23 (3), 2022, 1295-1307

Jurnal Pendidikan MIPA

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

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

Analysis of Science Literacy-Based High School Physics Textbooks using Weight Product Methods

Novi Ayu Kristiana Dewi*, Novita Andriani, & Vincencius Bellin Atmaja

Department of Information System, Institut Bakti Nusantara, Indonesia

Abstract: This study aims to determine the best science literacy-based physics textbook. This research is a descriptive study with data analysis techniques using the weight product method as a decision support system. The research sample comprised eleven high school physics textbooks for class X in Lampung Province. Methods of collecting data through observation, interviews, documentation, and questionnaires. Based on the research, the selection of the best science literacy-based physics textbook is made using the weight product method with the following steps: determining the criteria, making a suitability rating between alternatives and criteria, determining the weight of each criterion and its normalization, calculating the S value as an alternative preference, calculating the V value as a final alternative preference for ranking. Based on the final calculation results, the best alternative high school physics textbook based on science literacy was obtained with a value of V = 0.1070, namely B11.

Keywords: textbook, scientific literacy, weight product method, decision support.

Abstrak: *Penelitian ini bertujuan untuk mengetahui cara menentukan buku teks pelajaran fisika berbasis literasi sains terbaik. Penelitian ini merupakan penelitian deskriptif dengan teknik analisis data menggunakan metode weight product sebagai sistem pendukung keputusan. Sampel penelitian terdiri dari sebelas buku teks fisika SMA kelas X di Provinsi Lampung. Metode pengumpulan data melalui observasi, wawancara, dokumentasi, dan angket. Berdasarkan penelitian, pemilihan buku teks fisika berbasis literasi sains terbaik dilakukan dengan metode weight product dengan langkah-langkah: menentukan kriteria, membuat rating kecocokan antara alternatif dan kriteria, menentukan bobot setiap kriteria dan normalisasi bobot, menghitung nilai S sebagai preferensi alternatif, serta menghitung nilai V sebagai preferensi alternatif terakhir untuk perangkingan. Berdasarkan hasil perhitungan akhir diperoleh alternatif buku teks fisika SMA berbasis literasi sains terbaik dengan nilai V= 0.1070 yaitu B11.*

Kata kunci: *buku teks pelajaran, literasi sains, metode weight product, pendukung keputusan.*

▪ INTRODUCTION

Physics is one of the subjects in high school which is included in the science group or known as natural science. Physics learning aims to equip students to have knowledge, understanding, and ability in developing science and technology. Good physics learning is based on the nature of physics, namely the need for mastery of physics processes and products by students. The products of physics are the theories, principles, and laws of physics. Meanwhile, the process is how the product is found or obtained and then applied in everyday life (Wardhany, 2014). Because physics is part of science, and science is the product of scientific knowledge, so the methods, processes, principles, attitudes and others must also be scientific. Therefore, learning physics in schools must be carried out with a scientific approach (scientific approach) to be more

Novi Ayu Kristiana Dewi
*Email: noviayudi@gmail.com

DOI: http://dx.doi.org/10.23960/jpmipa/v23i3.1296-1307
Received: 04 September 2022
Accepted: 15 October 2022
Published: 19 October 2022

meaningful and able to form attitudes or characters for students (Sumiati, Septian, & Faizah, 2018).

Physics cannot be separated from a systematic scientific approach (Limatahu & Prahani, 2018). The learning process with a scientific approach is designed so that students actively construct concepts, laws or principles through stages such as observing, formulating problems, proposing hypotheses, collecting data, analyzing data, drawing conclusions and communicating (Wuri, 2014). Furthermore, in the current curriculum, the revised 2013 curriculum, there are three things that must be achieved in learning, namely character, competence, and literacy (Khoiriah & Kholiq, 2020). Scientific literacy skills for students are fundamental things that must be possessed in order to face the global era of the 21st century in meeting the needs of life and the ability to adapt to various situations (Kristyowati & Purwanto, 2019). Because to face the global era, students must have the main competencies in the form of learning and innovation skills, mastery of media and information, as well as life and career skills (Yuliyanti & Rusilowati, 2014). The results of research conducted by Usmeldi (2016) state that scientifically-based learning modules that are developed effectively can improve scientific literacy for students, so that scientific approaches can build positive attitudes towards science.

