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# Analysis of The Nature of Science in Class IV Thematic Curriculum 2013 Books

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**Abstract:** This study was aim to analyse science as a process skill, products/content, and attitudes on students' book thematic at 4th grade Theme 3 Curriculum 2013. The design of this study was qualitative with the type of content study research. The data was collected through documentation. Data analysis techniques through reduction, presentation and drawing conclusions. The results showed that science as a process skill, products/content and attitudes was available on that book, but the aspect of science process skill, science as product and science as hat attitudes was not complete. Science as a product/content found in this book merely on fact, concept, and principle. Science as attitudes found on this book are honest, open minded, responsible, objective, cooperative, critical thinking, curiosity, careful, discipline, care for environment. Science as a process found of this book are still limited in: observing, classifying, concluding, and communicating.

**Keywords:** Curriculum 2013; Essence of Science; Science; Students book

## Introduction

The 2013 curriculum offers various changes aimed at improving the previous curriculum. Internal and external challenges are the main reasons for developing this curriculum in Indonesia. Internal challenges include demands for achieving the eight national education standards set out in Government Regulation No. 19 of 2005. Meanwhile, external challenges relate to future challenges to compete in the international world in the 21st century. Competencies needed by the golden age generation in the future, the development of knowledge and technology, as well as global challenges that require every country to be able to compete in various aspects so that existence is maintained (González-Pérez & Ramírez-Montoya, 2022).

The learning process is one aspect in facilitating graduates to become excellent human beings (Rachmadtullah et al., 2020). In the 2013 curriculum, the learning process emphasizes the use of a scientific approach, namely learning that is logical, based on facts, data, or phenomena that can be explained with certain logic/reasoning (Wu et al., 2023). This approach encourages students to think critically, analytically, and precisely in identifying, understanding, solving problems, and applying learning materials(Dewi & Rukmini, 2019).

The scientific approach is actually a learning approach that underlies science learning (Voit, 2019). The scientific approach includes 5M activities, namely: observing, asking, trying, reasoning, and communicating (Afrilia et al., 2023; Nasrulloh et al., 2021; Prastiti, 2020; Wulan et al., 2023). This is a skill that underlies learning science. If so, it can be seen that the implementation of the scientific approach is a reference for the application of other content learning in the 2013 curriculum. The problem is that not all schools apply the scientific approach correctly.

In addition to a scientific approach in learning, textbooks are also an element of the curriculum that needs attention. Textbooks are one of the learning resources for students as well as guidelines used by teachers in learning (Puspitarini & Hanif, 2019). If a textbook does not present relevant material, then the

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impact is that curricular goals cannot be achieved optimally.

The implementation of the 2013 curriculum requires extra socialization so that educational actors, especially teachers understand the purpose of implementing the 2013 curriculum. One way to support the implementation of the 2013 curriculum is by providing teacher books and student books by the Indonesian Ministry of Education and Culture (Magdalena, 2022; Setiawan & Suwandi, 2022; Setyono & Widodo, 2019). Through teacher books and student books it is hoped that it will help the learning process in class. In the upper grades at the elementary school level, there are several subject contents, one of which is the content of Natural Sciences. science has certain characteristics that are different from other subject matter. So it is necessary to examine whether the contents of the science lessons contained in the 2013 textbook meet the specified science characteristics, such as embedding the essence of science in the learning process. This is important because science is the subject matter in the TIMSS test which is also followed by elementary school students in Indonesia, whereas according to TIMSS results Martin et al. (2015), Indonesia was ranked 4th from the bottom with a score 397, with an international average score of 500 points. So that the design needs to review the books used as references for students regarding the material used in the TIMSS study.

Science content, even though it is carried out in an integrated manner with other content, should still emphasize providing direct experience to develop competencies in order to explore and understand the natural surroundings scientifically. Learning that contains science content is directed to be carried out in an inquiry manner so that it can help students gain a deeper understanding of the natural surroundings. This has implications for learning in schools, especially in elementary schools, science learning must contain the characteristics of science consisting of three aspects, namely the nature of science products, scientific processes, and scientific attitudes. However, there are still educators who focus on science learning only in terms of content. Whereas the science curriculum aims to develop conceptual understanding and procedural understanding. Conceptual understanding leads to students' knowledge regarding biological and physical aspects of the world and procedural understanding leads to students' understanding of scientific procedures (Inspectorate Evaluation Studies, 2012). Therefore, it is necessary to examine whether the textbooks in the 2013 curriculum only instill content or already contain the essence of science to instill a scientist's soul in students.

