

Development of Local Wisdom Based Science Teaching Materials in Ngingas Village to Improve the Critical Thinking Skills of Fifth Grade Students of Elementary School

¹Fita Nurul Azizah, ²Suryanti, ³Widowati Budijastuti

¹Post Graduate, State University of Surabaya, ²Lecturer, State University of Surabaya, ³Lecturer, State University of Surabaya
Email: ¹fitahisna@gmail.com, ²suryanti@unesa.ac.id, ³widowatibudijastuti@unesa.ac.id

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Abstract - This study aims to produce local wisdom-based teaching material products in Ngingas Village to improve critical thinking skills of fifth grade students of elementary school. This research is a development research owned by Thiagarajan, Semmel, and Semel (1974) or called 4D Research and development which has four stages including: determination, design, development, and distribution. The subject of the study was the development of local wisdom-based science teaching materials in Ngingas Village by being tested in the fifth grade of SDN Ngingas Subdistrict Waru Sidoarjo using the design of the one group pretest-posttest. Teaching materials and their devices have received valid category mode from the validator. The practicality of teaching materials can be shown from (1) The implementation of overall learning gets a very good category. (2) Learning activities show an increase in the stage of understanding the focus of the problem and drawing conclusions. (3) Students' responses to learning using local wisdom-based teaching materials in Ngingas Village have a category of levels of interest from students . The effectiveness of teaching materials that have a good level of readability, learning outcomes on the test of critical thinking skills is very good because being able to achieve the minimum completeness criteria means that students complete in learning, and. The conclusion of this study is that local wisdom-based science teaching materials in Ngingas Village developed meet the criteria of validity, practicality and effectiveness so that they can be used to improve critical thinking skills of fifth grade students of elementary school.

Keyword- Teaching Materials, Local Wisdom, Critical Thinking Skills.

I. INTRODUCTION

Basic education is the main basic pillar of all levels of sustainable education aimed at providing education to prepare students to become human beings who have character, become citizens who are able to carry out their main obligations in achieving their future (Ali in Prastowo, 2013). Considering the importance of basic education in primary schools, the consequence is that the government must strive to improve the quality of relevance of basic education through curriculum development that has complemented the previous curriculum. The 21st century competency for four competencies supports the weaknesses that occur for education in Indonesia by improving students' thinking skills . The importance of critical thinking can make students interact, analyze, or even manipulate information beforehand so it is not monotonous. Critical thinking does not make difficult school learning material easy to understand, but the subject matter can teach a variety of critical thinking skills practiced in everyday life, namely increasing the ability to understand arguments or developing issues so that we can avoid making decisions that incorrect or not in accordance with the problem (Bassham, et al., 2011) .

The teacher as a learning designer must design learning plans according to the needs of students . Good planning will make learning regular so that learning will attract both students . Development of science materials based on local wisdom will help and facilitate the learning process in achieving predetermined goals. Each teacher is obliged to arrange learning tools which consist of: teaching materials, syllabus, learning implementation plans, student activity sheets, and student assessment sheets. Active collaboration between observers of education, stakeholders / community, business world, and bureaucracy, is very significant in the success of local wisdom-based education programs. Local wisdom-based education requires kema m ladies creation and innovation (Asmani, 2012) .

Local wisdom in each area is the basis for policy making at the local level in the fields of health, agriculture, natural resource management and community activities (Tiezzi, et al., 2007). Development of material depends on student books owned by learners. Facts prove that there are many young generations who do not understand the local wisdom that arises in their respective regions, students have not been able to integrate the concept of learning with the phenomena encountered in their environment. Though local wisdom contains local culture from the past that supports life now. Local wisdom is needed in the tradition that grows in the community to manage existing natural and human resources so that sustainability is maintained. Sidoarjo regency, precisely in the

Ngingas Village, Waru District is known as a metal industry village which produces many metal objects both domestically and abroad. So that it is appropriate for the local wisdom of metal villages to be internalized into learning in schools, so that students are more familiar with the local wisdom of metal villages in their area. Because from the results of the questionnaires it turned out that 780% of students stated that they did not yet know the local wisdom in their area could be used as learning materials that supported the material. One of the innovations that can be done to overcome the above problems is to develop teaching materials based on local wisdom in Ngingas Village.

