

The Development of Students' Worksheet Based on Guided Inquiry Learning to Foster Students' Critical Thinking in Elementary School

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Abstract

This research aims to describe the validity and effectiveness of based-guided inquiry learning in fostering students' critical thinking skills. This type of research is research and development that refers to the theory of Borg and Gall. The study population was the fourth grade students of the Raden Intan Front Cluster in Bumi Nabung Subdistrict and the research sample was fourth grade students of Elementary School 5 Bumi Nabung Ilir. Data collection techniques use nontes and test techniques. Data collection tools in the form of questionnaires and test questions. Data were analyzed using validity test and N-Gain effectiveness test. The results showed that (1) worksheet based-guided inquiry learning developed through Borg and Gall theory was valid based on suitability with guided inquiry learning steps and quality of worksheet, conformity with didactic, construction, and technical requirements, and in accordance with grammar rules. (2) worksheet based-guided inquiry learning is effective to foster students' critical thinking skills as indicated by the average N-Gain of 0.67 with the category "Medium".

Keywords: student worksheets, guided inquiry learning, critical thinking

1. Introduction

Education is a very important thing for the progress of the nation. Especially in this era of globalization, education is a basic need that cannot be separated from everyday life, because through education, Indonesian people are equipped with knowledge and skills to be able to survive and adapt to the times. Basic education plays an important role in developing the potential of students, because basic education is the initial foundation for students to open their insights. The implementation of learning at the primary education level needs to be adjusted to the level of development and the needs of elementary school students.

According to Dirman and Cich (2014: 330) the importance of learning that is appropriate to the needs of learners, especially is so that the teaching and learning process runs effectively, efficiently and meaningfully and motivates students to achieve learning success happily. These objectives can be realized if supported by the availability of teaching materials or supporting tools. Furthermore, Dirman (2014: 1) explained that the provision of teaching materials as well as dynamic, conducive and dialogical teaching methods is very necessary for optimal development of students' potential.

One of the teaching materials that can be used in learning is the Student Worksheet. Sands & Özçelik (1997); Atasoy & Akdeniz (2006) in Çelikler (2010: 43) student worksheet is defined as written material that contains the necessary process steps and helps students to configure knowledge and give students full participation in classroom activities.

Guided inquiry learning is one type of inquiry learning model. Naiwong and Pranee (2012: 329) explained that guided inquiry learning is learning in which students actively make their own procedures to find solutions, and teachers play an important role as facilitators providing material and problems to be investigated, as well as guiding students in solving problems. Through guided inquiry learning, students are directly involved in the learning process by conducting various investigations to solve problems, so that students can get direct learning experience. This is in accordance with the characteristics of elementary school students, that is children learn through direct experience, especially through their activities (Suharjo, 2006: 36). However, in the learning process the teacher must also continue to guide and direct students, so that students are not misunderstanding the concepts that being learned.

Thinking activity is an activity that is always done by humans. As students, thinking activities are the main things that support the learning process, including critical thinking. Ennis in Fisher (2009: 5) suggests that critical thinking is a thought process that aims to make reasonable decisions, so what is thought is the best of the truth that can be done correctly. Meanwhile, according to Rajendran (2013: 20) critical thinking is an intellectual process in concept making, analyzing, synthesizing, and evaluating various information obtained from observations, experiences, and reflections, where the results of this process are used as a basis for making a decision.

Therefore, the alternative used to foster critical thinking skills is by (1) producing student worksheet based on guided inquiry learning that is valid to foster critical thinking skills of fourth grade Elementary School students. (2) Knowing the effectiveness of student worksheet based on guided inquiry learning that can foster critical thinking skills of fourth grade Elementary School students.

2. Method

Method of the research that used in this study is research and development. The steps of the Research and Development (R & D) method refer to the seven steps of the ten steps of Borg and Gall (1989: 784), that are 1) research information gathering, 2) planning, 3) initial product form development, 4) stage testing initial, 5) product revision, 6) main field test, 7) product revision.

The subjects of the trial in this study were 26 people consisting of 3 validator lecturers, 1 class teacher, and 22 students in the main field trial. Teachers and students are teachers and students in fourth grade B in Elementary School 5 Bumi Nabung Ilir.

Data collection techniques that used in this study are nontes and test techniques. The research instruments used were questionnaires and critical thinking questions. Questionnaire was used to obtain student worksheet validity data through expert validation tests conducted by material expert lecturers, media experts, and linguists. Critical thinking questions were used at pretest and posttest to obtain student worksheet effectiveness data in fostering critical thinking skills through effectiveness testing.

Test the effectiveness of using student worksheet is analyzed using normalized n-gain. Furthermore, the n-gain value is interpreted using normalized gain tables according to Sundayana (2015: 151).