The nature of science as a product is a collection of research results that have been carried out by scientists and have formed concepts that have been studied as a result of empirical and analytical activities. The form of science as a product is the facts, principles, laws, and theories of science (Tursinawati, 2016). The essence of science as a process is a process to explore and understand knowledge about nature because science is not only a collection of facts and concepts but requires a process of finding facts and theories that scientists will generalize. The process of understanding science is called science process skills, namely skills performed by scientists. Science process skills are divided into two, namely basic process skills and integrated process skills. Elementary school age students are still instilled in aspects of basic science process skills. Referring to Sayekti (2016) research the basic process skills used in this study include: observing, classifying, measuring, predicting, concluding, and communicating.

Whereas the nature of science as an attitude or commonly known as a scientific attitude is the attitudes that underlie the science learning process, such as being curious, honest, objective, critical, open, meticulous discipline, and so on (Sayekti & Kinasih, 2016). A scientific attitude must be developed in science learning so that it can be internalized in the lives of students in cultivating the character of students. In this study, the nature of science as an attitude studied is: honest, open to new ideas, responsible, objective, cooperative, critical thinking, curiosity, introspection, discipline, and awareness or care for the environment. In accordance with the development of the 2013 curriculum, strengthening character education needs to be integrated into the implementation of learning. This is in line with Sayekti (2016) that science learning plays a role in building students' character because science learning contains the nature of science as an attitude that has almost the same value as character values in strengthening character education. Therefore, a study of the nature of science as an attitude in book content needs to be studied so that the cultivation of attitudes can help shape the character of good students.

Science is related to how to find out about nature systematically, so that science is not only the mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery. According to Samatowa (2011) states that " science is rational and objective knowledge about the universe and everything in it". Therefore, it is necessary to examine how the integration of the nature of science into textbooks on the content of science in the 2013 curriculum at the elementary school level. This is important because early experience of science is important for developing knowledge, skills, positive attitudes, and students' self-confidence towards science (Kazempour, 2014; Slameto, 2015).

Previously, research on book analysis had been carried out, including (Purnanto & Mustadi, 2016) regarding the feasibility of language in elementary

school textbooks; Next is Adi (2017) research regarding the analysis of character education content in elementary school textbooks. So that in this study the author wants to explore something different, namely an analysis of the nature of science in Class IV Student Books, Sub Theme I, Theme 3, a book issued by the Ministry of Education and Culture printed in 2017 which includes the nature of science as a product, process, and attitude.

## Method

This study uses a qualitative design with the type of content study research. Sources of data in this study were Student Books for Class IV, Sub Theme I, Theme 3, books issued by the Ministry of Education and Culture printed in 2017, journals, or literature related to the discussion. In this study the authors used the documentation method in data collection. This study uses a descriptive data analysis method that is inductive in nature, namely analysis based on the data obtained, then a certain relationship pattern is developed (Sugiyono, 2015). Data analysis was carried out continuously from the beginning to the end of the study. Miles and Huberman (Sugiyono, 2015) suggest that activities in qualitative analysis are carried out when data collection takes place, and after data collection is completed within a certain period. The activities carried out in data analysis are data reduction, data display, and conclusion drawing/verification (Sugiyono, 2015).

## Result and Discussion

Development is carried out after conducting research related to needs analysis to find out what is currently needed in the field. Needs analysis was carried out through interviews with SDN Drono II teachers and fifth grade students. Based on the results of the needs analysis interviews, the researchers concluded that in learning teachers often use worksheets as teaching materials. The student worksheet used has a weakness, namely the content of the student worksheet is only dominated by the cognitive abilities of students such as too much learning material is presented and 75% contains evaluation questions. Then the student worksheet used does not meet the criteria of a good student worksheet, this can be seen from the didactic requirements in the student worksheet that do not emphasize the concept discovery process.

