Development of Learning Book Based on Guided Inquiry the Topic Water Cycle in Elementary School

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Abstract. The objectives of this research are: 1) to develop of learning book based on guided inquiry; (2) to investigate the feasibility of learning book based on guided inquiry; and (3) the effectiveness of learning book based on guided inquiry for the students achievement on the topic Water Cycle for Grade V of Elementary School. The research used the Research and Development (R&D) method, which referred to the model claim by Thiagarajan (4D), namely: (1) Define; (2) Design; (3) Development; (4) Disseminate. The respondents of learning book development included field testing respondents consisting 2 validates and 2 practitioners, limited-scale main field testing respondents consisting 8 students, and operational field testing respondents consisting of 28 students in class existing learning. The data of research were gathered through questionnaire, observation, in-depth interview, and test. They were analyzed by using the descriptive qualitative method. Meanwhile, the result of cognitive learning was analyzed by using normalized N-gain to investigate the effectiveness of the developed learning model; Paired Sample T test to investigate the students achievement prior to and following the model use; Independent t test and Anava, to investigate the difference of the result of existing learning class, module class, and that of aggregation class. The results of research are as follows: 1) The product developed is the learning book which is in accordance with guided inquiry, it has student's work sheet, and it is contextual; 2) The result of learning book based on guided inquiry is feasible to be applied on the topic of Water Cycle. Therefore, it is feasible to be used in Elementary School. 3) The results of the effectiveness of the developed learning book based on guided inquiry are indicated by the average scores of the knowledge learning result obtained by the existing control class and book class. In term of attitude learning result, the control class has more students who obtain the very good score (72,65) than the learning book class (65,65) in each aspect. In term of skill learning result, the average score of the students of the control class is higher than that of the book class. Based on the results of research a conclusion is drawn that the characteristics of the developed by guided inquiry-based learning book, it has student's work sheet, and it is contextual. Therefore, it is feasible and effective to improve the student's achievement on the topic Water Cycle for Grade V of Elementary School.

1. Introduction

Learning is a process of change in behavior results from the interaction of students with their environment, because the interaction between students and their environment can develop the attitudes, knowledge, and skills. Learning is a process of seeing, observing and understanding a thing (Ilahi, 2012). Changes in student behavior must be planned deliberately through learning activities. Learning

is a process that aims to facilitate students to have specific competencies such as knowledge, skills, and attitudes required to perform a task or job. Learning is only done by transferring knowledge from teachers to students will lead to a given concept will not last long in the memory of students. Science or natural science is one of the requirements in the mastery of science and technology. Amalia Sapriati (2009) describes in the book Learning science in elementary school that Bruner learning model and its application in primary science teaching is an information processing activities that finding needs to recognize and describe symptoms that exist in our environment. Models present invention can change the motivation to learn search praise from the outside (external motivation) to the inner satisfaction (motivation from within). Model invention also equip students or learners with practical procedures to solve problems, procedures or steps that have owned it will be able to help solve their problems.

Instructional materials should have high adaptability to the development of science, technology, and flexible. Teaching materials are made to understand the students, teaching materials using simple language, easy to understand, as well as the term used is a generic term. Use of instructional teaching materials can condition more learning activities well planned, independent, and finished with a clear result. Learners can do an activity to learn anytime and anywhere. In line with the above problems, the data midterm test results even in Class VA SDN Pucangsawit Surakarta in 2018/2019 decreased when compared with the results of general tests odd semester of 2018/2019. In general tests odd semester in Class VA SDN Pucangsawit get a scoring average of 74.91 while in the middle of the semester test results get a scoring average of 54.00 with a minimum completeness criteria (KKM) 68. The results of the analysis of absorption into guidelines that the material selected as the material water cycle in development research.

The aim of this study was as follows:

- Provide guided inquiry-based teaching material on the material water cycle.
- Knowing the feasibility of developing material guided inquiry-based teaching materials in the material water cycle.
- Knowing the effectiveness of development material guided inquiry-based teaching materials in the material water cycle.
- Knowing the student learning outcomes in the material development of teaching materials based guided inquiry on the material water cycle.

2. Methods

Wina Sanjaya (2008) explains that according to Hilgard, "Learning is the process by the which an activity originates or changed through training procedures (Wether in the laboratory or in the natural environment) as distinguished from changes by factors not atributable to training". For Hilgard, learning is a process of change through activities or procedures training exercise either in the laboratory or in the natural environment. So that learning is not just accumulating knowledge. Learning is a mental process that occurs within a person, leading to the emergence of behavioral change. Mental activity was due to the interaction with the environment conscious individuals. Learning is a very fundamental thing for humans. Learning can be done anywhere. In Thomas Suharmanto (2006: 13) Yusuf Hadi Miarso states that learning is a process of communication.