Therefore, to improve the quality of education in Indonesia so that the implementation of physics learning remains in accordance with its essence, appropriate learning resources are needed, one of which is a science literacy-based physics textbook. Textbooks or textbooks are mandatory reference books that contain a collection of teaching materials aimed at students at the level of certain educational units that are prepared based on national education standards and are equipped with learning support facilities so that they are easily understood by users (Kusuma, 2018). The material arranged in the textbook contains learning materials that aim to increase faith and piety, noble character and personality, mastery of science and technology, and increase sensitivity and aesthetic ability. Textbooks have a very important and strategic role to improve the quality of education because they affect the knowledge of students as readers. Therefore, textbooks must provide the benefits of scientific knowledge and experience as science is obtained.

However, because there are quite a number of physics textbooks circulating in the field, the teacher must be careful to choose which books are really appropriate to be used as learning resources for students. Analysis of learning resources in the form of science literacy-based textbooks has been carried out by Nurdini, Sari, & Suryana (2018) with the result that all of the three high school physics textbooks used in high schools in Bandung City have the most dominant aspect only emphasizing the sub-aspect of presenting facts, concepts, principles, and laws so that it only requires students to memorize without thinking, experimenting, or investigating activities. In this study, the determination of the best scientific literacy-based book was determined based on the highest average score obtained from several aspects of scientific literacy. Therefore, a good analysis is needed to determine it, one of which is using the help of a decision support system.

Decision Support System is a specific information system that is used to assist management in making decisions related to semi-structured issues (Utomo, Cahyono, & Tristono, 2019). This system has the facility to generate various alternatives that are

interactively used by users (Mauliana, Wiguna, & Widyaman, 2018). One of the methods used in the decision-making system is the weight product. The weight product method is one of the multi-cretia decision making (MCDM) methods that is used as a decision-making technique from several available alternative choices (Yunita, Susanti, & Rizky, 2020). The product weight method uses a multiplication technique to connect attribute ratings, and the rating of each attribute must be raised to the first power with the weight of the attribute in question (Mateo, 2012). The weight for the "benefit" attribute functions as a positive power while the "cost" weight functions as a negative power. The multiplication result is not meaningful if it has not been compared (divided) with the standard value (Ponidi, Renaldo, & Mukodimah, 2021). From the final results of these calculations can be used as an alternative to the most appropriate choice. The use of the weight product method has been carried out by Putra, Borman, & Arifin (2022) to determine the best teacher performance. Furthermore, it was also used by Ahsan & Indawati (2019) to determine multiple intelligences in children.

The weight product method is an application of computer science that has never been applied in research to select quality physics learning books. So in this study the weight product method will be used to solve this problem. The focus of this research is to analyze the selection of physics textbooks for class X high school students based on scientific literacy. The formulation of the problem in this study are: 1) How to choose a physics textbook for class X SMA based on scientific literacy using the weight product method? 2) Which book is the best alternative so that it can be recommended as a physics textbook?. The results of this study are expected to be an alternative for schools, teachers, or students in choosing high quality high school physics textbooks based on scientific literacy and in accordance with the nature of physics learning. Thus it can improve the quality of education, especially in learning physics in high school.

▪ METHOD

This research is a descriptive study with data analysis techniques using the weight product method. The research was conducted in 2022 with a sample of physics textbooks for class X high school students in Lampung Province, either in schools or at bookstores. This research started from problem identification through observation and literature study, making research instrument, data collection, and data analysis using the weight product method.