Science lesson content for class IV Theme 3 "Caring for Living Things" in the 2013 Curriculum Student Book issued by the Ministry of Education and Culture printed 2017 concerning the nature of science is found in each sub-theme in learning 1 and 3. The Basic Concepts in the science content being studied on theme 3, namely: (1) 3.1. Analyzing the relationship between form and function of body parts in animals and plants; (2) 3.8 Explain the importance of efforts to balance and preserve natural resources in their environment; (3) 4.1. present a report on the results of observations on the form and function of plant body parts; (4) 4.8. Carry out activities to preserve natural resources with people in their environment. In sub-theme 1 learning 1 and 3 the part studied is the Basic Concepts. 3.8 and 4.8.

To be able to analyze the nature of science in each study, researchers must identify materials that are in accordance with the Basic Concepts mentioned above. The explanation of the planting of the essence of science in each aspect will be discussed.

*Nature of Science as a Product*

Based on the analysis of students' books, it can be seen that the planting of the nature of science as a product in sub-theme 1 of learning 1 can be seen in: (1) Facts appear in statements about something that can be observed in everyday life, such as: rice produces rice; rice growing process; garbage will cause flooding; plants produce oxygen; fields are plowed; rice is planted; grain rice; design paddy; rice is taken from the fields; rice is dried and milled; rice seeds ready to become rice; ready-to-eat rice; (2). Concepts are things that are more general in nature than facts, for example: rice granaries, seeds, rice seeds, germination, husks, seedlings, beaches, highlands, lowlands; (3) The principle can be seen from: if there is a flood, rice will not grow; The increasing population will increase the demand for rice.

In lesson 3, the nature of science as a product can be seen in: (1) facts: green plants freshen the air because they produce oxygen; flowers make a home beautiful and pleasing to the eye (2) Concept: roots; flower; leaf; stem; fruit; seed plants; photosynthesis; chlorophyll; (3) Principle: if a plant doesn't have roots, it can easily be uprooted, overturned, or washed away when it rains. The findings of the nature of science as a product are presented in table 1.

*Nature of science as a process*

The aspects of the nature of science as a process are shown in the following: (a) observing; (b) classify; (c) measure; (d) predict; (e) conclude; (f) communicate. The findings of the nature of science as a process are presented in table 2.

**Table 1.** Existence of the Nature of science as a Product

| Aspect | Sub Thema 1 | |
|---|---|---|
| | Learning 1 | Learning 3 |
| Fact | Page 1, 5 | Page 20, 21 |
| Concept | Page 1, 5 | Page 20 |
| Principles / Laws | Page 5 | Page 21 |
| Theory | - | - |
| Model | - | - |

**Table 2.** Existence of the Nature of science as a Process

| Aspect | Sub Thema 1 | |
|---|---|---|
| | Learning 1 | Learning 3 |
| Observe | Page 1, 4 | Page 20, 21, 22 |
| classify | Page 6 | Page 22 |
| Measure | - | Page 22 |
| Predict | - | Page 20 |
| Conclude | - | Page 22 |
| Communicate | Page 2, 3 | Page 21, 22 |

*Sub-theme 1 Learning 1*

*Observing:* according to theoretical studies, observing activities involve the sense of sight. In lesson 1 the observation activities are on page 1, on that page a picture of the rice field is provided where the rice lives. Observing activities are also listed on page 4 "Let's Observe". Students are asked to observe the picture, then write 5 questions about the picture.

*Classifying:* classifying is an activity of grouping objects based on similarities or differences in their characteristics and properties. In lesson 1 the classifying activity is on page 6, namely students are asked to fill out tables about beaches, highlands and lowlands. In this activity students look for differences between the coast, highlands and lowlands based on special characteristics or differences between the three.

*Communicating:* communicating can be said as the activity of conveying everything both verbally and in other forms such as graphics, data, images, and others. In learning 1 the communication activity is on pages 2 and 3. On page 2 students are asked to communicate in writing, while on page 3 students are asked to explain the diagrams that have been done.

*Sub-theme 1 Learning 3*

*Observation:* found on page 20 where in the book there are pictures that can help students observe. On page 21 there is also a picture of a child watering flowers which can strengthen students in observing activities which help visualize existing explanations. On page 22, students are asked to plant one type of plant and then observe the growth of the plant. These activities include observation because it involves the sense of sight.

*Classifying:* found on page 22, students are asked to identify the parts of plants and their functions. This is included in classifying activities because students must know the differences in the parts and functions of these plant parts.

*Measuring:* found on page 22, where students are asked to put the seeds in the soil in a pot of approximately 3cm. then students are encouraged to try to measure the depth of the soil using a measuring ruler.