Table 1. Normalized Gain Categories

Percentage	Interpretation
$g \geq 0,70$	High
$0,30 \leq g < 0,70$	Medium
$g < 0,30$	Low

3. Results and Discussion

3.1 Research result

The results of this development study are student worksheet based on guided inquiry learning. The material developed was the theme of 9 "Kayanya Negeriku", the subtheme is "Pelestarian Kekayaan Sumber Daya Alam di Indonesia" in fourth grade Elementary School. The results of each stage of the development procedure are as follows.

3.1.1 Preliminary Information Collection

The initial stage of the research was carried out by collecting data in the form of information on the learning process of Elementary School 5 Bumi Nabung Ilir. This is used as material for consideration and basic principles in the development of student worksheet which is based on the acquisition of empirical data about how the profile and subject to be studied.

Based on the results of preliminary research conducted through interviews, observation and questionnaire needs in September 2017 carried out on class teachers and fourth grade students in Elementary School 5

Bumi Nabung Ilir, Bumi Nabung Subdistrict, initial data obtained were Elementary School 5 Bumi Nabung Ilir already using the curriculum 2013 since the first 2013 curriculum was applied, the learning process was not directed to improve students' critical thinking skills, the delivery of teaching material was still fixated on the textbooks used, the available student worksheet was less attractive and difficult to understand for students, and most students still experienced difficulty in answering questions and questions that require reasoning.

Based on the results of the preliminary study, it is necessary to develop student worksheet based on guided inquiry learning used by fourth grade students at Elementary School 5 Bumi Nabung Ilir, so that the development of student worksheet can foster students' critical thinking skills.

3.1.2 Planning

Planning for student worksheet development based on a constructivist approach includes the preparation of the student worksheet Framework, the systematic determination of the order of material presentation, evaluation planning, and the preparation of assessment instruments.

3.1.3 Developing Student Worksheet

Follow-up of the draft at the planning stage, followed by the development of student worksheet. student worksheet preparation is based on aspects of content and presentation.

3.1.4 Preliminary Field Testing

Preliminary field testing were carried out by validating student worksheet products on material, media and language aspects. Product validation tests are carried out using questionnaires by material experts, media experts, and linguists, and field practitioners. Material validation obtained a value of 95.16 which is included in the valid category. Media validation gets 88 points with valid categories. Language validation has a value of 83.33 with a valid category and validation by field practitioners, that is fourth grade teachers obtain a score of 97.76 with a valid category. The validators also provide advice and input on student worksheet products based on guided inquiry learning.

Suggestions and input from material experts, namely indicators developed in accordance with basic competencies, bills and exercises in student worksheet need to be developed, and add guidelines or guidelines in working on student worksheet bills as expected. Suggestions and input from media experts, that are fixing the cover, adjust to the theme of natural resources, images of student worksheet instructions adjusted to the instructions, and add a description of the place name below the picture of the types of natural appearance. While the advice from linguists is to improve spelling, sentence structure and sentence effectiveness, correct the sentence used according to the enhanced spelling, and correct the use of symbols.

3.1.5 Main Product Revision

Based on suggestions and input from the validator, the researchers improved the student worksheet as suggested. Based on material experts' suggestions, several revisions were made, namely developing indicators in accordance with basic competencies, adding bills and exercises in student worksheet, and adding guidelines or guidelines for working on student worksheet bills according to expected targets. Based on the recommendations of the media expert, several revisions were made, namely the images on the cover were adjusted to the theme of natural resources, replacing student worksheet instructions according to work orders, and adding a description of the place name below the picture of the types of natural appearance. Based on the linguist's suggestions, several revisions were made, that are improving spelling, sentence structure and sentence effectiveness, correcting the sentences used in accordance with the enhanced spelling, and improving the use of symbols.

3.1.6 Main Field Testing

The main field testing were carried out by implementing student worksheet products based on guided inquiry learning in the learning process carried out on May 21 2018 to May 26, 2018. The main field testing subjects were students in fourth grade B at Elementary School 5 Bumi Nabung Ilir which totaling 22 learners.

Learning activities begin with working on the pretest. After the pretest was held, students carried out learning activities using student worksheet based on guided inquiry learning until the sixth learning, and at the end of the sixth learning the students implemented the posttest. This is intended to see the effectiveness of student worksheet based on guided inquiry learning whether it can foster students' critical thinking skills based on learning outcomes before and after the implementation of learning using student worksheet based on guided inquiry learning.

3.1.7 Product Revision

Product revisions are carried out based on the results of testing hypotheses and findings in the field when the product is tested. Based on the results of hypothesis testing that has been carried out, obtained data on the growth of students' critical thinking skills seen from the learning outcomes of students who are increasing. Therefore, student worksheet products based on guided inquiry learning are not revised and are feasible to be implemented.