Some alternatives to solve this problem are by developing local wisdom-based teaching materials in Ngingas Village. This teaching material is also adapted to the conditions of students in the surrounding area. Another expected outcome of the development of this teaching material is that it can improve students' critical thinking skills. Critical thinking has many benefits in everyday life. Critical thinking teaches a variety of thinking skills which, if practiced significantly, can improve the ability to understand arguments or issues discussed in teaching materials (Bassham, et al., 2011).

The development of local wisdom-based science teaching materials in Ngingas Village in learning is believed to be one of the teacher's methods for making learning easier for students to understand the science concept, so that their thinking develops. The local wisdom-based development strategy can provide a nurturant effect of developing skills such as critical logical thinking (Hariri, et al., 2016). People who think critically will evaluate and then conclude things based on facts to make decisions (Hassoubah, 2007). So that one characteristic of people who think critically will always look for and explain the relationship between the problems discussed with experience or other similar problems. This relates to the experience of students in utilizing local wisdom in their area in supporting learners' learning about the material encountered in learning.

Critical thinking is often referred to as thinking that seeks deficiencies or mistakes of people or groups, whereas criticism is not the same as criticism which tends to attempt to overthrow or attack others, critical thinking is the ability to issue logical and rational opinions to find facts from a view. This misunderstanding is the limitation of freedom in increasing thinking in order to develop. According to the father of modern critical thinking tradition explained that critical thinking is an activity in weighing, continuing and researching a belief or knowledge that is not easily accepted but by expressing various arguments that support rational conclusions. Critical thinking is considered the same as active thinking (John Dewey in Sihotang, et al, 2012). Critical thinking is taught to students to think critically at different points of view on related issues and their consequences in daily life and evaluate a problem from a social and environmental perspective (Mapeala & Siew, 2015). Critical thinking is a reasonable thing that is reflective thinking focused on deciding what to believe or do, it involves affective dispositions and cognitive skills (Ennis, 1987). The approach used to make it easier to recognize elements in the critical thinking process that can use the FRISCO approach (Ennis, 2012). These elements include : focus, reason, inference, situation, clarity, and overview.

Teaching materials are the most important supporting part for curriculum development in the implementation of education. Teaching materials are part of learning tools including syllabus and plan for implementing learning. Teaching material is a composition of materials collected from various learning resources that are systematically made (Prastowo, 2016). The importance of teaching materials used by various parties has functions including for teachers and students. For teachers, among others, can shorten the time in teaching activities, change the teacher from the teacher to become a facilitator, improve the learning process to be more interactive and effective, as a reference in focusing all learning activities that are part of the substance of competencies taught to students, as well as evaluation tools mastery of learning outcomes.

Local wisdom is the personality or identity of the inventions, feelings and intentions of a nation that has the ability to absorb, even cultivate cultures originating from foreign cultures or other nations into their own character and abilities (Wibowo, 2015). Local wisdom is a habit that is formed in the community based on the results of a particular nation which is not necessarily owned by other nations. For this reason, skills are needed to maintain the management of existing natural resources by increasing human resources owned by a nation so that the existing culture remains and is preserved. Local wisdom-based education is education that utilizes the needs of global competitiveness and local excellence in aspects of economics, language, culture, information and communication technology, students' human and environmental conditions, etc. which contain benefits for the development of student competencies at all levels of education units. especially elementary schools both formal and non-formal education that have accreditation or recognition from the government (Toto Ruhimat in Asmawi, 2012).

II. RESEARCH METHODE

The following research is development research using the 4D model, namely the development of local wisdom-based Science Teaching Materials in Ngingas Village to improve the critical thinking skills of fifth grade students of elementary school. The subjects in this study were local wisdom-based science teaching materials in Ngingas Village to improve the critical thinking skills of fifth grade students of State Elementary School in the even semester of the school year 2018-2019. This research will be carried out in the even semester of the school year 2018-2019 which is located in Ngingas Elementary School, Waru District, Sidoarjo Regency. Ngingas Elementary School was chosen as a research site because it was one of the areas where most of the population worked as metal entrepreneurs which was a form of local wisdom in the school. The research design uses research and development development research designs belonging to Thiagarajan, Semmel, and Semel (1974) or referred to as 4D which consists of four stages including: Define, Design, Develop, and Disseminates. The stages of defining to analyze the objectives and boundaries of the subject matter include five steps, among others, a needs analysis based on the characteristics and abilities of fifth grade elementary school students shows that 80% of students have never used local wisdom to develop heat transfer

material. Analysis to students related to the academic ability of students, the emotional and social background of students, physical characteristics, and the level of cognitive development of students . design phase consists of several stages, among others by arranging the test, media selection, the selection format, the preliminary draft. The development phase includes teaching materials, syllabus, learning implementation plans (RPP), student activity sheets (LKPD) , and tests of critical thinking skills. Validity learning measured from teaching materials and learning tools, learning practicality measured by adherence to learning, the activities of students , and the response of students to learning. The effectiveness of learning is measured by the readability of teaching materials and the increase in learning outcomes from tests of critical thinking skills from pretest to posttest.