*Concluding:* found on page 22, namely students are asked to make a report on the results of the discussion. In the report, of course, there are conclusions from the experimental results.

*Communicating:* found on pages 21 and 22, that is, after reading a text about plant parts, students are asked to answer several questions based on the text. In addition, on page 22, students are asked to write down the results of the discussion in the form of a report, this instills students' communication skills in writing.

*Nature of science as an attitude*

Sayekti (2016), argues that the notion of science includes three aspects, one of which is the nature of science as an attitude. Scientific attitudes: are beliefs, values, opinions/ideas, objectives, and so on. For example, making decisions after obtaining enough data related to the problem, always trying to be objective, honest, and so on. The findings of the nature of science as an attitude can be presented in table 3.

**Table 3.** Existence of the nature of science as an attitude

| Aspect | Sub Thema 1 | |
|---|---|---|
| | Learning 1 | Learning 3 |
| Honest | Page 2 | Page 23 |
| Open to new ideas | Page 6 | - |
| Responsible | Page 3 | Page 21, 22 |
| Objective | Page 4 | Page 21 |
| Cooperation | Page 2, 3, 5, 6 | Page 21, 22, 23 |
| Critical thinking | Page 3 | Page 21, 22 |
| Curiosity | Page 2 | Page 23 |
| Introspective | - | Page 22 |
| Discipline | - | Page 22 |
| Care for the environment | Page 4, 6 | Page 22 |

*Sub-theme 1 Learning 1*

*Honest attitude:* Shown in lesson 1 page 5 when students are asked to choose a plant that is often used in everyday life.

*Open to new ideas:* Demonstrated in learning 1 page 6, namely students are asked to state attitudes that can be applied in everyday life after studying the material.

*Responsible attitude towards science, collaboration, and critical thinking:* shown by the assignment on page 3, namely students are asked to discuss filling in the diagrams, then students are asked to account for the results based on the questions provided. Based on these activities, besides students being asked to take responsibility for their work, students are also asked to be objective and critical in compiling answers (Pande & Bharathi, 2020).

*Objective attitudes and attitudes based on evidence:* found in learning 1 page 4, namely students are asked to observe the pictures and then write down five questions according to the pictures. Learners are trained to be objective because questions must match the pictures.

*Cooperation:* cooperation shows the interaction between two or more people to achieve common goals. this is shown by the sentence "discuss it with friends..." found on pages 2, 3, 5 and 6.

*Curiosity:* is shown by learning 1 page 2, namely students are asked to make as many questions as possible to answer students' curiosity.

*The attitude of awareness:* or care for the environment is shown on page 4, namely there is material on several ways to preserve rice so that it can still be enjoyed by the Indonesian people.

*Sub-theme 1 Learning 3*

*Honest:* Honest attitude in learning 3 can be found on page 23, this honest attitude is instilled through questions that encourage students to answer according to what is experienced and felt, such as to identify what has been learned today and what students want to know further.

*Responsible for science, objective, and cooperation:* shown on page 21, namely when students are asked to discuss looking for other plant parts that function to preserve plants. In this activity students are trained to be responsible for the results of their discussions. Must be objective because their explanations must be in accordance with the theory presented, then practice cooperation because discussions are carried out in groups. In addition, responsibility is also instilled when students are asked to plant plants. In this activity there are several instructions that students must carry out when planting and caring for plants.

*Critical thinking:* This attitude can be seen on pages 21-22 when students are asked to answer several questions related to plants around students. Indirectly students are asked to think critically to answer these questions because the answers relate to students' opinions.

*Based on evidence:* This attitude is found on page 21, namely students are asked to look for plant parts that can protect other plant parts. In this activity students must have strong evidence to be able to choose the part of the plant.

*Curiosity:* found on page 23, in the "Let's Reflect" activity, students are asked to write down what they have learned today and what they want to know more about.

*Introspective attitude, discipline, and awareness or care for the environment:* found on page 22 in the activity students are asked to plant one type of plant then care for and observe each part of it. Students must be careful in planting plants because if they are not careful the plants will not grow properly. Students are required to be disciplined because they have to water and care for them regularly. Otherwise, the plant may die. Students are also trained to care for the environment, because by planting these plants students indirectly take care of the preservation of the surrounding environment.

