

The Development of Fourth Grade Primary School Science Learning Material Based on Local Wisdom at SDN Kesongo 01 Kabupaten Semarang

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Abstract

Based on the result of 2015 PISA (Programme for International Students Assessment) in term of science, Indonesia ranked 64th from 72 countries. Meanwhile based on the result of TIMSS (Trends in International Mathematics and Science Study), Indonesian ranked 45th from 48 countries. Those results showed that Indonesia still have low quality in science. This problem also happened in SDN Kesongo 01. It was known that students had low science learning outcome because learning material had not yet developed. In order to solve this problem, researcher developed an innovative learning material based on local wisdom. This research aimed to know the feasibility, students and teacher responses, and the effectiveness of 4th grade Primary School Science learning material based on local wisdom. This research was research and development (R&D). Main subject of this research was students of class IV SDN Kesongo 01. Data analysis were percentage descriptive statistic, normality test, t-test and gain test. The results showed that 4th grade primary school science learning material based on local wisdom was developed by integrating the lesson material with the contents of local wisdom, feasible to be used, and effectively improved student learning outcome with moderate criteria. Shown by the result of gain test 0,6 and t test 0.00. The conclusions of this research were 4th grade primary school science learning material based on local wisdom was very feasible, obtained very positive responses, and effectively improved student learning outcome. Suggestion from this research was 4th grade primary school science learning material based on local wisdom can be used as an alternative learning material in science lesson in the accordance with the guideline.

Keywords: development, learning material, local wisdom, science.

1. INTRODUCTION

Law of the Republic of Indonesia number 20 year 2003 about national education system stated that education is a conscious and planned effort to create an atmosphere of learning and learning process so that learners could actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and skill, which are needed by theirselves, society, nation and state.

Government regulation number 32 year 2013 as an amendment of government regulation number 19 year 2005 about national standard of education stated that the curriculum of primary education or the equivalent education must include science (IPA). Based on the regulation, science learning must be given to students of primary and secondary education. According to the regulation of the minister of education number 22 year 2006 about standard of content, the Standard of competency (SK) and Basic Competency (KD) of science in primary school are the minimum standard which must be nationally achieved by learners and become a reference in curriculum development in each educational unit. Science is an important content in primary school curriculum.

According to Samatowa (2016:3) science discussed about natural phenomena which was

arranged systematically based on experimental result and observation made by humans. Furthermore, Cain and Evans (1990: 4) divide four basic characteristics of science, namely; (1) science as product; (2) science as process; (3) science as attitude; and (4) science as technology. Science education is expected to be a tool for learners to learn about themselves and environment, as well as a prospect for further development in applying it in daily life.

Problem was still found in science learning activity in Indonesia. Organization for Economic Cooperation & Development (OECD) conducted a three-year survey for 15 year old students around the world known as Programme for International Students Assessment (PISA). PISA is a study focusing in the assessment on the core subjects of science, literacy, reading and math. According to the result of the 2015 PISA in the term of science Indonesia ranked 64th of 72 countries. The results of the study showed the average score obtained by Indonesian students was 403. While the average OECD score was 493. Although Indonesia rose by 6 levels, the average score for Indonesia was still below the average of OECD score (OECD, 2016: 5). Meanwhile, according to the results of Trends in International Mathematics and Science Study or TIMSS, a study initiated by the International Association for the Evaluation of Educational

Achievement (IEA) in order to compare the achievement of mathematic and science students of 8th grade and 4th grade in several countries around the world which was conducted every 4 years showed the average score obtained by Indonesian students in the term of science was 397. From the result, Indonesia occupied the position of 45th out of 48 countries which were participated (Research and Development Agency, 2017: 1).

Science lesson in its implementation in primary school has not been in accordance with the goals set by the government which was described in the regulation of the Minister of National Education No. 22 year 2006. This fact was supported by the data obtained by the researcher. Through interview, observation and data collection which were conducted at SDN Kesongo 01 in Semarang Regency, researcher found that teacher has not yet developed learning material. This problem resulted in low science learning outcome of 4th grade students of SDN Kesongo 01. It was proved by three times of daily test which only 21.7% score was above minimum completeness criteria (KKM) and 78.3% score was under the minimum completeness criteria (KKM) with the KKM for science was 72.

