

Feasibility of Scientific-Based Student Worksheets to Improve the Settlement of Environmental Problems of Elementary School Students

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Abstract. This study aims to one of them to determine the feasibility of content, language, presentation, and graphics as a result of the development of elementary school student worksheets based on a scientific approach to improve the skills to solve environmental problems. As for this opportunity, researchers will review the stages of development or development stage. At this stage, it will discuss aspects of the feasibility of content, language, presentation, and graphic development of student activity sheets based on scientific approaches. The instruments used are the instrument checklist validation of content, language, display, and graphics validation. The results of the validity of the content, language, recitation, and graphics of the elementary school student activity sheets based on the scientific approach are feasible to be applied in learning in primary schools.

Keywords: student worksheet, scientific approach, environmental problems, elementary school.

1. Introduction

The nature of education is a conscious effort that is carried out as a process to make humans useful for themselves, fellow human beings, the environment, and all its contents and civilization. In the process of teaching and learning activities, the teacher can utilize various kinds of learning resources to be given to students to support the achievement of competency, one of which is the student activity sheet. The target, according to the indicator of the success of a teaching and learning process is the teaching material used by the teacher, should be accompanied by student activity sheets [1]. Student activity sheet contains instructions for student activities in learning activities to apply or practice the knowledge that has been obtained. Through the activities, of working on the student activity sheet, the teacher can observe and pay attention to students who have mastered the material provided and students who have not mastered the material. So, it takes an ideal student activity sheet according to the standards set out in PP (Government Regulation) No. 19 of 2005 article 43 point 5 concerning national education standards which includes the feasibility of the content, the feasibility of language, the feasibility of serving and the feasibility of graphics.

Different from the student activity sheet circulating and developing at this time which is still far from the feasibility standard. Student activity sheets that are implemented in learning activities only work on multiple-choice questions and descriptions that are neatly arranged on paper without involving student activities directly. This is evidenced by the results of observations of researchers on several samples of elementary schools in Aceh Besar District,

which showed that the student activity sheets used by the teacher were only multiple-choice questions.

Besides, based on the observations of researchers, it is also known that student activity sheets in schools are student activity sheets purchased from certain publishers, not the results of the teacher's work. In fact, it is not appropriate for teachers or schools to rely solely on instant student activity sheets that are circulating on the market without being checked first [2], [3]. In addition, the results of the interview also show that teachers prefer to buy student activity sheets so that they are caused by several reasons, including (1) teachers do not have time to independently create student activity sheets, (2) schools do not provide budgets for the development of making teaching materials for teachers, (3) the teachers are more preoccupied with school administration such as filling online report cards in the 2013 curriculum, and (4) teacher's ignorance of how to develop student activity sheets.

Based on the explanation, the student activity sheet based on a scientific approach is needed in the learning process because it contains learning activities that can involve all students to be active visually, verbally, or kinesthetic. Through the development of student activity sheets based on scientific approaches, more learning activities utilize all the potential of students. Student activity sheets based on the scientific approach provide opportunities for students to be more innovative and creative in the skills to solve a problem or problem. The benefit, when students find a problem in their daily lives is the same as what they found in the student activity sheet based on a scientific approach, they can solve it quickly. Later, the student activity sheet will be combined with the essential competencies of Natural Sciences (IPA) in fourth-grade elementary school.

Through the development of scientific-based student activity sheets, students are expected to be able to conduct behavior, attitude, actions, and communication activities properly. Teachers must be able to help students develop their behavior patterns, improve their standards of behavior, and implement the rules as a tool to enforce discipline in each of their activities [4], [5]. Student activity sheets based on a scientific approach will help students develop their scientific abilities in every life activity. In the learning process students will naturally learn to decipher problems, then seek solutions. Students will conduct observations, ask questions, process, conclude, and create. Student activities can be carried out in learning through the work of student activity sheets based on a scientific approach. The implication is that students are demanded independently in building their scientific attitude to solve problems. For example, how to wear the right uniform, how to clean yourself thoroughly, how to speak politely, and so on. In essence, the development of student activity sheets based on this scientific approach is intended to improve the skills of solving environmental problems around students and at the same time as a complement to the 2013 curriculum students.

2. Material & Methodology

This type of research is research and development or R & D (Research and Development) which produces student activity sheet products based on scientific approaches. R & D (Research and Development) is a research method used to produce certain products, and test the effectiveness of these products [6]. Development of student activity sheets based on a scientific approach to improve environmental problem solving skills for students in primary schools adapting the Four D Model design (4-stage model) which consists of 4 main stages, namely (1) Define or defining stage, (2) Design or design stage, (3) Development or development stage, (4) Disseminate or deployment stage [7]. As for this opportunity, researchers will review the stages of development or development

stage. At this stage, it will discuss aspects of the feasibility of content, language, presentation, and graphic development of student activity sheets based on scientific approaches. This research place is in Aceh Besar District, Aceh, Indonesia Data retrieval techniques to determine aspects of the feasibility of content, language, display, and graphics development of student activity sheets based on scientific approaches are checklist techniques. The instruments used are the instrument checklist validation of content, language, display, and graphics validation. This instrument is given to two experts writing student worksheets in elementary school. Data analysis techniques resulting from filling in the instrument checklist validation of the feasibility of content, language, presentation, and graphics by experts will be analyzed quantitatively descriptively [6]. The data is described in the range of values in the following interpretation table.

