

Developing Students' Activity Worksheet Based on Constructivism Approach to Grow Critical Thinking of Grade IV Elementary School Students

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Abstract

The Research and development is aimed to develop students' activity worksheet based on constructivism approach to grow critical thinking of the students, to analyse the attractiveness and effectiveness of students' activity worksheet. This research and development refers to the theory of Borg and Gall. The subjects of the research are the expert of material validity, media, language, teachers, and grade IV students of State Elementary School 1 Nunggalrejo. Some instruments applied are test to measure learning result and critical thinking ability of the students' activity worksheet which has been validated by the experts of material, media, language, and classroom teacher. The result of the research shows that the students' activity worksheet which is developed based on the result of the students' need analysis can be applied for 2013 curriculum, and refers to the positive response of the students it is attracting them. And it is effective for learning by referring the improvement of the learning result.

Keywords : Constructivism approach, critical thinking, students' activity worksheet

1. Introduction

Education is not only a must for human being but also a need. Human beings will grow up better by education. Education is an effort of awareness done by human being to grow and develop any potencies from birth. Education process will be influenced by interrelated components namely the role of cooperation between teacher and students. In learning, the teacher's role is very important to conduct education process, in which it has dominant task in the learning process.

Active learning is not merely dependent on the text books available at school moreover, it needs teaching materials to support and give learning experiences for students. One of the teaching materials that can be applied in learning process is students' activity worksheet. It provides some benefits for both teachers and students. The teacher will have a ready to use teaching materials and in another side the students will get self-learning experiences and will be able to understand the written task provided in the students' activity worksheet.

According to Satria (2014 : 90) students' activity worksheet can be a supporting alternative exercise to improve the students' critical thinking skill so that they can comprehend easily their daily life problem. Students' Activity Worksheet can be applied as an activity instrument in the context of research or any discussion for the students and mates in the learning process. Furthermore, learning approach also has a very important role in learning by which it can encourage the students to be more active, creative, innovative, and joyful to improve the activity and learning result of the students.

Thinking activity is an activity done by human beings continuously. Even for students, it is the main thing to support their learning process. According to Dewey (in Dunita, 2015: 789) critical thinking is an active process in which students do special things for themselves with questions and some relevant information. Meanwhile Ennis (in Fisher, 2009:5) states that critical thinking is a process aimed that the students can make logic decision, and so what they are thinking is the best thing of the truth which can be done correctly.

One of the ways to increase the thinking activity is learning activity based on constructivism approach. As it is stated by Olsen in Gunduz, et al (2015 : 527) that general perspective of constructivism is that the students construct the knowledge themselves which in fact it is a learning process which involves changes. Because construct means a learning process. Referring to Budiningsih (2005 : 58) the learning theory of constructivism is a process of building knowledge. This process should be done by students themselves. The students should be active to do some activities, thinking actively, building the concept, and taking the meaning of what they are learning.

Karly (2002 : 2) state that constructivism is one of perspective about learning process which claims that during learning process (gaining knowledge) started by cognitive conflict appearance which can only be solved through self knowledge and at the end of learning process the knowledge will be constructed by the students through their experiences as the result of their interaction with their environment.

Thus, the alternative applied to encourage the critical thinking skill is by (1) producing students' activity worksheet based on constructivism approach which can encourage the critical thinking skill of Grade IV students of State Elementary School 1 Nunggalrejo. (2) seeing the attractiveness of the students' activity worksheet based on constructivism learning of Grade IV students of State Elementary School 1 Nunggalrejo. (3) Knowing the effectiveness of the students' activity worksheet based on constructivism which can encourage critical thinking skill of Grade IV students of State Elementary School 1 Nunggalrejo.

2. Method

Method of the research is Research and Development. The procedure of the Research and Development method refers to the theory of Bergand Gall (2003 : 569 – 575), 1) Collecting research information, 2) Planning, 3) Developing initial product form, 4) Initial trial, 5) Revising the product, 6) Doing main field test, 7) Revising the product, 8) Operational field test, and 2) Final product revising.