One of the component in science learning was learning material. Learning material as one of the component of learning science, was defined by Prastowo (2016:17) as all materials (both information, tool, and text) which are arranged systematically, displaying the complete figure of competence to be mastered by learners and used in the learning process with the purpose of planning and reviewing the implementation of learning process. Teaching materials could not be used directly, thus teaching material need to be developed by considering the needs of students which was in the accordance with the characteristic and setting of student social environment (Warso, 2016: 21). The characteristic and setting of student social environment could be in the form of local wisdom in student real life. Wisdom means (1) wise and (2) intellect. Based on the meaning of the Great Indonesian dictionary, the meaning of the word 'wisdom' was related to two things, namely (1) character or personality (emotion) and (2) intelligence (cognitive). The values of local wisdom need to be preserved, because local wisdom becomes the characteristic of a place, beside learning local wisdom had a strategic position in education (Rahyono, 2015: 10).

Based on the problem which occurred, researcher developed a 4th grade primary school science learning material based on local wisdom to improve the quality of science learning in order to encourage student to involve in learning and simplify students in remembering the science material which was being taught. The purpose of this research was to know the characteristic of learning materials which previously used at SDN Kesongo

01, to develop, to examine the feasibility, to know the student and teacher responses, and to examine the effectiveness of 4th grade primary school science learning material based on local wisdom.

2. RESEARCH METHOD

This research was research and development. This research used research and development model from sugiyono adaptation (2010: 409). The steps in this research were: (1) potential and problem; (2) data collection; (3) product designing; (4) product validation; (5) product revision; (6) product testing; (7) product revision; (8) operational testing; (9) product revision; (10) mass production. The experimental design to know the effectiveness of the product was pre-experimental model one group pretest-posttest design (Sugiyono, 2015:110-111). This model compared the pretest score (before using 4th grade primary school science learning material based on local wisdom) with posttest score (after using 4th grade primary school science learning material based on local wisdom). The main subject of this research was students of grade IVB SDN Kesongo 01, which consist of 20 students. The sampling technique was saturated sampling technique because all members of population were being used as a sample, since the population was relatively small. Data collection techniques used observation, interview, documentation, questionnaire and test.

3. RESEARCH RESULT AND DISCUSSION

3.1 The Characteristics of 4th Grade Teaching Material Used in SDN Kesongo 01

Learning material is one of the component that must exist in science learning. The definition of learning material according to Hamdani (2011: 120) is any form of material which was arranged systematically used to help teachers or instructors in carrying out teaching and learning activities that create an environment or atmosphere that allow students to learn. Science learning material in SDN Kesongo 01 has not yet developed according to the characteristic and setting of student social environment. Books that student used as a learning material contain material lesson which was still common and did not related to student daily life. As a consequent, science lesson which was created was less meaningful because students were not familiar with the material discussed in the book. In addition, the books have not accommodated students to participate in learning activities as a form of science as a process.

According to Minister of National Education Regulation no. 22 year 2006, science examines natural phenomena come from daily life. It was explained that learning process emphasized the provision of hands-on experience to develop competency to explore and understand the natural world scientifically. This problem resulted in low science learning outcome of 4th grade students of SDN Kesongo 01. According to Warso (2016: 19) learning material need to be developed considering there are number of reasons including the demand for solving learning problem. To overcome this difficulty, researcher developed a 4th grade primary school science learning material based on local wisdom.

3.2 The Development of 4th Grade Primary School Science Learning Material Based on Local Wisdom

According to Ausubel's meaningful learning theory (in Wisudawati and Sulistyowati, 2014: 43) students learn by associating their understanding with what they already have. In learning process, it would be more meaningful if students build their own concept by doing an association process toward experience, phenomena which they encounter, and new fact into the understanding which they already owned. Meanwhile, according to constructivism learning theory, knowledge construction process is more meaningful if students encountered it through the phenomenon that occurs.

Followed up on this theory, teaching material as a component that must exist in science learning need to be developed to create meaningful learning. The learning material was developed based on local wisdom in order to make learning material more meaningful for the students.

Table 1. The Presentage of The Assessment of Fouthth Grade Primary School Science Learning Material Based on Local Wisdom on Each Aspect.