Data collection techniques consist of observation, interviews, documentation, and questionnaires. Observation is used to make observations on textbooks for physics class X SMA in Lampung Province, either in schools or bookstores in Lampung Province. The interview was aimed at physics subject teachers and students to find out about physics textbooks for class X high school which are used as learning resources in senior high schools in Lampung Province. Documentation was used to take a sample of physics textbooks for class X high school. Meanwhile, the questionnaire in this study was a closed questionnaire with a checklist that was used to evaluate physics textbooks based on the completeness of the criteria adopted from aspects of scientific literacy according to Chiappetta (cited in Budiningsih , Rusilowati, & Marwoto, 2015) as presented in table 1.

Table 1. Literacy science indicators

No	Scientific Aspects	Indicators
1.	The knowledge of science	- Presents just one of the facts, concepts, principles, and laws. - Present two or more of facts, concepts, principles, and laws. - Presenting hypotheses, theories, and models. - Ask students to present facts and hypotheses. - Ask students to remember knowledge or information.
2.	The investigative of science	- Presents just one of the facts, concepts, principles, and laws. - Present two or more of facts, concepts, principles, and laws. - Presenting hypotheses, theories, and models. - Ask students to present facts and hypotheses. - Ask students to remember knowledge or information.
3.	Science as a way of thinking	- Describe how science experiment. - Shows the history of the development of ideas. - Demonstrate the empirical nature and objectivity of science. - Provide a cause-effect relationship. - Presenting the scientific method and problem solving.
4.	Interaction of science, technology, and society	- Describe the usefulness of science and technology for social life. - Emphasizes the negative effects of science and technology on social life. - Discuss social issues related to science and technology. - Mention various careers in science and technology. - Concluding with your own thoughts or utilizing or applying the acquisition of knowledge in life.

Data analysis was carried out using the product, namely the multiplication concept to connect the attribute ratings that must be raised first with the relevant weights (Khairina, Asrian, & Hatta, 2016). The steps in the weight product method are as follows: determining the criteria first, determining the suitability rating between the criteria and alternatives, determining the weight of each criterion and normalizing the weights with equation 2, calculating S as an alternative preference with equation 3, calculating the value of V as an alternative preference with equation 4 which is then

used as a ranking determinant of each alternative.

$W_j = \frac{W_j}{\sum W_j}$ ... (1)

Notes:

W_j : attribute weight

$\sum W_j$: sum of attribute weight

$S_i = \prod_{j=i}^{n} X_{ij}^{W_j}$ ... (2)

Notes:

S_i : normalization result of decision on alternative i

X_{ij} : rating alternative per attribute

W_j : attribute weight

i : alternative

j : attribute

n : number of criteria

$Vi = \frac{Si}{S1+S2+\cdots}$ ... (3)

Notes:

Vi : preference alternative i

▪ RESULT AND DISSCUSSION

Based on the findings in the field regarding the use of physics textbooks for class X SMA in Lampung Province, there are 11 books that used in high schools or in the center of book sales as an alternative. The data is presented in table 2 below:

Table 2. Alternative physics textbooks for tenth-grade of high school

No.	Authorship	Publisher
B1	Tim Masmadia Buana Pustaka	Masmedia
B2	Ni Ketut Lasmi	Erlangga
B3	Bambang Ruwanto	Yudishtira
B4	Ketut Kamajaya & Wawan Purnama	Gravindo
B5	Sunardi et al.	Yrama Widya
B6	Hari Subagya & Insih Wilujeng	Bumi Aksara
B7	Muhammad Farchani Rosyid et al.	PT Tiga Serangkai Pustaka Mandiri
B8	Muhammad Farchani Rosyid et al.	Platinum
B9	Yuni Supriyati 7 Zaenuri Siroj	Andi Yogyakarta
B10	Aris Prasetyo Nugroho et al.	Mediatama
B11	Marthen Kanginan	Erlangga

The eleven types of high school physics textbooks above are editions of the revised 2013 curriculum. The first step in using the weight product method is determining the criteria (Bachriwindi, Putra, Munawaroh, & Almais, 2019). The criteria selected are aspects of scientific literacy, including: knowledge of science as the first criterion (C1), investigation of the nature of science as the second criterion (C2), science as a way of thinking as the third criterion (C3), and the interaction of science, technology and society. as the fourth criterion (C4).