The subject of the try-out of the research are 39 people which consist of 3 validator lecturers, 1 classromm teacher, 9 students as small trial group, and 26 students of big trial group. The teacher and the students are classroom teacher of grade IV and the grade IV students of State Elementary school 1 Nunggalrejo.

The collected data of the research is gained by filling questionnaire by the teacher and the students. The questionnaire is applied to gain data at expert test, small group test, big group test, and attractiveness test. On the step of expert validation, the data is gained through filling questionnaire on material test by expert lecturers on materials, media, and language.

The data of the effectiveness use of the students' Activity Worksheet is gained from pre test and postest administered to grade IV students of State Elementary School 1 Nunggalrejo before and after applying the students' Activity Worksheet. Data analysis technique on the questionnaire of attractiveness test, easyness, and the usefulness of the Students' Activiy Worksheet based on CTL (Contextual Teaching Learning) by the students response questionnaire.

The effectiveness test on the Students' Activity Worksheet is analysed by its validity, reliability, deviation, level of difficulty, and score analysis n-gain normalised. Further the score of n-gained is interpreted by using the table of normalised gain by Sudaryana (2015 : 151).

Table 1. Normalised Gain Category

Percentage (%)	Interpretation
$-1,00 \leq g \leq 0,00$	Decrease hopening
$g = 0,00$	Constant
$0,00 < g < 0,30$	Low
$0,30 \leq g < 0,70$	Medium
$0,70 \leq g \leq 1,00$	High

3. Result and Discussion

3.1 Result of the Research

The result of the Research and Development is the students' activity worksheet based on constructivism approach. The material developed is theme and entitled " Daerah Tempat Tinggalku," the sub – theme is " Keunikan Tempat Tinggalku " for grade IV of Elementary Students. The result of every development procedure stage is as follows :

3.1.1 Collecting Previous Information

The previous stage of the research was conducted by collecting data of learning process information at State Elementary School 1 Nunggalrejo. The information is used as considerance and main point in developing Students' Activity Worksheet based on gained empirical data about the profile and the subject of the research.

Referring to the result of pre – research conducted by means of interview and questionnaire of needs in July 2017 toward the headmaster and the teacher of grade IV and also the students of State Elementary School 1 Nunggalrejo in District of Punggur, the researcher got the data as the following : State Elementary School 1 Nunggalrejo has applied the curriculum 2013 since it is launched, the teaching materials used has been suitable to the Curriculum 2013, but the teachers use the text books as the only resources of learning materials, the teachers do not involved the students very much to find the concept which enable to improve their critical thinking skill, Students' Activity Worksheet available can not encourage them yet to think critically in learning, many students still got difficulties in answering the teacher's questions and to express their ideas, further the students do not take part actively in learning.

By referring to the result of the preliminary research, it is very urgent to develop the students' Activity worksheet based on constructivism approach which is applied by the students of State Elementary School 1 Nunggalrejo, and so the development of the students' activity worksheet will be able to increase the students' critical thinking skill.

3.1.2 Planning

The planning of developing the students' activity worksheet based on constructivism approach, namely drafting the students' activity worksheet, determining the steps of presenting the materials, planning the evaluation, and arranging the assesment instrument.

3.1.3 Developing Students' Activity Worksheet

The follow up of drafting in planning stage is to develop the students' activity worksheet. The students' activity worksheet development is based on the aspect of content and the way of presenting it.

3.1.4 The trial of preliminary product

The trial of preliminary product was conducted by validiting the aspect of materials, media, and language. The

expert test of the materials, media, and language was done by means of questionnaire to Unila lectures, and teachers of grade IV. The result of the materials validation is 86,29, the media validation got 87,5. Language validation gained 96,15 and the validation by teachers of grade IV got 85,5. The validation expert gave some suggestion to the students' activity worksheet based on constructivism approach and it was revised in accordance with the recommendation of the product validation.

