



Development of student activity sheets based on Science Literacy to Improve Primary School Student Learning Outcomes

Pengembangan LKPD berbasis Literasi Sains untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar

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Received: 21-05-2022

Accepted: 19-10-2022

Published: 30-10-2022

How to cite this article:

Hasan. Kune, S., & Rahmawati. (2022). Development of student activity sheets based on Science Literacy to Improve Primary School Student Learning Outcomes. *Pedagogik Journal of Islamic Elementary School*, Vol. 5(2), 257–266. <https://doi.org/10.24256/pijies.v5i2.2717>

Abstract

This study aims to develop valid, practical, and effective student activity sheets based on scientific literacy. This study uses Research and Development with a 4-D model design developed in four stages: defining, designing, developing, and disseminating. This study involved 36 grade VI elementary school students. Data collection techniques are observation to analyze product needs, questionnaires to determine the validity and practicality of the product, and tests to determine the product's effectiveness. The results showed that the development of student activity sheets based on science literacy in Electrical Energy learning was very valid, practical and effective. Material experts rated it very valid with a final score of 0.81. The results of the practicality of using the teacher and student questionnaires were 3.85, and the value of effectiveness validation using the observation sheet was 3.84 with an N-gain score of 0.75.

Keywords: student activity sheet; science literacy; learning outcomes; 4-d model

Abstrak

Penelitian ini bertujuan untuk mengembangkan lembar kegiatan siswa berbasis literasi sains yang valid, praktis, dan efektif. Penelitian ini menggunakan Reseach and Development dengan desain model 4-D yang dikembangkan dalam empat tahap yaitu pendefinisian (define), perancangan (design), pengembangan (develop), dan penyebaran (disseminate). Penelitian ini melibatkan 36 siswa sekolah dasar kelas VI. Teknik pengumpulan data yang digunakan ialah observasi untuk menganalisis kebutuhan produk, anget untuk mengetahui validitas dan kepraktisan produk, dan tes untuk mengetahui keefektifan produk. Hasil penelitian menunjukkan bahwa pengembangan lembar kegiatan siswa berbasis literasi sains pada pembelajaran Energi Listrik mendapatkan kategori sangat valid, sangat praktis dan sangat efektif. Ahli materi menilai sangat valid dengan nilai akhir 0,81. Hasil kepraktisan

menggunakan lembar angket guru dan siswa diperoleh 3,85, nilai validasi efektifitas menggunakan lembar observasi 3,84 dengan nilai N-gain score 0,75.

Keywords: lembar kerja peserta didik, literasi sains, hasil belajar, model 4-d

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Introduction

Students who are successful in learning succeed in achieving learning or instructional goals (Abdurrahman, 1999). Students can achieve learning outcomes by participating in teaching and learning programs following the goals set. Learning outcomes are a process to see the extent to which students can master learning after participating in teaching and learning activities or the success achieved by a student after participating in learning activities marked by certain numbers, letters, or symbols agreed upon by the education provider (Supramono, 2016).

Factors that affect learning outcomes include students' physical and spiritual factors. This is related to students' health problems in general physical condition, while environmental factors also greatly influence (Sudjana & Rivai, 2001). In student learning outcomes in schools, 70% are influenced by students' abilities, and the environment influences 30%. Cognitive domains in elementary school students that are suitable to be applied are memory, understanding, application, and analysis. The purpose of the cognitive aspect is oriented to thinking skills which include simpler intellectual abilities, namely remembering, to problem-solving abilities that require students to connect and combine several ideas, ideas, models, or procedures learned to solve the problem (Arikunto, 2007).

The low level of conventional science learning (Fuadi et al., 2020). The ability of teachers to implement science learning is still influenced by the curriculum and education system. The quality of learning, the selection of methods and models of teacher teaching and science learning are still conventional. Facing science material without trying to solve problems and find solutions causes students to feel bored and bored in the learning process. This is not following the goals of National Education and the achievement of indicators of scientific literacy competence and student learning outcomes (Fred Percival and Henry Ellington, 1993).

The above objectives can be achieved by teaching science from an early age by applying scientific literacy adapted to the age development of students at each level. In the teaching and learning process, teachers must have strategies so students can learn effectively and efficiently and hit the learning objectives (Sari et al., 2022). Natural Sciences deals with 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. Science education is expected to be a vehicle for students to learn about themselves and the environment and prospects for further development in applying it in everyday life (Hutauruk & Simbolon, 2018). The learning process emphasizes providing direct experience to develop competencies to scientifically explore and understand the natural surroundings (Nurdiyansah, 2018). Science learning is an interaction between teachers and students for the teaching and learning process in studying science and facts and phenomena rationally and objectively (Wisudawati & Sulistyowati, 2022).