III. RESULT AND DISCUSSION

Preparation of research results based on data obtained during the development of teaching materials and the results of limited trials conducted at the Ngingas Waru Sidoarjo. The research subject was in the form of local wisdom-based teaching materials in Ngingas Village related to heat transfer, while those acting as observers were fifth grade teachers at Ngingas Elementary School. The results of the development and implementation of teaching materials developed along with supporting devices include syllabus, Learning Implementation Plan (RPP), Student Activity Sheet (LKPD), and Critical Thinking Skills Test.

A. Results V alidasi development of teaching materials

Complete and understandable layout design of teaching material contents. Complete teaching materials include writing titles, subtitles, understanding concepts, page numbers, and captions of each material supported by related images. A consistent layout according to a predetermined pattern with spaces between paragraphs that are clearly arranged between the right and left margins. Teaching materials can be understood by the use of the upper and lower desian , as well as the middle part based on white to clarify the material contained in the teaching material so as to facilitate the level of readability of students . Local wisdom chosen in the study of this material included making crowbar. Crowbar is an object made of iron, the shape of both ends is flat and pointed, making semi-traditional crowbar with combustion. Making crowbar is one form of activity that is still semi-traditional as a work carried out for generations . shows that overall the development of teaching materials has a valid category mode. The average percentage of suitability of the assessment given by the validator to the instructional materials developed is 94.15%. The development of teaching materials is declared valid based on the preparation in accordance with the steps in accordance with the development instruments found in the Minister of Education and Culture in 2017.

B. Practicality of Teaching Materials

Practicality teaching materials can be observed from some of the following activities: (1) H acyl learning keterlaksanaan shows the general assessment of the enforceability of the third meeting of the RPP on many found very good category. Overall the percentage of RPP implementation in the score is between 75% and 100%. So that it can be stated that learning using local wisdom-based teaching materials can be carried out very well. (2) Student activities during the learning process using local wisdom-based teaching materials indicate that the activities of students during the learning process using observed local wisdom-based teaching materials have a very good category. Both observers have the same and consistent results so that the instrument is said to be very good and reliable. In the activity propose a simple explanation students have the ability to provide an explanation based on existing knowledge. This affects the existence of teaching materials that support students to better understand the existence of existing local wisdom related to learning materials. While the irrelevant aspects there are still students who do not focus on learning and are a little crowded which makes the class less conducive. (3) The response of students' interest in the development of teaching materials carried out in class towards the use of local wisdom-based teaching materials in learning to improve critical thinking skills. The results of the response of students in a questionnaire to measure the practicality of teaching materials that produce a response that is carried on the process of learning, t erdapat 20 questions to support the development of teaching materials so that researchers concluded that based teaching materials keraifan local village Ngingas developed by the researchers have the category level of interest higher than students .

C. Effectiveness of Teaching Materials

The effectiveness of teaching materials is measured from the results of readability and learning outcomes of tests of critical thinking skills. (1) The readability test of local wisdom-based teaching materials is used to determine the level of readability of the teaching materials developed. The results of the calculation using sentence hitching by using appropriate words so that the teaching material can be read shows the average number of words that can be completed by students is 36 words out of 50 words or the percentage obtained is 72%. This shows that teaching materials based on local wisdom can be used in learning activities. (2) Practicality Critical thinking skills are assessed using assessment rubrics that are presented in the form of numbers. The following results of the pretest and posttest of the critical thinking of students in using local wisdom-based teaching materials in Ngingas Village showed that the average results of the prestige scores of students' critical thinking skills were 84.8 % . The results of critical thinking tests can be observed in table 1.