Physics textbooks for class X high school in this study were assessed based on the completeness of aspects of scientific literacy which focused on one topic of discussion "Newton's Laws of Motion" with the assumption that the book has consistency in writing in each chapter so there is no need to correct all of them. The results of the

assessment of the completeness of the scientific literacy aspect are used as a rating of the suitability of each criterion which is presented in table 3 below.

Table 3. Criteria match rating

Alternative	Points for each criteria				Total
	C1	C2	C3	C4	
B1	2	4	2	1	9
B2	4	4	2	1	11
B3	3	5	3	2	13
B4	4	4	3	2	13
B5	3	5	3	2	13
B6	4	4	3	1	12
B7	4	4	5	1	14
B8	4	4	5	1	14
B9	5	4	3	1	13
B10	2	5	4	2	13
B11	3	4	5	2	14

The weighting of each criterion is as follows: C1 is given a weight of 3 with the attribute being benefit, C2 is given 5 with the attribute being benefit, C3 being given a weighting 4 with the attribute benefit, and C4 being given a weighting 5 with the attribute benefit. The four criteria have the same attribute of benefit because each criterion provides benefits which will later give a positive rank. However, if there are criteria that are the opposite or do not provide benefits, then the attribute is cost which will give a negative rank.

The weighting of each criterion is based on the following considerations: C1 is given the smallest point, namely 3 because basically every textbook does provide knowledge, and the most common facts found in the field are that students are required to memorize more than conduct investigations or think critically. (Nur'aini, Rahardjo, & Vh, 2017). C2 is given 5 points because science learning should prioritize the investigation of the nature of science, such as involving students in experimental activities, giving students the opportunity to answer questions, the ability to calculate, use tables or graphs to answer questions, and be able to give reasons not just memorizing the answers given. given. According to Etherington (2011) that scientific investigation can be done through problem-based learning. Thus the nature of science as a product, process, and scientific attitude can be mastered well by students. C4 is given 4 points because it is more important than C1. In the C4 aspect there are indicators of science process skills which are one of the important aspects of physics (Kruea-In & Thongperm, 2014). Science process skills are used by scientists to build knowledge, find problems, and make conclusions (Aydın, 2013). While C5 is given 5 points because not all books explain the benefits, negative impacts, social issues, and careers related to science and technology being discussed. This is an important point that can motivate students to be interested in learning by knowing the impact and benefits in life. A good physics textbook is one that can connect science with the daily lives of students and how science, technology, and society are interconnected (Jannah, Suyana, & Novia, 2019). Scientific literacy is very important to teach students to be able to live in the midst of modern society in the 21st century through optimizing socio-scientific issues

(Dewi & Rahayu, 2022). This is in line with the opinion of Ke, Sadler, Zangori, & Friedrichsen (2021) that socio-scientific issues can encourage scientific literacy because they relate science to everyday life and society so as to provide students with knowledge and skills to deal with complex problems. This shows that it is important to build scientifically literate humans to be able to understand the relationship between science, technology, and society and be able to use their knowledge in decision making in everyday life (Ersay, 2015). Based on the value for each of these criteria, the normalized weighting of each criterion is obtained as presented in table 4.

Table 4. Results of the weighting normalization

Improvement Criteria Weighting	Nilai W	Normalized W Value
W1	0.18	0.18
W2	0.29	0.29
W3	0.24	0.24
W4	0.29	0.29
Total	1	-

Normalized W value is the actual weight value on each criterion, namely the rating of each attribute must be raised first with the appropriate weight (Taufik et al., 2019). Based on table 4, the normalized W results are positive, because the attributes used in the criteria are in the form of benefit or profit attributes, if the attribute is a cost attribute which means the opposite of profit then it is negative (Divayana, Adiarta, & Abadi, 2018). After the weight value is normalized, the next step is to determine the value of S as a preference value by multiplying all criteria on each alternative and the weight of each criterion as its rank. The results of the S calculation are then used to calculate the V value of each alternative by dividing the S value of each alternative by the total S value. The total value of V from all alternatives results in the number 1. Ranking against V is used to get the final decision in choosing the alternative as the recommended choice (Aldisa & Abdullah, 2022). The results of the S, V, and ranking calculations are presented in table 5 and the diagram in Figure 1 below.