No	Aspect of Feasibility	Score	Maximum Score	Percentage	Criteria
1	Graphical	64	70	92%	Very Valid
2	Serving	45	50	90%	Very Valid
3	Content	39	45	87%	Very Valid
4	Languange	32	35	91%	Very Valid
5	Assessment of local wisdom	22	25	88%	Very Valid

Fourth grade primary school science learning material based on local wisdom helped students to understand and remember science material lesson. The 4th grade primary school science learning material based on local wisdom was integrated with content of local wisdom around student's environment. As a result, the material was more

meaningful because it could be encountered by students in their daily life. This solution was supported by theory by Rahyono (2015: 10) about the factors which made learning local wisdom has strategic position. These factors were: (1) local wisdom is an inherent form of identity since birth; (2) local wisdom wis not strange to the owner; (3) there is a strong community's emotional involve in the appreciation of local wisdom; (4) learn a local wisdom do not require imple-mentation; (5) local wisdom is capable to develop self-esteem and self-confidence; and (6) local wisdom could enhance the dignity of the nation and state.

The main characteristic of 4th grade primary school science learning material based on local wisdom resided in the material which was in accordance with the characteristic and setting of social environment of students. It was integrated with local wisdom which was contained in their daily life. The material contained the contents/ dimensions of local wisdom, namely: (1) local knowledge; (2) local culture; (3) local skill; (4) local source; and (5) local social process.

3.3 The Feasibility of 4th Grade Primary School Science Learning Material Based On Local Wisdom

The feasibility of 4th grade primary school science learning material based on local wisdom was obtained from the validation process done by two expert which were media expert and material expert as well as one teacher. The validation was done to the aspect of the learning material feasibility according to BSNP (2008: 8) including graphical feasibility, serving feasibility, content feasibility, language feasibility, and assessment of local wisdom.

Based on the percentage of the assessment of 4th grade primary school science learning material based on local wisdom on each aspect in table 1 showed that each feasibility aspect got >84% score which was belong into very valid category. From the result, it could be concluded that 4th grade primary school science learning material based on local wisdom was very feasible to be used.

3.4 Students and Teacher's Responses toward 4th Grade Primary School Science Learning Material Based on Local Wisdom

According to Prastowo (2015:18) if learning material is made by educators, then learning would become more interesting and memorable for students. Questi-onnaire response was given to students and teacher to know their responses toward 4th grade primary school science learning material based on local wisdom. Students and teacher's

responses were categorized into very positive, positive, quite positive, less positive and non-positive criteria. Here is the result of recapitulation of students and teacher responses on every aspect toward 4th grade primary school science learning material based on local wisdom.

Table 2. Recapitulation of Students and Teacher's Responses Questionnaire

Response	Classical Presentage	Criteria
Students	93,5%	Very positive
Teacher	92,7%	Very positive

Based on the recapitulation of the result of students and teacher questionnaires in table 2 showed that the percentage of student response was 93.5% (very positive) and the percentage of teacher response was 92.7% (very positive). Those result indicated that 4th grade primary school science learning material based on local wisdom got very positive responses from both students and teacher.

3.5 The Effectiveness of 4th Grade Primary School Science Learning Material Based on Local Wisdom

The effectiveness of the use of 4th grade primary school science learning material based on local wisdom was seen from student's cognitive learning outcomes in science with natural resource as subject lesson. Student's cognitive learning outcomes consist of pretest and posttest score. The score of pretest and posttest learning outcomes were presented in the following table.

Table 3. The Recapitulation of Student Learning Outcome (Pretest and Posttest)

Step	Higher Score	Lower Score	Average Score	Number of Student's Completne ss	Learning Completne ss (%)
Pretest	80	54	65,7	5	25%
Posttest	97	74	86,3	20	100%

Based on the recapitulation of student learning outcome showed that there was a difference between students learning outcomes at prerest and posttest. Pretest average score was 65,7 meanwhile posttest average score was 86,3. In addition, the learning completeness at pretest and posttest also showed there was a difference. Number of students' learning completeness during pretest was 5 students (25%) meanwhile number of student's learning completeness during posttest was 20 students (100%).

Fourth grade primary school science learning material based on local wisdom could be said as an effective learning material based on the significant average score difference between pretest and posttest results. The result of t-test which was conducted before and after the use of 4th grade primary school science learning material based on local wisdom was presented in the following table.

