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Developing the Book of Student Worksheets based on Local Potentials through Scientific Reading Based Project Model for the Fifth Graders of Elementary School

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Abstract

This research aims to assess the eligibility of student worksheets based on the local potentials of Kebumen Regency through the reading scientific based project model for the fifth graders based on four aspects, namely content feasibility, presentation feasibility, language feasibility, media feasibility, as well as seeing the readability of teachers and students, especially to help students recognize the potentials of their own region through meaningful learning. The development model used in this research is adapted from the 4-D model developed by Thiagarajan, Semmel, and Semmel that consists of 4 stages, namely: define stage, design stage, develop stage, and disseminate stage. The results showed that student worksheets based on local potentials of Kebumen Regency through the scientific reading based project model for the fifth graders meet the four criteria of eligibility and readability. This can be seen from the results of the student worksheet assessment by material expert showed the assessment criteria of "feasible and highly valid" (0.84), the assessment by the linguist showed the assessment criteria of "feasible and valid" (0.58), and the assessment by media expert showed the assessment criteria of "feasible and valid" (0.55), the assessment by teacher showed the assessment criteria of "feasible and highly valid" (0.97), and the assessment by students showed the assessment criteria of "feasible and highly valid" (0, 96). Based on the results of the assessments, student worksheets based on local potentials of Kebumen Regency through the scientific reading based project model for the fifth graders meet the eligibility and legibility criteria that can be used at schools.

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INTRODUCTION

The need of high quality education in 21st century is increasing. Education plays an important role in building students' 21st Century skills which include critical thinking, collaborative, communicative, creative, technological literacy, problem solving, human literacy, and self-confidence skills. Along with this, 21st century skills are indispensable as the goal of education is to be fair for everyone. This is supported by the Indonesian government as outlined in Law Number 20 of 2003 concerning the National Education System in Article 3 which reads: "National education functions to develop skills and build the character and civilization of a nation with dignity in order to educate the nation's life, aimed to develop its potential to become human beings who believe in the Almighty God and be pious, have noble character, are healthy, knowledgeable, capable, creative, independent, democratic and responsible. " Later in the article 14, formal education consisted on primary education, secondary education, and higher education is written. Based on the foregoing, elementary school is included in the formal education level.

Students in elementary school level are between 7 and 12 years old. According to Piaget's theory, children in 7 to 12 years old belong to the stage of concrete operational development. At this time, they can use logical thinking but are limited to real objects. Therefore, at children could not think logically if the interlocutors only used symbols or were abstract, so that quality learning for students during the concrete operational period is discovering. Teachers need to arrange various kinds of tasks such as scientific practicums and projects to help them (Jarvis, 2009). This is also in accordance with Buhler's theory in Sobur (2011) which stated that children of 9-11 years old enter the fourth phase in the developmental stage where this period can also be called a period of investigating, trying, and experimenting. The low HOTs of students is caused by the lack of opportunities to think scientifically (Qori Agussuryani et al., 2020)

Based on the opinions of the experts above, it can be concluded that the importance of learning to be quality must be in accordance with the development phase of elementary school student. It is learning that is discovering through experiments, scientific practicum, and experiments using real objects that are related to the student's environment.

To support the plan above, facilities that can support the creation of learning in accordance with the development phase of elementary school students are needed so that it can produce high quality learning. One of them is through books. According to Lailuz, et al. (2020) books are an important means of efficiency and effectiveness in developing and improving science, technology and cultural arts.

Books that are actually necessary and important for elementary students are the book that includes student worksheets with appropriate learning models supported by materials, tools, and materials as well as experimental steps that are related to the student environment in the form of local potential, so as to stimulate students to conduct scientific practicum and direct projects. According to Asmani (2012), local potential is anything that is characteristic of regionalism, covering various aspects. In addition to being in accordance with the phase of student development in the form of real objects, local potential in Permendikbud Number 81 A of 2013 concerning Curriculum Implementation explains that understanding the potential of the area of residence is useful in providing skills, attitudes, and knowledge to students. However, such textbooks are hard to found. The available learning books still contain abstract material with tools and materials that are unfamiliar from the student's environment.

The results of the analysis of the teacher and student booksof fifth graders of SD Negeri 4 Karanganyar, Kebumen Regency, Central Java Province on the 7th theme "Events in Life", it is known that the learning material is not real. One example is in the subject of sub-theme 3 of theme 2, students are asked to observe and analyze images in the form of crystallizing snow ice. The

crystallization of snow ice is an event that is unfamiliar with the student environment because Indonesia has no snow season. Meanwhile, the area of Kebumen Regency itself has a lot of local wealth, one of which is wide sea with sunshine all year round, making Kebumen is able to produce abundant salt. Therefore, the snow crystallization material needs to be replaced by salt crystallization. This is because the salt crystallization is close to the students and can be observed directly. The main problem is the absence of local potential-based student worksheets which causes many students to find it difficult to obtain and observe information and cannot do experiments. Therefore, the learning that occurs is not considered to be high quality because it only provides facts and is not in accordance with the phase of student development which requires an experiment/ discovery.