Building Scientific Literacy is inseparable from the main goal, namely, improving the quality of human resources ready to enter the 21st Century (Pratiwi et al., 2019). Therefore, the operational objectives of scientific literacy for students are: (1) having the knowledge and understanding of scientific concepts and processes needed to participate in society in the digital era; (2) the ability to find or determine answers to questions stemming from curiosity related to everyday experiences; (3) can explain and predict phenomena; (4) can carry out social conversations that involve the ability to read and understand scientific articles; (5) can identify scientific and information technology problems; (6) can evaluate scientific information based on the sources and methods used; (7) can draw conclusions and arguments and can evaluate arguments based on evidence. An assessment of scientific literacy is needed to measure the level of scientific literacy ability. (Kusuma, 2016).

The results of preliminary observations and observations at the Mangkura 1 State Elementary School in Makassar City found that the student activity sheets were still simple because the student assignments were only based on the package book. There was no separate student activity sheet, and it did not meet the standardization of making student activity sheets. Standardization in the manufacture of student activity sheets is a tendency for the problems presented not to follow the daily lives of students, not contain teaching materials and only contain questions that must be done by students and not contain interesting learning activities that involve students directly. Student activity sheets based on observations also showed that starting from an unattractive cover that did not show interest in reading students, the contents of the student activity sheet were

very short and unclear and did not contain scientific material, the pictures on the student activity sheets were made out of colour, the questions on the sheet student activities do not show problem-solving is still Lower Order Thinking Skills not yet High Order Thinking Skills.

Student activity sheets like this do not provide an interesting experience in completing science assignments given by the teacher and do not encourage better student learning outcomes. Student activity sheets need to be developed so that students are developed through student activity sheets to train students skills to solve problems, explore information, and deepen the concept of science through teaching experiences between teachers and students. The gap in the teaching and learning process impacts the low ability of learning outcomes in solving problems through scientific literacy on the science concept. It appears that there are still students who have not reached the Minimum Completeness Criteria of < 75 , namely 37 students from 69 students (54%) who have not completed and 32 students out of 69 (46%) students have completed.

This fact proves that the low interest of students in solving problems through student activity sheets on the science concept is influenced by several factors because (1) the student activity sheets used are not interesting, the content and material do not match the needs of students, (2) the student activity sheets used are uninteresting. Provided does not provide stimulus and response between teachers and students. And (3) the presentation of questions on student activity sheets still uses lost questions (Syamsu, 2018).

One of the efforts to overcome the problems in the school is to use student activity sheets that follow the characteristics of students and the school environment. In this study, researchers developed student activity sheets based on scientific literacy to improve learning outcomes for elementary school students.

Metode

This study uses the Research and Development method with reference to the 4-D development model. This 4-D development model consists of 4 main stages: define, design, develop, and disseminate (Thiagarajan, 1974).



Figure 1 Stages of the 4-D research and development model

The existence of time and cost limitations forced this research to limit only to the define, design, and developing stages. The subjects of this study were 36 grade VI students of the Mangkura 1 public elementary school in Makassar City. Data collection techniques used by researchers are observation to determine product needs, questionnaires to determine the validity and practicality of the product, and test sheets to determine the product's effectiveness. Data validity and practicality in the form of numbers filled in using a Likert scale will be converted into qualitative data. While the data obtained from the test sheet will be processed using the percentage formula, and then the N-gain test is carried out to measure the learning outcomes of elementary school students (Hake, 1999).

Result

The validity of the scientific literacy-based student activity sheet

The results of the assessments from 3 validator experts showed that the scientific literacy-based student activity sheets were declared to be very valid. The recapitulation of the validation results can be seen in table 1.

Table 1 Results of the Validation of Science Literacy-Based Student Activity Sheets

No	Aspect	Score	Category
1	Content Expert	3,79	Very Valid
2	Construction Expert	3,90	Very Valid
3	Linguist	3,89	Very Valid
	Average	3,86	Very Valid

Although the scientific literacy-based student activity sheet received a very valid category, the researchers also received some suggestions and comments from experts. The suggestion became a reference for researchers to revise and develop student activity sheets based on scientific literacy.