3.1.8 Student Worksheet Effectiveness Test

The product effectiveness test is conducted to see a significant increase in students' critical thinking abilities seen from the learning outcomes of students before and after learning using student worksheet based on guided inquiry learning. Recapitulation of student learning data shows an increase in learning outcomes which also shows the results of students' critical thinking skills after learning using student worksheet based on guided inquiry learning theme 9 sub-themes 3. The average pretest learning outcomes of students in fourth grade B is 40.00 and posttest results increased to 79.82 with an average increase of 49.89%.

3.2 Discussion

The development of student worksheet based on guided inquiry learning in thematic learning is focused on fourth grade with the theme of 9 The Rich of My Country with the sub theme 3 Conservation of Natural Resources in Indonesia. Development of student worksheet based on guided inquiry learning adapts the seven steps of ten steps of R & D by Borg & Gall (1989: 784). Preparation and development of initial student worksheet products in accordance with guided inquiry learning steps and referring to Minister of Education and Culture regulations Number 22 of 2016 concerning Process Standards.

3.2.1 Student Worksheet Validity Based on Guided Inquiry Learning

The validity test was carried out by three experts and one field practitioner, that are a fourth grade B teacher at Elementary School 5 Bumi Nabung Ilir. The results of the validation test are validation tests by material experts covering the suitability of student worksheet with guided inquiry learning and quality. The results of the student worksheet product validation test by material experts obtained a value of 95.16 with the "Valid" category. Validation tests by media experts include the requirements for making student worksheet, that are didactic, construction, and technical requirements. The results of the student worksheet product validation test by media experts obtained a value of 88.00 with the category "Valid". Validation tests by linguists include writing according to enhanced spelling, and the relationship with linguistic aspects. The results of the student worksheet product validation test by linguists obtained a score of 83.33 with the category "Valid". Fourth grade teacher validation tests include suitability of student worksheet with guided inquiry learning, quality of student worksheet, student worksheet, that are didactic, construction, and technical requirements. The results of product validation assessment by fourth grade teachers obtained a score of 97.76 with the category "Valid".

Based on the validity test results above, it can be seen that student worksheet based on guided inquiry learning arranged according to the Process Standards and developed using the steps of Borg & Gall development research is valid based on the suitability of guided inquiry learning steps and student worksheet quality, conformity with didactic requirements, construction, and technical, and in accordance with the rules of grammar.

3.2.2 The effectiveness of Student Worksheet Based on Guided Inquiry Learning

The effectiveness test was conducted to determine the effectiveness of student worksheet based on guided inquiry learning in the learning process that has been carried out based on the learning outcomes of students who refer to critical thinking skills. The effectiveness of a teaching material can be seen from the increasing

or not learning outcomes of students after using the instructional materials provided. As the opinion of Sugiyono (2013: 413) suggests that measuring the effectiveness of materials / learning media seen from 1) the ease of learning materials or media is implemented, 2) the learning atmosphere becomes conducive, and 3) learning outcomes are increased. Therefore, to determine the effectiveness of using student worksheet based on guided inquiry learning on the ability to think critically by looking at the learning outcomes of students before and after using student worksheet based on guided inquiry learning. student worksheet based on guided inquiry learning can be said to be effective to foster students' critical thinking skills if the learning outcomes of students after using student worksheet based on guided learning inquiry are higher than before using student worksheet based on guided inquiry learning.

Based on the effectiveness test using N-Gain obtained the results of learning critical thinking of students after using student worksheet based on guided learning inquiry is higher than before using the student worksheet. The results of the recapitulation of the average N-Gain in the field trial obtained an average N-Gain of 0.67, which means the normalized gain is in the "Medium" classification, the effectiveness level is effective.

The effectiveness test results above show that the use of student worksheet based on guided inquiry learning is effective to foster students' critical thinking skills. The effectiveness of the use of student worksheet teaching materials is strengthened by the results of Marta's research (2017: 197) which shows that student worksheet that is developed based on guided inquiry allows students to actively participate during the learning process, helping students to learn better, and improving results learners. In addition, according to Demircioglu and Kaymaki (2011: 200) student worksheet can make learning more interesting and enjoyable, and provide feedback and can promote higher-order thinking skills. Furthermore, the results of Azizmalayeri's research, et al., (2012: 47) show that learning with guided inquiry learning has a significant influence on students' critical thinking skills.

4. Conclusion

The conclusion of this research and development is that student worksheet products based on guided inquiry learning are prepared according to the 2013 Curriculum Process Standards and developed using steps of research and development Borg and Gall are valid products based on suitability with guided inquiry learning steps and quality of worksheet, conformity with didactic, construction, and technical requirements, and in accordance with grammar rules. Student worksheet products based on guided inquiry learning is effective to foster students' critical thinking skills.

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