Based on the existing problems, the book of student worksheets based on the local potential of Kebumen Regency is needed using the Scientific Reading Based Project (SRBP) model. The SRBP model is a learning model developed by Suryandari, Sajidan, Rahardjo & Prasetyo where the learning uses projects and research and is based on scientific reading activities . According to Hsu & Smith in (Suryandari et al., 2019) the benefits of using the PBL (Project Based Learning) model in learning are training to think critically, creatively, and innovatively. The application of PQ4R (Preview, Question, Read, Reflect, Recite, Review) according to Kim, et al. (2013) is able to train students to solve problems in inquiry, investigation, and independently. Based on the opinions of the experts above, it can be concluded that the SRBP model is indispensable as a learning model in local potential-based student worksheets because the model is able to create learning that is in accordance with the phase of student development, namely learning that is investigating and discovering through scientific projects and practicum.

The data above confirms that the book of student worksheets based on local potential with SRBP models need to be applied in teaching the fifth graders so that they had no difficulty in understanding the learning material. In addition, it helps students obtain and observe complete and real information, and be able to do scientific practicum and projects directly so that the high quality learning can be achieved.

METHOD

This is the research and development type of research. Sugiyono (2012) suggests that research and development is a research method used to produce a product and test the effectiveness of the product. The research model chosen in this research uses a 4-D model development research model by Thiagarajan, Semmel, and Semmel. According to Thiagarajan et al. (1974) the 4-D model consists of 4 stages, namely: the Define, Design, Develop and Disseminate stages. According to the National Standards Agency in Khoiriyah (2019), high quality student worksheets must meet four aspects including: content feasibility, linguistic, presentation, and media aspects. The research subjects consisted of one material expert, one linguist, and one media expert, as well as one teacher and seven students.

Data Collection Techniques

Observation

Observation was conducted in fifth graders of Elementary School of 4 Karanganyar on January 6th, 2020. The results of the observation indicated that: 1) the learning material was not related to the students' environment, less concise, and still general in nature; 2) there are still many students who do not know the local potential of their own area, the local potential of Kebumen Regency; 3) the unavailability of student worksheets based on local potentials of Kebumen Regency on science material; 4) students have not been actively involved in learning so

that the learning that occurs is less qualified which is indicated by student learning outcomes that are not optimal with the average score of the final test semester one in science subjects is only 72.25. Researchers chose Elementary School of 4 Karanganyar because it is the favorite elementary school in the Karanganyar sub-district.

Interview

Interview is a technique for collecting data through direct or indirect questions and answers with respondents in order to achieve goals (Arifin, 2012). Interview allows researchers to get more in-depth data from respondents. Interview was conducted in fifth graders of Elementary School of 4 Karanganyar on January 6th, 2020. The result of the interview of teachers and students in fifth grade of Elementary School of 4 Karanganyar showed the same results in which most students got the low quality of learning since they found it hard to obtain and observe the information in the material, as well as experiment or discover the object directly.

Questionnaire

Questionnaire is a data collection technique that is carried out by providing a set of written statements or questions to respondents to answer (Sugiyono, 2012). The questionnaire in this research was in the form of an assessment sheet aimed at several validation experts, teachers and students. The assessments proposed in this study include: material expert test, linguist test, media expert test, and teacher and student legibility test.

Data Analysis Technique

The data analysis of the eligibility assessment by experts, teachers and students was done using computing applications Microsoft Excel 2010. Meanwhile, the test result analysis of experts, teachers and students used the formula of Aiken V.

The results of the assessment of the experts were calculated using the Aiken V method (Retnawati, 2016):

$$V = \frac{\sum s}{[n\,(c-1)]}$$

Information:
V = validity index
s = score assigned by each expert minus the lowest score in the category used (s = r - lo)
r = category score given by the assessor/ expert
lo = lowest score in the scoring category
n = number of assessor/ experts
c = number of categories that can be selected by assessor/ expert

From the results of the Aiken V index calculation, an item or device can be categorized based on its index with the classification in table 1 (Retnawati, 2016).

Table 1 Aiken V Index Classification

Average			Classification
	0.40		Less valid
0.40	V	0.80	Valid

0.80	Highly valid

RESULT AND DISCUSSION

Based on the 4-D development model by Thiagarajan, Semmel, and Semmel, the development process is divided into several development stages consisting of: (a) the define stage, (b) the design stage, (c) the develop stage, and (d) the disseminate stage. However, in this research the development stage is only up to the development stage. The stages in the 4-D model are presented in table 2.