The practicality of science literacy-based student activity sheets

Besides being declared very valid, the student activity sheet based on scientific literacy is also stated practically based on table 2.

Table 2 *The results of the practical analysis of student activity sheets based on scientific literacy*

No	Aspect	Score		Category
		Teacher	Student	
1	Instructions for use help in using student activity sheets	4	4	Very Practical
2	Easy-to-read writing	4	4	Very Practical
3	The perfect color to look at	4	3,67	Very Practical
4	The suitability of the image with the content of the material	4	3,67	Very Practical
5	The info box on the student activity sheet makes it easy to find concepts	4	4	Very Practical
6	The contents of the student activity sheet help understand the material	3,67	4	Very Practical
7	The exercises on the student activity sheets are interesting and challenging	3,67	4	Very Practical
8	Increase interest and motivation to learn	3,67	4	Very Practical
9	In general, student activity sheets are easy to use	4	4	Very Practical
10	Interesting student activity sheet display	4	4	Very Practical
Average		3,91		Very Practical

The effectiveness of scientific literacy-based student activity sheets

After the product was tested for validity and practicality, the product of student activity sheets based on scientific literacy was tested for effectiveness. For effectiveness, the researcher gave a pretest to students before applying the scientific literacy-based student activity sheet and a posttest after the product was applied. The results of the pretest and posttest can be seen in table 3.

Table 3 *Comparison of Pretest and Posttest scores*

Description	Pretest		Posttest	
	Quantity	Persentase	Quantity	Persentase
Students didn't pass	32	88,89%	2	5,56%
Students pass	4	11,11%	34	94,44%

Table 4 The result of N-Gain

Aspect	Average	Category
Learning outcomes	0.75	Medium

Table 3 shows the results of the pretest only 4 students completed while 32 did not. The results of the post-test were that 34 students completed it while only 2 students did not complete it. The results of the completed pretest were 11.11%, while the posttest was 94.44%. The data explained that the learning outcomes of the pretest had increased in the post-test results, so it can be said that the student activity sheet based on scientific literacy was very effective to use.

Discussion

Based on the research results, scientific literacy-based activity sheets have been valid, practical, and effective for improving science learning outcomes in the electrical energy material for grade VI elementary school students. This is supported by several previous studies such as research (Listianingrum, 2017; Handayani et al., 2020; Zahro & Yuliani, 2021)

The quality of a product can be measured based on the validity, practicality, and effectiveness tests to improve the learning outcomes of elementary school students (Ardhyantama, 2019). Measurement of product validity was measured by involving three experts: content, language, and construction experts. The validation sheet given to the validator uses a Likert scale. The validation results are in the form of quantitative data and then converted into qualitative data. In addition, the validator also provides some suggestions and input for researchers to revise the product of student activity sheets based on science literacy. Suggestions from the validators include revising the cover of the science literacy-based student activity sheet based on the material's content, improving non-standard vocabulary, and improving the color gradation to make it more comfortable for the eyes to see. The measurement of product practicality is measured based on a teacher and student response questionnaire that focuses on several aspects, including the use of language that is easy to understand, using sentences that do not cause double meanings, instructions for use in student activity sheets based on clear scientific literacy, selection of fonts, sizes, and spaces to make it easier to explain.

Difficult material, the use of worksheets has something interesting, makes it easier for teachers to understand the material, motivates students to learn concepts, directs students in concluding the material, and students to enjoy learning the material. They are easy to find in everyday life. At the same time, the effectiveness measurement is based on learning outcomes tests. Student learning outcomes test was used to measure learning outcomes in 36 grade VI elementary school students in the pretest average student learning test was in the medium category. While in the post-test, the average student learning outcomes are in the very high category. The N-gain formula is used to see the increase in student learning outcomes test results. The comparison of the pretest and posttest results and the results of the N-Gain shows that the student activity sheet based on scientific literacy is effective for improving student learning outcomes.

Conclusion

Based on the results of product development and testing related to science literacy-based student activity sheets to foster student learning outcomes for Grade VI elementary school students on electrical energy in science learning are declared practical because two indicators are achieved, namely student responses are very practical and teacher responses to literacy-based student activity sheets. Science is very practical. In addition, student activity sheets based on scientific literacy were also declared effective based on student learning outcomes tests. The science literacy-based student activity sheets produced can be used as an alternative in problem-solving because students can solve the electric energy formula themselves from previous experience. This research can be used to develop student activity sheets based on scientific literacy.