Table 5. Calculation results of preferences and ranking

Alternative	S	V	Ranking
1	2.0000	0.0655	XI
2	2.2602	0.0740	X
3	3.0944	0.1014	III
4	3.0488	0.0999	X
5	3.0944	0.1014	IV
6	2.4865	0.0814	VII
7	2.8041	0.0918	VIII
8	2.8041	0.0918	IX
9	2.5864	0.0847	VI
10	3.0825	0.1010	II
11	3.2680	0.1070	I
Total	30.5292	1.0000	-

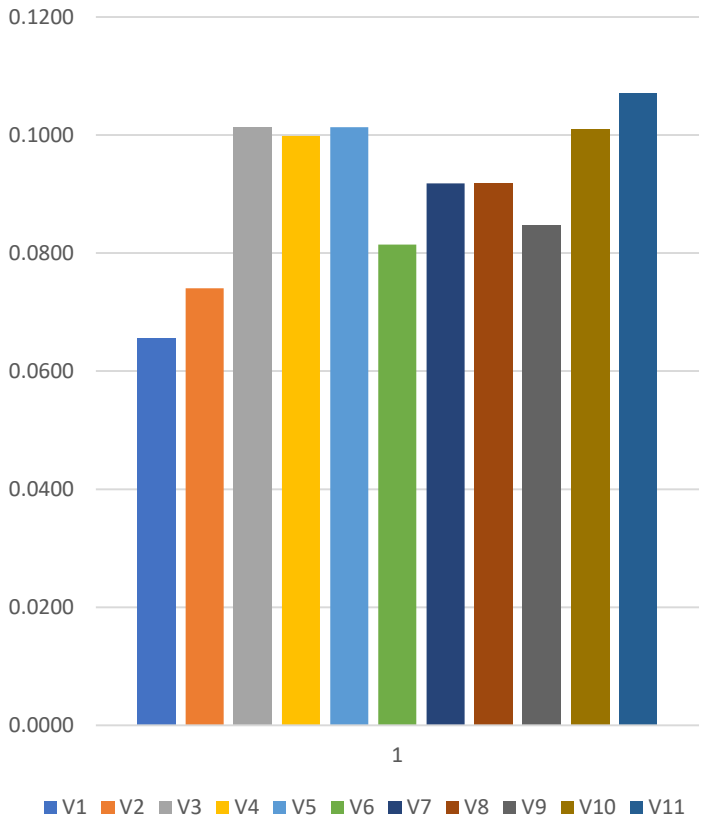

Figure 1. Diagram of decision result V

Based on table 5 and figure 1 above, it can be seen that the decision support system using the weight product method gives results that show the order of high school physics textbooks based on scientific literacy from the top to the top. lowest in Lampung Province. The top three rankings are respectively owned by alternative books B11, B10, and B3 and B5 which have the same score, with respective scores of 0.1070, 0.1010, and 0.1014 respectively. This means that the four books can be used as the best alternative choice for student learning resources.

The results showed that the best science literacy-based high school physics textbooks were books with code B11, namely the book by Marthen Kanginan published by Erlangga. The book contains aspects of scientific literacy that are more complete than other books. The advantages of this book include aspects of knowledge, namely when other books only present facts, concepts, and laws, the B11 book is equipped with prerequisite materials that provide opportunities for students to remember previous knowledge or information. On the aspect of science as a way of thinking, B11 presents these aspects in full. In the aspect of interaction between science, technology, and society, B11 emphasizes the negative effects of the science. Another advantage is the use of the weight product method which gives the satisfaction of being the best textbook. This can be seen when several other books also gave the same total score of 14, namely books B7, B8, and B11, but books B11 on important aspects had higher scores than B7 and B8. Because the aspects that are considered important are the assessment criteria with a greater weight, the decision support system will give the best

value to B11. As explained in the introduction, in previous studies to determine the best book selection, only the highest average score was used.