Tabel 1. Validation Interpretation Value

Validation Score (SV)	Interpretation
$1,0 \leq SV \leq 1,5$	Not good, can't be used
$1,6 \leq SV \leq 2,5$	Not good, can be used but many revisions
$2,6 \leq SV \leq 3,5$	Good, can be used but a little revision
$3,6 \leq SV \leq 4,0$	Very good, can be used without revision

3. Results

The results of the validation of the scientific learning student activity sheet show that the overall average score is 127 with the results of validator 1 equal to 125 and validator two same to 128. In the average rating of all components, from component 1-33 is 3, 8, while the average percentage of all parts is 96.3%. The percentage result of 96.3% shows that the student activity sheet based on the scientific approach is very feasible to be applied in learning. Student activity sheets based on a scientific approach can be used to improve environmental problem-solving skills.

The components that get an average score of 4 are components (1) the completeness of the material presented in accordance with competence, (2) the breadth of the material is explained according to the development of students, (3) the depth of material is explained by an explanation of facts, concepts, and generalizations that are appropriate with the level of development of students, (4) the accuracy of the material is presented in accordance with competence, (5) the accuracy of the questions is presented in accordance with the material context, (6) pictures and illustrations in accordance with the context of the material, accuracy of the material, drawings and illustrations include clear sources, (7) material and questions can encourage students' curiosity, (8) the systematic presentation contains the title, objectives, instructions, and questions, (9) the material is presented in harmony with easy levels to difficult, (10) the questions presented are sufficient for students with difficulty simple to difficult, (11) includes instructions for working on student activity sheets, (12) there are covers and table of contents, (13) exercises and questions about scrutiny provide a scientific approach, namely; observe, ask, collect information, process, and communicate, (14) material, questions, instructions, and activities are easy to understand and in accordance with the development of students, (15) sentences and language used can guide students in working on student activity sheets, (16) the size and type of paper used in accordance with ISO standards namely A4, (17) the illustration of the cover image reflects the material in the student activity sheet, (18) the appearance of images, colors, letters, and harmonious layout, (19) contains illustrations and images that in accordance with the material, (20) using easy-to-read letters, (21) illustration drawing components, and balanced sentences, (22) creative in compiling and

layout. All 22 components that get a percentage of 100%, with the criteria "very good, can be used without revision.

The components that get an average score of 3.5 from both validators consist of components (1) questions that are presented to meet the needs of students with a simple level of difficulty to difficult, (2) the accuracy of the terms in accordance with the material context and level of student development, (3) material activity in accordance with the conditions in Indonesia and discuss current issues, (4) there is additional material that is relevant and encourages the expansion of student knowledge, (5) learning activities invite students to be active, (6) exercises and problems reflect problem solving skills namely introduction to problems, developing strategies, exploring solutions, and evaluating, (7) material presented in harmony and each part of the material in harmony, (8) terms and spelling used in accordance with Indonesian rules, (9) display of images, colors, letters, and harmonious layout, (10) the accuracy of the problem is correct and there are no errors, all of the 10 components have a percentage of 87.5% bro, the criteria "very good, can be used without revision".

Based on the validation, it shows that all components of the assessment of validation of scientific-based student activity sheets can be said to be reliable because the results of data calculation show a reliability level of $\geq 75\%$. Following the formula that has been chosen in determining the reliability of the instrument, that the instrument is said to be reliable if the results of the reliability calculation are $\geq 75\%$ [8].

4. Discussion

Based on the data from the check-list, the validity of the content, language, display, and graphics by the expert concluded that the student activity sheet based on the scientific approach obtained excellent criteria. This is because the design of student activity sheets based on a scientific approach takes into account the details of each component of content, language, display, and graphics so that it can be easily used by elementary school students to improve the skills to solve environmental problems [3], [9]. Besides, the designer also always pays attention to the direction of Government Regulation No. 19 of 2005 Article 43 point 5 concerning national education standards, one of which is the eligibility criteria of teaching materials in the form of student activity sheets. The student activity sheet based on this scientific approach was made as interesting as possible and following the criteria for making student worksheets so that the results of the validity of the content, language, display, and graphics of the experts showed a positive response. The student activity sheet based on this scientific approach also has some uniqueness, one of which is two special pages display 3-dimensional images with the theme of protecting the surrounding environment. So it can be ascertained that the student activity sheet based on a scientific approach will help open up students' insight about the importance of protecting the environment [3], [10], [11].

5. Conclusion

The results of the validity of the content, language, recitation, and graphics of student activity sheets based on the scientific approach are feasible to be applied in learning in elementary schools. Overall, each component of the feasibility validation assessment of content, language, recitation and graphic student activity sheets based on a scientific approach gets a high score or right so that it can be used without revision. The student activity sheet based on this scientific approach is expected to be one of the breakthroughs to stimulate the improvement of environmental problem-solving skills around elementary school students.

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