientific Literacy in a Writing-to-Learn Context. *Res Sci Educ*.

Van Zee, E. H.et al. (2013). Integrating Physics and Literacy Learning in a Physics Course for Prospective Elementary and Middle School Teachers. *J Sci Teacher Educ*, 665-691

Wahyuni, S., Miarsyah, M., & Adisyahputra. (2018). Correlation between Achievement Motivation and Reading Comprehension Ability through Science Literacy to High School Studen. *Indonesian Journal of Science and Education*, *2*(2), 115–124. https://doi.org/10.31002/ijose.v2i2.613

Wibowo, A. & Cholifah, T. N. (2018). Pengembangan Instrumen Tes Tematik Terpadu Kurikulum 2013 Berbasis PISA'S Literacy Di Sekolah Dasar. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *2*, 209–221. https://doi.org/10.31331/jipva.v2i2.726

Wilkinson, J. (1999). *A Quantitative Analysis of Physics for Scientific Literacy Themes*. Research in Science Education, 29 (3): 385-399.

Winarto. Zahro, U.C. & Ardiyansyah, A. (2018). Pengembangan Perangkat Pembelajaran Berbasis Model Belajar Siswa Aktif dengan Pendekatan Al-Qur'an, Sains dan Karakter (ALSAK) Bagi Siswa Sekolah Dasar. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *2*(1), 5–6.

Winarto. (2018). Designing Basic Concept Materials by Using Alqur'an, Sains, Character (ALSAL) Approach For Student Of Elementary School Teachers Education Study Program As A Character Building Media In Higher Education. *Indonesian Journal of Science and Education*, *2*(April), 81–88. https://doi.org/10.31002/ijose.v2i1.721

Wulandari, N., & Sholihin, H. (2016). Analisis Kemampuan Literasi Sain Pada Aspek Pengetahuan dan Kompetensi Sains Siswa SMP Pada Materi Kalor. *EDUSAINS*, *8*(1), 66–73.