The result of the decision based on this research does not mean that the other books are not good, but that each book has its own strengths and weaknesses. One book excels in certain aspects, but is weak in other aspects. Because textbooks have a very important role for students in the science learning process, teachers must have the ability to be able to choose them well. So, if one of the learning objectives is to improve scientific literacy skills, the teacher can choose alternative B11 as a source of student learning. Scientific literacy is one of the skills needed in digital literacy. Where knowledge and understanding of scientific concepts and processes is required for personal decision making, participation in civic and cultural affairs, and economic productivity. Scientific literacy is important in our modern society because of many issues related to science and technology (Turiman, Omar, Daud, & Osman, 2012). According to Jufrida, Basuki, Kurniawan, Pangestu, & Fitaloka (2019) scientific literacy is an ability that students must have to analyze and apply scientific concepts in solving problems of everyday life. It was further explained that science ability had a significant influence on student achievement. That is, if students' scientific literacy is good, student achievement is also good, so that learning objectives can be achieved. Thus iteration of science is one of the main elements in national education systems around the world (Cakici, 2012). Scientific literacy involves individuals who develop a good understanding of scientific facts and processes of scientific inquiry, and an awareness of the relationship between science, technology, and society (Chabalengula, Mumba, Lorsbach, & Moore, 2008).

▪ CONCLUSION

Based on the results of the study, it can be concluded that the selection of the best science literacy-based physics textbooks can be done with a decision support system using the weight product method. The steps that must be taken: 1) determine the criteria to be assessed, namely aspects of scientific literacy, 2) determine the suitability rating obtained through a questionnaire in the form of an assessment of each alternative on each of the existing criteria, 3) assign weights to each criterion and perform normalization of weights so that the actual weight is obtained, 4) determine the value of S as a preference, 5) determine the value of V as the final decision-making preference, the V is the best alternative. Based on the results of calculations using the weight product method on 11 alternative book choices, the V is V11 of 0.1070, so that the best alternative is owned by B11 as the best science literacy-based physics textbook. The election of B11 as the best alternative is expected to be the right choice as a learning resource in learning. However, the use of B11 will only result in good learning if the use of the book is applied in accordance with the right steps, namely by following all the series of activities in the book, because aspects of scientific literacy are presented in these various series of activities.

▪ REFERENCES

Ahsan, M., & Indawati, N. (2019). Implementation weighted product method to determine multiple intelligence child. Journal of Physics: Conference Series, 1375(1), 12038. IOP Publishing.

Aldisa, R. T., & Abdullah, M. A. (2022). Application of the weight product method on a decision support system for the latest mobile recommendations. IJISTECH (International Journal of Information System and Technology), 5(6), 703–708.

Aydın, A. (2013). Representation of science process skills in the chemistry curricula for grades 10, 11 and 12/Turkey. International Journal of Education and Practice, 1(5), 51–63.

Bachriwindi, A., Putra, E. K., Munawaroh, U. M., & Almais, A. T. W. (2019). Implementation of web-based weighted product use decision support system to determine the post-disaster damage and loss. Journal of Physics: Conference Series, 1413(1), 12019. IOP Publishing.

Budiningsih, T. Y., Rusilowati, A., & Marwoto, P. (2015). Pengembangan buku ajar IPA terpadu berorientasi literasi sains materi energi dan suhu [Development of integrated science textbooks oriented towards energy and temperature science literacy]. DoubleClick: Journal of Innovative Science Education, 4(2).

Cakici, Y. (2012). Exploring Turkish upper primary level science textbooks' coverage of scientific literacy themes. Eurasian Journal of Educational Research, 49, 81–102.

Chabalengula, V. M., Mumba, F., Lorsbach, T., & Moore, C. (2008). Curriculum and instructional validity of the scientific literacy themes covered in zambian high school biology curriculum. International Journal of Environmental and Science Education, 3(4), 207–220.