Table 4. The Result of T-test of Students Pretest and Posttest Score

Sig.	Alpha	Interpretation
0,00	0.05	Hypothesis was accepted

Based on the result of t-test of students pretest and posttest in table 4 showed that there was a significant value $0.00 > \text{Sig } 0.05$. From those result, it could be concluded that there was a difrence of students learning outcome at class IV SDN Kesongo 01 before and after the use of 4th grade primary school science learning material based on local wisdom.

Gain test was used to know the increase of the students average learning outcomes score before and after using 4th grade primary school science learning material based on local wisdom. The result of gain test was presented in the following table.

Table 5. The Result of Gain Test

Category	Nilai
Pretest average score	65,7
Posttes average score	86,3
Difference average score	20,6
Gain score	0,6
Criteria	Moderate

Based on the result of gain test in table 5 showed that gain test of pretest and posttest average score was 0,6 with the difference average score was 20,6. Those result belong to moderate criteria.

Based on the explanation, the use of 4th grade primary school science learning material based on local wisdom affecting student sciene learning outcomes, thus it could be used as an alternative learning material in science. This result was the same as the early research conducted by Farida Nur Kumala and Prihatin that showed the use of learning material based on local wisdom could effectively increase student learning outcome and activity.

4. CONCLUSION

Based on the result, expalantion, and data analysis, it could be concluded that learning material that previously used by student has not been developed according to the characteristic and setting or student social environment, 4th grade primary school science learning material based on local

wisdom was developed by integrating the material with the contents of local wisdom in student daily life, feasible/decent to be used, obtained an assessment score with very valid criteria, obtained students and teacher responses with very positive criteria, and effective to increase student science learning outcome with moderate criteria.

5. REFERENCES

- [1] BSNP. (2008). Panduan Pengembangan Bahan Ajar. <http://gurupembaharu.com/home/wp-content/uploads/downloads/2011/09/Panduan-Pengembangan-Bahan-Pelajaran.doc> (diunduh 7 Januari 2017).
- [2] Cain, Sandra E. and Jack M. Evans. (1990). *Sciencing*. Columbus: Merrill Publishing Company.
- [3] Hamdani. (2011). *Strategi Belajar Mengajar*. Bandung: CV Pustaka Setia.
- [4] Kumala, Farida Nur dan Prihatin Sulistyowati. (2014). Pengembangan Bahan Ajar IPA Berbasis Kearifan Lokal. *Jurnal EduBio Tropika*. 2, 1, pp. 121-186.
- [5] OECD. (2016). PISA 2015-OECD. <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf> (diunduh 7 Januari 2017).
- [6] Pemerintah Republik Indonesia. 2013. Peraturan Pemerintah Nomor 32 Tahun 2013 tentang Perubahan atas Peraturan Pemerintah Nomor 19 Tahun 2005 Tentang Standar Nasional Pendidikan. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- [7] _____. 2006. Peraturan Menteri Pendidikan Nasional Nomor 22 Tahun 2006 tentang Standar Isi. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- [8] Pusat Penilaian Pendidikan Badan Penelitian dan Pengembangan. 2015. TIMSS-Infographic. <http://www.acdp-indonesia.org/wp-content/uploads/2017/01/-TIMSS-infographic.pdf> (diunduh 7 Januari 2017)
- [9] Prastowo, Andi. (2015). *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Jogyakarta: DIVA Press.
- [10] Rahyono, F. X. (2015). *Kearifan Budaya dalam Kata*. Jakarta: Wedatama widya Sastra.
- [11] Samatowa, Usman. (2016). *Pembelajaran IPA di Sekolah Dasar*. Jakarta: PT Indeks.
- [12] Sugiyono. (2015). *Metode Penelitian Pendidikan*. Bandung: Alfabeta.
- [13] Warso, Agus Wasisto Dwi Doso. (2016). *Publikasi Ilmiah Pembuatan Buku, Modul, Diklat dan Nilai Angka Kreditnya*. Yogyakarta: Pustaka pelajar
- [14] Wisudawati, Asih Widi dan Eka Sulistyowati. (2014). *Metodologi Pembelajaran IPA*. PT Bumi Aksara.