Table 1 Learning Outcomes Pretends and Postings Critical Thinking Skills

No.	Name	Value				N	Kat
		Pretest	Completeness	Postes	Completeness		
1	FS	24	Not completed	42	Not completed	0.23	Low
2	Elementary school	30	Not completed	84	Complete	0.68	Is being

No.	Name	Value			N	Kat	
		Pretest	Completeness	Postes			Completeness
3	AF	38	Not completed	88	Complete	0.64	Is being
4	ZS	36	Not completed	88	Complete	0.65	Is being
5	SW	80	Complete	100	Complete	0.25	Low
6	FZ	40	Not completed	94	Complete	0.68	Is being
7	AF	82	Complete	100	Complete	0.23	Low
8	ID	36	Not completed	94	Complete	0.73	High
9	MA	22	Not completed	92	Complete	0.88	High
10	A A	36	Not completed	92	Complete	0.7	High
Average		42.4		84.8		0.742	Is being
% Complete		20%		90%			
% hasn't finished yet		80%		10%			

N-gain value meme n Uhi category is, it indicates there is an average increase in critical thinking test students after learning using teaching materials based on local wisdom. Students who complete learning are as much as 90%, while those that have not been completed are 10%. Based on the analysis of the results of critical thinking tests the students' incompleteness as a result of lack of understanding the text contained in the test questions.

Based on this description, local wisdom-based science teaching materials in Ngingas Village along with supporting tools for overall learning have met all the criteria of a good learning component because they have validity criteria, practicality, and effectiveness. Teaching materials that have been developed and received validation from the expert team have a high percentage of agreement .

IV. CONCLUSION

Data analysis and discussion of the results of the discussion from the previous chapter related to the formulation of the problem and the purpose of the study, resulted in the conclusion of local wisdom-based science teaching materials in Ngingas Village along with supporting devices that have been developed as follows.

1. Science development of teaching materials based on local wisdom in the village Ngingas along with supporting devices have been validated by a team of experts has declared to the level of an invalid 's good at 94.13% and can be used to improve critical thinking skills fifth grade elementary school.
2. Learning using science materials based on local wisdom to improve critical thinking skills has good practicality criteria supported by the implementation of learning plans , including student activities that have a good category during the learning process, as well as student responses of more than 70% who are interested in teaching materials developed.
3. Local wisdom-based science teaching materials in Ngingas Village have a readability level of 72% which means teaching materials are easily understood to influence the increase in results from pretest to post-test to reach completeness so that the developed learning material meets the effectiveness criteria for improving critical thinking skills of fifth grade students .

Suggestions that can be stated by researchers related to research that has been done include:

1. The application of local wisdom-based science teaching materials in Ngingas Village to improve critical thinking skills for teachers must be able to further explore the local wisdom found in the area of learning and be able to provide a link between local wisdom and the knowledge of natural science in it.
2. Application of science teaching materials based on local wisdom in the village Ngingas to improve critical thinking skills of students can be developed for conserve where local knowledge of the region with the cooperation of stakeholders in the area.
3. Learning related to improving students thinking skills is very important to be applied in learning activities because it can attract students interest and activeness .
4. Learning by using local wisdom-based teaching materials in Desa Ngingas can be developed by expanding the subject of students along with a more complex study of material.