Based on the opinion of the above it can be concluded that learning is a process of change that occurs in a person.

Curriculum developed by this model is geared to educate students to have the ability to investigate the (inquiry) and find (discovery). Learning so that children can develop intellectual skills then the subject matter need to be presented with the stage of cognitive development of children which includes the step enactive, iconic and symbolic.

The research method developed is a method of Research and Development with the development of teaching materials guided inquiry-based science. The study design is consistent with research that

developed Thiagarajan et al (1974: 5). The steps of this study is known as the 4D model (Define, Design, Development and Dissemination).

3. Results

3.1 Validation presentation book

The expert presentation of the book involved in the assessment a lecturer of Muhammadiyah University of Solo. Aspects validated by expert presentation module is a general presentation of the organization, presentation considering the significance and usefulness, involving students actively, general display, variations in the delivery of information, content of book, and pay attention to the code of ethics and copyright.

The results of expert validation of the complete book presentation in attachment 4, and visualized in Table 1.

Table 1. Validation Results expert

No	Aspect Rate	Value	Category
1	Public Organizing	3	Good
2	Presentation	3	Good
3	Involving students actively	3	Good
4	Display	3,5	Good
5	Variation	3	Good
6	Content	4	Very Good
7	Code of Ethics and Copyright	4	Very Good
	Average	3,25	Good

Based on Table 1 shows that the value obtained from the expert presentation of the product on the organizational aspects of the public presentation gets a value of 3; presentation aspect consider the significance and usefulness scored 3; aspect involves students actively scored 3; aspect common to see scores 3.5; aspects of the variation in the delivery of information to get a value of 3; aspects of content in the book to get a value of 4; and pay attention to the code of ethics and copyright scored 4. The average value obtained from expert validation serving of the product is 3.25 goes into a good qualifying.

Tabel 2. Data Description Learning Outcomes pretest and posttest

No	Comparison	Aggregation Class		Book Based Class	
		Pretes	Postes	Pretes	Postes
1	Maximum Value	62,50	92,50	60,00	95,00
2	Minimum Value	25,00	57,50	45,00	60,00
3	Average Value	39,10	75,56	53,27	81,64
4	Standar Deviation	7,44	7,59	4,89	7,54

Table 2 based on the average value of a book based class before using book- based learning is 39.10 with a standard deviation of 7.44; The maximum value of 62.50; and a minimum value of 25.00. While the value after learning by using book-based average of 75.56 with a standard deviation of 7.59; the maximum value of 92.50 and a minimum value of 57.50. In the aggregation class average value before learning to use the model, modules, and media is at 53.27 with a standard deviation of 4.89; maximum value of 60.00 and a minimum value of 45.00. Meanwhile, after learning the value of using the model, modules, and the average media student scores be 81.64 with a standard deviation of 7.54; a maximum value of 95.00 and a minimum value of 60.00.

The calculation result t test no difference between student learning outcomes in the classroom knowledge with students in grade aggregation module (sig 0.00 <0.05). The average result of learning student aggregation class higher than the class module. The average grade obtained aggregation is 81.64, while the module class has an average of 75.56.

4. Conclusions

- The books are developed using models or research and development Research and Development (R & D)
- Eligibility test book after module validation by experts presenting scored 3.25 with both categories; by subject matter experts to get a value of 3.62 in the category very well; on expert learning device to get the value of 3.87 in the category very well; the value obtained from the teacher practitioner is 3.42 fit in either category; and a given value amounted to 3.19 students get into either category. After field operational tests overall modules developed good and decent.
- Inquiry Guidance book-based can improve the effectiveness of learning outcomes characterized by increased knowledge of learning outcomes; there are differences in learning outcomes before and after the learning book using Inquiry Guidance; there are differences in learning outcomes of knowledge with an average grade module (75.69) is better than the existing classroom learning (69.12), but the average module grade lower than grade aggregation (81.64); learning outcomes in the classroom aggregation attitude better than the class of the module; and there was no difference in the outcomes of learning skills.

Acknowledgements

Application of the product in the form of book based learning produced findings as follows:

- At the first meeting a lot of students who asked about the formulation of the problem and hypotheses, because students are not familiar with using the book - based learning Inquiry Guidance.
- Students acquire direct experience of the scientific work. Which consists of formulating a problem, make hypotheses, designing experiments, make observations according to plan, and concluded the observed data.
- My University, STKIP Muhammadiyah Blora.

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