Based on the results of the study conducted, it was found that the 2013 curriculum text book had instilled the essence of science in learning. As for planting, it really depends on the teacher as an education facilitator. This shows that the government through the Ministry of Education and Culture has carried out the mandate of the science learning objectives to emphasize direct experience. Weaknesses found in the 2013 revised edition of the 2017 class 4 theme 3 curriculum student book are related to the instilling of the nature of science which is not yet comprehensive. This is evident from the studies that have been conducted that the nature of science as a product found in books is limited to facts, concepts, and principles. Though other aspects are still possible to be developed. The nature of science as a process is good enough because it includes basic science process skills, namely in the aspects of: observing, classifying, measuring, concluding, and communicating. The nature of science as an attitude in the book is more complete, including: honest, open to new ideas, responsible for his knowledge, being objective, collaborating, thinking critically, curiosity, introspective attitude, self-discipline, and awareness/caring to the environment.

## Conclusion

Based on the results of the analysis that has been carried out, the 2013 revised edition of the 2017 class 4 theme 3 curriculum book still has deficiencies related to the nature of science. The essence of science as a product is found in the textbooks of Class IV Theme 3 students, namely limited to facts, concepts, and principles. The essence of science as a process found in this book is still limited to the following aspects: observing, classifying, measuring, concluding, and communicating. The nature of science as an attitude in the book is more complete, including: honest, open to new ideas, responsible for his knowledge, being objective, collaborating, thinking critically, curiosity, introspective attitude, self-discipline, and awareness/caring to the environment. Similar research still needs to be carried out to improve the preparation of teacher and student books by the Ministry in the next stage.

## References

Adi, Y. K. (2017). Analisis Muatan Pendidikan Karakter Dalam Buku Teks Kurikulum 2013 Kelas III SD Semester 1. *Profesi Pendidikan Dasar*, *4*(1), 27–41. https://doi.org/10.23917/ppd.v1i1.3754

Afrilia, R., Hasnunidah, N., & Maulina, D. (2023). Argumentation skill through a scientific approach: Study at different school accreditations rating. *Jurnal Biolokus: Jurnal Penelitian Pendidikan Biologi Dan Biologi*, *5*(2), 132–149. https://doi.org/10.30821/biolokus.v5i2.1339

Dewi, R. A. K., & Rukmini, P. (2019). The effect of thematic learning by using a scientific approach to

increase the multiple intelligence of students. *Jurnal Prima Edukasia*, *7*(1), 40–46. Retrieved from https://journal.uny.ac.id/index.php/jpe/article/view/24326

González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: systematic review. *Sustainability*, *14*(3), 1493. https://doi.org/10.3390/su14031493

Inspectorate Evaluation Studies, I. E. S. (2012). *Science in the Primary School 2008*. Evaluation Support and Research Unit Inspectorate Department of Education and Skills. Retrieved from https://www.education.ie/en/Publications/Inspection-Reports-Publications/Evaluation-Reports-Guidelines/Science-in-the-Primary-School.pdf.

Kazempour, M. (2014). I Can't Teach Science! A Case Study of an Elementary Pre-Service Teacher's Intersection of Science Experiences, Beliefs, Attitude, and Self-Efficacy. *International Journal of Environmental and Science Education*, *9*(1), 77–96. Retrieved from https://eric.ed.gov/?id=EJ1016889

Magdalena, M. C. (2022). Curriculum "Sekolah Penggerak": An Overview of Solutions to Learning Problems. *Proceeding International Conference on Religion, Science and Education*, *1*, 137–147. Retrieved from http://sunankalijaga.org/prosiding/index.php/icrse/article/view/785

Martin, M. O., Mullis, I. V. S., Foy, P., & Hooper, M. a. (2015). TIMSS 2015 International Results in Science. In *IEA*. Retrieved from http://timss2015.org/wp-content/uploads/filebase/full pdfs/T15-International-Results-in-Science.pdf

Nasrulloh, M. F., Ningsih, E. Z., & Satiti, W. S. (2021). Development of Scientific Approach-Based Teaching Materials to Improve Students' Mathematical Literacy. *Multidiscipline International Conference*, *1*(1), 91–95. Retrieved from https://ejournal.unwaha.ac.id/index.php/ICMT/article/view/2205

Pande, M., & Bharathi, S. V. (2020). Theoretical foundations of design thinking–A constructivism learning approach to design thinking. *Thinking Skills and Creativity*, *36*, 100637. https://doi.org/10.1016/j.tsc.2020.100637