Dewi, C. A., & Rahayu, S. (2022). Pentingnya Mengoptimalkan literasi kimia melalui pembelajaran berbasis isu-isu sosiosaintifik di abad ke-21 [The importance of optimizing chemical literacy through socio-scientific issues-based learning in the 21st century]. DoubleClick: Proceeding Seminar Nasional IPA, 348–359.

Divayana, D. G. H., Adiarta, A., & Abadi, I. (2018). Initial draft of CSE-UCLA evaluation model based on weighted product in order to optimize digital library services in computer college in Bali. IOP Conference Series: Materials Science and Engineering, 296(1), 12003. IOP Publishing.

Ersay, E. (2015). Investigating pre-service early childhood teachers' views on science technology and society issues in Turkey. Procedia-Social and Behavioral Sciences, 191, 1397–1402.

Etherington, M. B. (2011). Investigative primary science: A problem-based learning approach. Australian Journal of Teacher Education (Online), 36(9), 53–74.

Jannah, N., Suyana, I., & Novia, H. (2019). Analisis hakikat sains (nature of science) dalam buku teks fisika SMA kelas X di Kota Bandung [Analysis of the nature of science in physics textbooks for class X high school in Bandung]. DoubleClick: Seminar Nasional Fisika, 1(1), 160–166.

Jufrida, J., Basuki, F. R., Kurniawan, W., Pangestu, M. D., & Fitaloka, O. (2019). Scientific literacy and science learning achievement at junior high school. International Journal of Evaluation and Research in Education, 8(4), 630–636.

Ke, L., Sadler, T. D., Zangori, L., & Friedrichsen, P. J. (2021). Developing and using multiple models to promote scientific literacy in the context of socio-scientific issues. Science & Education, 30(3), 589–607.

Khairina, D. M., Asrian, M. R., & Hatta, H. R. (2016). Decision support system for new employee recruitment using weighted product method. 2016 3rd International

Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE), 297–301. IEEE.

Khoiriah, M., & Kholiq, A. (2020). Validitas perangkat pembelajaran fisika berbantuan e-book literasi sains pada materi fluida dinamis [The validity of physics learning tools assisted by science literacy e-books on dynamic fluid materials]. DoubleClick: Inovasi Pendidikan Fisika, 9(1).

Kristyowati, R., & Purwanto, A. (2019). Pembelajaran literasi sains melalui pemanfaatan lingkungan [Learning scientific literacy through the use of the environment]. DoubleClick: Scholaria: Jurnal Pendidikan Dan Kebudayaan, 9(2), 183–191.

Kruea-In, N., & Thongperm, O. (2014). Teaching of science process skills in Thai contexts: Status, supports and obstacles. Procedia-Social and Behavioral Sciences, 141, 1324–1329.

Kusuma, D. (2018). Analisis keterbacaan buku teks fisika SMK kelas x [Readability analysis of physics textbooks for class x SMK]. DoubleClick: Jurnal Pendidikan Fisika Dan Sains (JPFS), 1(1), 14–21.

Limatahu, I., & Prahani, B. K. (2018). Development of CCDSR teaching model to improve science process skills of pre-service physics teachers. Journal of Baltic Science Education, 17(5), 812.

Mateo, J. R. S. C. (2012). Weighted sum method and weighted product method. In Multi criteria analysis in the renewable energy industry (pp. 19–22). Springer.

Mauliana, P., Wiguna, W., & Widyaman, D. (2018). Sistem pendukung keputusan evaluasi kinerja pramuniaga toserba yogya ciwalk menggunakan metode weighted product [Decision support system performance evaluation of yogya ciwalk department store salesperson using the weighted product method]. DoubleClick: Infotronik: Jurnal Teknologi Informasi Dan Elektronika, 3(2), 85–94.

Nur'aini, D., Rahardjo, S. B., & Vh, E. S. (2017). Analisis buku ajar kimia kelas xi pada materi termokimia di kota surakarta berdasarkan muatan literasi sains [Analysis of class xi chemistry textbooks on thermochemical materials in surakarta city based on scientific literacy content]. DoubleClick: Prosiding SNPS (Seminar Nasional Pendidikan Sains), 254–259.