Some suggestion and recommendation from the expert of media are : to write the basic competency and the goal of the learning in every teaching and learning. Redesign and completing the writing style. Every learning should include moral value suitable to the teaching materials being learned. The expert on media suggested the researcher fix the cover not including pictures which are not suitable in size. It should be suitable with the size of the font, pictures position, and the colour of the pictures. Delete the pictures behind the writing which is not suitable with the teaching materials in this students' activity worksheet. The steps on constructivism should be rearranged. Meanwhile the linguist suggests the writer on diction, the grammar and the effectiveness of the sentences. The researcher should correct some sentences referring to EYD (Indonesian grammar) and to correct the use of symbols.

3.1.5 Revising of Product

In accordance with the validator's suggestion, the researcher redesign and make the students' activity worksheet better. Based on the test of the material expert, it should be some revision, namely to state the basic competency and the learning goal in every teaching and learning. The writing style should be made better, the moral value should be stated in every learning. The expert of media, suggest the researcher revise the cover, make suitable the font size, pictures positioning, and the colour of the pictures. The researcher deleted the pictures behind the writing and adapted the pictures with the materials. Rearrange the steps of constructivism. Next, the linguist suggest the researcher choose the correct words, use the effective sentences which is grammatically correct. The sentences has been suitable to EYD (Ejaan Yang Disempurnakan) and the symbols has been adapted.

3.1.6 Trial of Small Group

After revising product based on the expert suggestion, the researcher did a trial on a small group consisting of 9 students of Grade IV B of State Elementary School 1 Nunggalrejo, in which they represent low, medium, and high in capability. In this trial of data was taken to know the attractiveness of the students' activity worksheet based on constructivism approach.

3.1.7 Revising of Product

Based on the results the trial of students' activity worksheet trial based on constructivism approach, it can be stated that there is any increase on the students' learning result and the improvement of the students' critical thinking ability after the process of learning by applying the students' activity worksheet based on constructivism approach. The attractiveness of the students' activity worksheet based on the constructivism approach also increase better. Thus, it can be concluded that the students' activity worksheet based on constructivism approach the students' activity worksheet needs no revision anymore and it is representative to be tried out to bigger group.

3.1.8 Trial of Bigger Group

The subject of the bigger group trial is Grade IV A students of the State Elementary School 1 Nunggalrejo consisting of 26 students. The trial was at 16 – 21 April 2018. Before the activity of learning at the first meeting, the students got a pretest. And they got a post test at the sixth meeting ; The tests were done to see the effectiveness of the students' activity worksheet based on constructivism approach and, to know if it can improve the students' critical thinking ability after learning process by applying the students' activity worksheet based on constructivism approach

3.1.9 The Final Product Revision

The final product revision was done based on the hypothesis test and findings in the field when the product is being tried out. Referring to the result of the hypothesis test, the researcher found that the student critical thinking got increased which can further be seen from their learning result which tend to increase, too. Next referring to the result of discussion with expert of materials, the expert of media, and linguist it can be inferred that the students' activity worksheet based on constructivism approach could be implemented in learning process and it did not need any revision.

3.1.10 The Attractiveness Test of Students' Activity worksheet

Attractiveness test was done on trial of small group and bigger group. The test was done to know whether the development of the students' activity worksheet based on constructivism approach attractive or not to be applied for students in learning. Referring to the response of the students, the researcher got the result on the attractiveness of the students' activity worksheet as the following :

Table 2. Test Results of the Attractiveness

No	Category	Trial of Small Group		Trial of Bigger Group	
		Frequency	%	Frequency	%
1	Very attractive	5	55,56	14	53,85
2	Attractive	3	33,33	12	46,15
3	Quite attractive	1	11,11	0	0
4	Less attractive	0	0	0	0
5	Not attractive	0	0	0	0
average		4,06		4,06	
interpretation		Attractivee		Attractive	

The table shows that the form of the students' activity worksheet based on constructivism approach, according to the students' response, make them interested in using the students' activity worksheet and they were eager to use and do exercises more and more by applying the students' activity worksheet based on constructivism approach.