Prastiti, T. D. (2020). The analysis of the implementation of scientific approach 5M to improve the elementary students' critical thinking skills in solving a fraction sorting problem. *Journal of Physics: Conference Series, 1563*(1), 12045. https://doi.org/10.1088/1742-6596/1563/1/012045

Purnanto, A. W., & Mustadi, A. (2016). Analisis kelayakan bahasa dalam buku teks tema 1 kelas I sekolah dasar kurikulum 2013. *Profesi Pendidikan Dasar*, *3*(2), 102–111. Retrieved from http://journals.ums.ac.id/index.php/ppd/article/view/2773

Puspitarini, Y. D., & Hanif, M. (2019). Using Learning Media to Increase Learning Motivation in Elementary School. *Anatolian Journal of Education*, *4*(2), 53–60. Retrieved from https://eric.ed.gov/?id=ej1244451

Rachmadtullah, R., Yustitia, V., Setiawan, B., Fanny, A. M., Pramulia, P., Susiloningsih, W., & Ardhian, T. (2020). The challenge of elementary school teachers to encounter superior generation in the 4.0 industrial revolution: Study literature. *International Journal of Scientific & Technology Research*, *9*(4), 1879–1882. Retrieved from http://www.ijstr.org/final-print/apr2020/The-Challenge-Of-Elementary-School-Teachers-To-Encounter-Superior-Generation-In-The-40-Industrial-Revolution-Study-Literature.pdf

Samatowa, U. (2011). *Pembelajaran IPA di Sekolah Dasar*. Indeks.

Sayekti, I. C. (2016). Pembelajaran IPA Menggunakan Inkuiri Terbimbing Melalui Eksperimen dan Demonstrasi Ditinjau dari Kemampuan Analisis Siswa. *Jurnal Pendidikan Sains Universitas Muhammadiyah Semarang*, *4*(1), 6–16. Retrieved from https://jurnal.unimus.ac.id/index.php/JPKIMIA/article/viewFile/1834/1878

Sayekti, I. C., & Kinasih, A. M. (2016). Profesionalisme Guru dalam Menanamkan Keterampilan Proses Sains pada Siswa Kelas IV A di SDM 14 Surakarta. In *Prosiding SNPS (Seminar Nasional Pendidikan Sains)*, 3, 63–70. Retrieved from https://jurnal.fkip.uns.ac.id/index.php/snps/article/view/9815

Setiawan, B., & Suwandi, E. (2022). The Development of Indonesia National Curriculum and Its Changes: The Integrated Science Curriculum Development in Indonesia. *Journal of Innovation in Educational and Cultural Research*, *3*(4), 528–535. https://doi.org/10.46843/jiecr.v3i4.211

Setyono, B., & Widodo, H. P. (2019). The representation of multicultural values in the Indonesian Ministry of Education and Culture-Endorsed EFL textbook: a critical discourse analysis. *Intercultural Education*, *30*(4), 383–397. https://doi.org/10.1080/14675986.2019.1548102

Slameto, S. (2015). Rasional dan elemen perubahan kurikulum 2013. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *5*(1), 1–9. https://doi.org/10.24246/j.scholaria.2015.v5.i1.p1-9

Sugiyono. (2015). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Tursinawati, T. (2016). Penguasaan konsep hakikat sains dalam pelaksanaan percobaan pada pembelajaran IPA di SDN Kota Banda Aceh. *Pesona Dasar: Jurnal*

*Pendidikan Dasar Dan Humaniora*, *2*(4), 72–84. Retrieved from https://jurnal.usk.ac.id/PEAR/article/view/7534/6201

Voit, E. O. (2019). Perspective: Dimensions of the scientific method. *PLOS Computational Biology*, *15*(9), 1007279. Retrieved from https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1007279

Wu, C., Zhang, R., Kotagiri, R., & Bouvry, P. (2023). Strategic Decisions: Survey, Taxonomy, and Future Directions from Artificial Intelligence Perspective. *ACM Computing Surveys*, *55*(12), 1–30. https://doi.org/10.1145/3571807

Wulan, E., Berlian, L., & Kurniasih, S. (2023). Development of online student worksheet based on scientific approach to improve critical thinking ability in Junior High School. *Jurnal Pijar Mipa*, *18*(1), 50–56. https://doi.org/10.29303/jpm.v18i1.4336