REFERENCES

- Ariyanto, M., Kristin, F., & Anugraheni, I. (2018). Penerapan Model Pembelajaran Problem Solving Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Hasil Belajar Siswa. *Jurnal Guru Kita PGSD*, 2(3), 106-115.
- BSNP. (2008). *Pengembangan Bahan Ajar*. Buletin BSNP 1(2): 19-23.
- Depdiknas. (2003). Undang-Undang Republik Indonesia Nomor 20 tahun 2003 Tentang Sistem Pendidikan Nasional. Jakarta: Dirjen Pendidikan Dasar dan Menengah.
- Duncan, M. (2014). How the Cultural Contexts of Urban Teaching Affect Novice Science Educators: Implications for School Leaders. *International Journal of Educational Leadership Preparation*, 9(1), n1.
- Ennis H. Robert (1995). *Critical thinking*. Prentice Hall: Upper Saddle River, NJ 07458
- Jumadi, dkk. (2018). Pengembangan Modul IPA berbasis keterampilan proses sains untuk meningkatkan kemampuan berpikir kritis peserta didik kelas VII SMP pada materi kalor. *Jurnal Pendidikan IPA* 7(2).262-272.
- Laksana, D. N. L., Kurniawan, P. A. W., & Niftalia, I. (2018). Pengembangan Bahan Ajar Tematik SD Kelas IV Berbasis Kearifan Lokal Masyarakat Ngada. *Jurnal Ilmiah Pendidikan Citra Bakti*, 3(1), 1-10.
- Lesley-Jane, et.al. (2013). Critical thinking skill for education student +M. learning matter. *Second Edition Sage*.
- Prastowo, Andi (2011). *Panduan kreatif membuat bahan ajar inovatif*. Jogjakarta: Diva Press.
- Prastowo, Andi (2013). *Panduan kreatif membuat bahan ajar tematik*. Jogjakarta: Diva Press.
- Prins, G. T., Bulte, A. M., & Pilot, A. (2018). Designing context-based teaching materials by transforming authentic scientific modelling practices in chemistry. *International Journal of Science Education*, 1-28.
- Purwanto, J., & Hasanah, B. U. (2014). Efektivitas Model Pembelajaran Inkuiri Tipe Pictorial Riddle dengan Konten Integrasi-Interkoneksi pada Materi Suhu dan Kalor terhadap Kemampuan Berpikir Kritis Siswa SMA. *Jurnal Kaunia*, 10(2), 117-127.
- Sani, Abdullah Ridwan. (2014). *Pembelajaran saintifik untuk implementasi kurikulum 2013*. Jakarta: Bumi Aksara
- Sari, R., Harijanto, A., & Wahyuni, S. (2018). Pengembangan Lks Ipa Berbasis Kearifan Lokal Kopi Pada Pokok Bahasan Usaha Dan Energi Di Smp. *JURNAL PEMBELAJARAN FISIKA*, 7(1), 70-77.
- Sihotang, dkk. (2012). *Critical Thinking membangun pemikiran logis*. Jakarta: Pustaka Sinar Harapan.
- Suastra, I. W., Tika, K., & Kariasa, N. (2011). Efektivitas model pembelajaran sains berbasis budaya lokal untuk mengembangkan kompetensi dasar sains dan nilai kearifan lokal di SMP. *Jurnal Penelitian dan Pengembangan Pendidikan*, 5(3), 258-273.
- Sugiyono (2016). *Metode penelitian & pengembangan research and development*. Bandung: Alfabeta
- Sulardi, S., Nur, M., & Widodo, W. (2017). Pengembangan Perangkat Pembelajaran Fisika Model Problem Based Learning (Pbl) Untuk Melatih Keterampilan Berpikir Kritis Siswa. *JPPS (Jurnal Penelitian Pendidikan Sains)*, 5(1), 802-810.
- Thiagarajan, Semmel, DS&Semmel M.I. (1974). *Instructional Development for Training Teacher of Exceptional Children*. A. Sour Book. Blomington: Center for Innovation on Teaching the Handicapped.
- Tiezzi, E., Marchettini, N., & Rosini, M. (2003). Extending the environmental wisdom beyond the local scenario: eco-dynamic analysis and the learning community. *WIT Transactions on Ecology and the Environment*, 63.
- TIMSS & PIRLS International Study Center. (2012). TIMSS 2011 international results in science. Retrieved from Boston: The TIMSS & PIRLS International Study Center, Boston College: timss.bc.edu/timss2011/release.html. [04 Agustus 2015].
- Wahyuni, S. (2015, September). Pengembangan bahan Ajar IPA untuk meningkatkan kemampuan berpikir kritis siswa SMP. In *PROSIDING: Seminar Nasional Fisika dan Pendidikan Fisika*(Vol. 6, No. 6).

Wisudawati, A.W., & Sulistyawati, E. (2013). *Metodologi pembelajaran IPA sesuaikurikulum 2013*. Jakarta: Bumi Aksara.

Yuniyati, S. (2018). *Pengembangan Bahan Ajar Tematik Berbasis Kearifan Lokal Pada Tema" Daerah Tempat Tinggalku" Untuk Peserta Didik Kelas Iv Sekolah Dasar* (Doctoral dissertation, Universitas Sebelas Maret).

Yusuf, M. (2018). Pengembangan Perangkat Pembelajaran IPA Berbasis Keterampilan Proses untuk Meningkatkan Keterampilan Berpikir Kritis Siswa SD. *Pedagogia: Jurnal Pendidikan*, 7(1), 32-46.

AUTHORS

First Author – Fita Nurul Azizah, Post Graduate, Universitas Negeri Surabaya
and email : fitahisna@gmail.com

Second Author – Suryanti, Lecturer, Universitas Negeri Surabaya
and email : suryanti@unesa.ac.id

Third Author – Widowati Budijastuti, Lecturer, Universitas Negeri Surabaya
and email : widowatibudijastuti@unesa.ac.id