Nurdini, N., Sari, I. M., & Suryana, I. (2018). Analisis buku ajar fisika sma kelas xi semester 1 di kota bandung berdasarkan keseimbangan aspek literasi sains [Analysis of physics textbooks for class xi semester 1 in bandung city based on the balance of scientific literacy aspects]. DoubleClick: WaPFi (Wahana Pendidikan Fisika), 3(1), 96–102.

Ponidi, P., Renaldo, R., & Mukodimah, S. (2021). Analisis penerapan metode weighted product method sebagai indikator penetapan calon penerima bantuan bedah rumah [Analysis of the application of the weighted product method as an indicator of determining candidates for home surgery assistance]. DoubleClick: Prosiding Seminar Nasional Darmajaya, 1, 206–213.

Putra, S. D., Borman, R. I., & Arifin, G. H. (2022). Assessment of teacher performance in smk informatika bina generasi using electronic-based rating scale and weighted product methods to determine the best teacher performance. International Journal of Informatics, Economics, Management and Science, 1(1), 55–62.

Sumiati, E., Septian, D., & Faizah, F. (2018). Pengembangan modul fisika berbasis scientific approach untuk meningkatkan keterampilan proses sains siswa [Development of a physics module based on a scientific approach to improve students' science process skills]. DoubleClick: Jurnal Pendidikan Fisika Dan Keilmuan (JPFK), 4(2), 75–88.

Taufik, I., Saleh, A., Slamet, C., Maylawati, D. S., Ramdhani, M. A., & Muhammad, B. A. (2019). Decision support system design for determining brown sugar quality with weighted product method. Journal of Physics: Conference Series, 1280(2), 22019. IOP Publishing.

Turiman, P., Omar, J., Daud, A. M., & Osman, K. (2012). Fostering the 21st century skills through scientific literacy and science process skills. Procedia-Social and Behavioral Sciences, 59, 110–116.

Usmeldi, U. (2016). Pengembangan Modul pembelajaran fisika berbasis riset dengan pendekatan scientific untuk meningkatkan literasi sains peserta didik [Development of research-based physics learning module with scientific approach to improve students' scientific literacy]. DoubleClick: Jurnal Penelitian & Pengembangan Pendidikan Fisika, 2(1), 1–8.

Utomo, P., Cahyono, S. D., & Tristono, T. (2019). Selection of talented archery athletes using weighted product method. Journal of Physics: Conference Series, 1211(1), 12037. IOP Publishing.

Wardhany, R. P. K. (2014). Media video kejadian fisika dalam pembelajaran fisika di sma [Media video of physics events in physics learning in high school]. DoubleClick: Jurnal Pembelajaran Fisika (JPF), 2(4)

Wuri, O. R. (2014). Penerapan pendekatan saintifik pada pembelajaran fisika materi kalor terhadap keterampilan berpikir kritis siswa kelas x SMA [The application of a scientific approach to the learning of heat material physics on the critical thinking skills of class x high school students]. DoubleClick: Inovasi Pendidikan Fisika, 3(3).

Yuenyong, C., & Narjaikaew, P. (2009). Scientific literacy and thailand science education. International Journal of Environmental and Science Education, 4(3), 335–349.

Yuliyanti, T. E., & Rusilowati, A. (2014). Analisis buku ajar fisika sma kelas xi berdasarkan muatan literasi sains di kabupaten tegal [Analysis of physics textbooks for class xi based on scientific literacy content in tegal regency]. DoubleClick: UPEJ Unnes Physics Education Journal, 3(2).

Yunita, A. M., Susanti, E. N., & Rizky, R. (2020). Implementasi metode weight product dalam penentuan klasifikasi kelas tunagrahita [Implementation of the weight product method in determining the classification of the mentally impaired class]. DoubleClick: JSiI (Jurnal Sistem Informasi), 7(2), 78–82.