Table 2 Stages of 4-D model development

No	Steps	Steps taken
1.	Define	Student analysis
		Purpose specification
2.	Design	Selection of student worksheet formats
		Reference material
		Design student worksheets
		Student worksheet products
3.	Develop	The results of the assessment of the validity test of the experts
		Revision
		Limited field test

Define Stage

The define stage is useful in defining the various needs and information needed in making the product. This stage is divided into 2 steps, namely:

Student Analysis

Student analysis is useful for considering student worksheets to be developed so that they are in line with student development and needs. This analysis is carried out by considering the students' needs, abilities, experiences, and characteristics. Based on the results of the analysis of the characteristics of the fifth graders, they are generally 11 years old, where in Piaget's theory of development, children aged 7-12 years are classified in the concrete operational stage. Children in the stage need real objects in thinking so they need practical, experimental, and discovering learning. Supported by data from observations and interviews with teachers and the fifth graders of Elementary School of 4 Karanganyar, it was known that the learning process is not in high quality because there were no books that match their development. In addition, many students found it difficult to obtain and observe information and could not carry out experiments because the existing learning material is abstract. This showed the need for the book of student worksheets based on local potentials since the model is able to create learning that is in accordance with the phase of student development, namely learning that is investigating and discovering through real scientific projects and practicum .

Purpose Specifications

The objective specification serves to clarify the development goals, so that later it can measure how much the goals were achieved. The purpose of developing participant worksheets based on the local potential of Kebumen Regency through the Scientific Reading Based Project (SRBP) model is to help the fifth graders and teachers in facilitating learning resources so that they can realize quality

learning, learning that fits their needs, and the development phase of students with learning that is discovering, scientific practicum, experiments, and learning with real objects in the form of potential in their environment.

Develop

The results at the develop stage in this study is consisted of three stages, namely: (1) the results of the assessment of student worksheets by experts, (2) revision, (3) limited field testing which will be explained as follows:

Assessment of Student Worksheets by Experts

Student workbooks that have been developed are tested by experts (material experts, linguists, and media experts) to determine the appropriateness of student worksheets.

The following table is the final result of the overall recapitulation of student worksheet assessments from material experts, linguist, and media experts using *the Aiken V index* classification method. The result is presented in table 3.

Table 3 Overall Expert Assessment

No.	Evaluator	Score	Criteria
1.	Material Expert	0.84	Highly Valid
2.	Linguist	0.58	Valid
3.	Media Expert	0.55	Valid

Based on table 3 it can be concluded that the developed student worksheet is suitable for use in learning. This can be seen from the results the material expert showed the assessment criteria of "feasible and highly valid" (0 , 84), assessment by the linguist showed the assessment criteria of "feasible and valid" (0.58), and the assessment of media expert indicates the assessment criteria of "feasible and valid" (0.55). Thus the developed student worksheet book is suitable for use in learning.

Revision

Revision is the stage of improving student worksheet products that have been validated in accordance with suggestions, comments, and criticisms from the validators.

The following is a revision of the student worksheet based on the validation of material experts, linguists, and media experts which are presented in table 4.

Table 4 the results of the revision of student worksheet products

No.	Validators	Revision results
1.	Material experts	Chart improvements Adjustment of images of experimental tools and materials with a description of the number of tools and materials needed. Improvement of the sentence at the conclusion, to "heat can change the temperature of an object because it is caused by .....". Improvement of the sentence at the conclusion, to "heat can change the temperature of an object because it is caused by .....".
2.	Linguist	Improvement of the second and third paragraphs into one paragraph. Replacing foreign brick images with local bricks Improve the sentence "observe"

		Improvement of the writing of the word "and"
		Improvement of writing two sentences into one sentence
		Add an exclamation point at the end of a sentence.
		Reduce periods in the question section
3.	Media experts	Adding a tool that can facilitate students to carry out experiments on the nature of liquid objects flowing from high to low.

Limited Field Test

After the product is validated and revised, the final product is obtained in the form of a book of student worksheets based on the local potential of Kebumen Regency using Scientific Reading Based Project (SRBP) model for the fifth graders that is feasible to be tested in the field. Field testing was carried out with limited respondents that are a teacher and seven fifth graders. Student worksheets that had been developed were tested by the teacher and students to determine the readability of the student worksheets.

Following are the results of the recapitulation of student worksheet assessments from teachers and students.

Table 5 Questionnaire for Student and Student Worksheet Readability

No.	Evaluator	Score	Criteria
1.	Teacher	0.97	Highly valid
2.	Students	0.96	Highly valid

Based on table 5 it can be concluded that the developed student worksheet books are suitable for use in learning, and make it easier for students to understand the material. This can be seen from the results of the teacher's assessment criteria of "feasible and highly valid" (0,97), and from the students showed the assessment criteria of "feasible and highly valid" (0.96).

CONCLUSION

The result of student worksheets assessment by the material expert showed the assessment criteria of "feasible and highly valid" (0 , 84), assessment by the linguist showed the assessment criteria of "feasible and valid" (0.58), and the assessment of media expert indicates the assessment criteria of "feasible and valid" (0.55). Then the results of the teacher's assessment showed the assessment criteria of "feasible and highly valid" (0,97), and from the students showed the assessment criteria of "feasible and highly valid" (0.96). Based on the results of the assessment above, it can be concluded that the student worksheet based on local potential through the Scientific Reading Based Project model for the fifth graders model is feasible to use.

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