Reference

- Abdurrahman, Mulyono, (1999). *Pendidikan Bagi Anak Berkesulitan Belajar*, Jakarta: Rineka Cipta
- Ardhyantama, V. (2019). Pengembangan media flash untuk meningkatkan hasil belajar siswa SD kelas IV SD Hangtuah VI Surabaya. *Alpen: Jurnal Pendidikan Dasar*, 3(1).
- Arikunto, Suharsimi. (2007). *Prosedur Penelitian Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta
- Handayani, M., Rusilowati, A., & Sarwi, S. (2020). Pengembangan Lembar Kerja Siswa Berbasis Literasi Sains pada Materi Alat-Alat Optik untuk Meningkatkan

- Kemampuan Literasi Sains Siswa SMP. UPEJ Unnes Physics Education Journal, 9(1), 79-88.
- Kusuma, A. Y. (2016). Literasi Sains Dalam Pembelajaran IPA. Issn, 7(3B), 1693-7945. Retrieved from http://ejournal.unwir.ac.id/file.php?file=preview_jurnal&id=735&cd=0b2173ff6ad6a6-fb09c95f6d50001df6&name=8. Yani Kusuma Astuti STKIP NU INDRAMAYU_GW_Juni_2016.pdf
- Listianingrum, N., Maridi, M., & Aminah, N. S. (2017). Pengembangan Perangkat Pembelajaran IPA Menggunakan Model Inkuiri Terbimbing Berbasis Literasi Sains Untuk Memberdayakan Ketrampilan Proses Sains. In Prosiding SNPS (Seminar Nasional Pendidikan Sains) (pp. 178-186).
- Prastowo, A. (2011). *Panduan Kreatif membuat Bahan Ajar Inovatif*. Yogyakarta: Diva Express
- Sudjana, N dan Ahmad, R, (2001). *Media Pengajaran*. Bandung: Sinar Baru
- Yulianti, Y. 2017. Literasi Sains Dalam pembelajaran IPA. *Jurnal Cakrawala Pendas*, 3(2)
- Zahroh, D. A., & Yuliani, Y. (2021). Pengembangan e-LKPD Berbasis Literasi Sains Untuk Melatihkan Keterampilan Berpikir Kritis Peserta Didik Pada Materi Pertumbuhan Dan Perkembangan. *Berkala Ilmiah Pendidikan Biologi (BioEdu)*, 10(3), 605-616.
- Supramono, A. (2016). Pengaruh model pembelajaran quantum (quantum teaching) terhadap hasil belajar IPA siswa kelas III SD YPS Lawewu kecamatan Nuha kabupaten Luwu Timur. *Jurnal Nalar Pendidikan*, 4(2).
- Fuadi, H., Robbia, A. Z., Jamaluddin, J., & Jufri, A. W. (2020). Analisis faktor penyebab rendahnya kemampuan literasi sains peserta didik. *Jurnal Ilmiah Profesi Pendidikan*, 5(2), 108-116.
- Sari, M. Z., Fitriyani, Y., & Gunawan, I. (2022). Strategi belajar mengajar. *Perkumpulan Rumah Cemerlang Indonesia*.
- Nurdyansyah, N. (2018). Model Pembelajaran Berbasis Masalah Pada Pelajaran IPA Materi Komponen Ekosistem. Universitas Muhammadiyah Sidoarjo.
- Hutauruk, P., & Simbolon, R. (2018). Meningkatkan hasil belajar siswa dengan menggunakan alat peraga pada mata pelajaran IPA kelas IV SDN Nomor 14 Simbolon Purba. *School Education Journal PGSD FIP Unimed*, 8(2), 121-129.
- Wisudawati, A. W., & Sulistyowati, E. (2022). *Metodologi pembelajaran IPA*. Bumi Aksara.
- Pratiwi, S. N., Cari, C., & Aminah, N. S. (2019). Pembelajaran IPA abad 21 dengan literasi sains siswa. *Jurnal Materi dan Pembelajaran Fisika*, 9(1), 34-42.
- Syamsu, F. D. (2018). Pengembangan penuntun praktikum ipa berbasis inkuiri terbimbing untuk siswa smp siswa kelas vii semester genap. *Bionatural: Jurnal Ilmiah Pendidikan Biologi*, 4(2).