3.1.11 The Students' Activity Worksheet Effectivity Test.

The effectivity test was applied on small group and bigger group trial trough pre-test and post test to know the difference of the result before and after applying the students' activity worksheet based on constructivism approach. Referring to data analysis on students' learning result on small group, it can be infered that there was significant increase between pre-test and post-test result. The increase of learning score can be seen from the difference of the pre-test and post-test score of the students.

Before applying the students' activity worksheet, the average score of the students is 46,11 and after applying the students' activity worksheet in learning, their average score becomes 70,56. Thus, it can be concluded that there was significant increase on students' learning result by applying the students' activity worksheet based on constructivism approach on small group trial, namely 34,65%.

While the result of the test on the bigger group also indicates there is significant increase on the students' critical thinking ability. This happens after the students got treatment using the students' activity worksheet based on constructivism approach in their learning at theme 8 and sub theme 2. The average of the Grade IV A students' learning score score got increased. It can be infered by the difference score of the pre test and post test by which the average score of the pre test is 39,42 and the average score of post test is 77,31. The increase the reaches 49%.

3.2 Discussion

3.2.1 The developing the Students' Activity Worksheet product based on constructivism approach

The students' learning activity stated on students' activity worksheet based on constructivism approach consist of five main steps, namely: Orientation, Elicitation, Idea restructuring, Ide usage, and review. The five components are, then applied on thematic learning activity for the students through developing the students' activity worksheet based on constructivism approach which can make the students' activity more active so that it can improve the students' critical thinking ability. It is in line to what Dewey has stated (in Dinuta, 2015 : 789) that critical thinking is an active process in which the children do certain thins for themselves through some questions to relevan information. It also suits Sukardjo (2013:54), the constructivism psychologist get knowledge by the process of building knowledge by ralating their schemata to the present knowledge and it is done by themselves independently. So, thus, the learning performed focuses more and the students activity in gaining concept they have to master.

The students' activity worksheet based on constructivism approach is designed in line with the developing of Curriculum 2013 applying thematic models to increase learning result and to encourage the students' critical thinking ability. The existance of the students' activity worksheet based on constructivism can be an alternative to solve a problem on the lact of learning materials in Elementary School in learning the materials related to the students' hometown.

This is strengthened based on the results of research by Supianti, et al (2013: 145) that the results of data analysis and discussion, it can be concluded that the worksheets developed have been theoretically feasible and activities during learning activities using constructivist-based worksheets have helped students develop own knowledge and train science process skills, proven by getting 97.47% percentage with very decent criteria. The percentage of students who meet Activities 1 and 2 gets a percentage of 82.4% and 87.5%. In addition, it is in line with the results of research conducted by Mila, et al (2015: 720) that constructivism-based Integrated Science Worksheets are very feasible and have a positive effect on learning outcomes and are able to develop students' creative thinking skills so that they can be used in learning.

Eventhough the students' activity worksheet was aoolied on one of theme sub-theme in Grade IV, but it is preved that the students' activity worksheet based on constructivism approach as a better alternative, representative solution, and applicable learning materials among others. The developing of the students' activity worksheet can be a reference and supporting of the learning materials development as it is presented in students' book and

teacher's guide book of the latest edition 2017 of the Curriculum 2013.

3.2.2 *The attractiveness of Students' Activity Worksheet attractiveness based on Constructivism Approach*

During the trials on both small and bigger group, the students were given questionnaire about the attractiveness of the product after it was applied to the students' learning. The result of the small group trial, which consists of 9 students showed the average by 4,06 by attractive category. Meanwhile the result the bigger group trial which consists of 26 students indicated the average of the attractiveness by 4,33 by very attractive category.

Thus, it can be started that the students' activity worksheet based on constructivism approach can attract the students' interest in applying it and the students are willing to do more exercises using it, and the students get easiness in using the students' activity worksheet and they can understand the learning material more easily by applying the students' activity worksheet. This is because of the use of constructivism approach used in small students' activity worksheet. According to Gagnon, et al (in Kaya and Donmez, 2009 : 575), constructivism is a learning approach in which students build their own knowledge and mental as the result of their experience and thoughts by the interaction with their environment. The students' activity worksheet is developed in adaptation to the learning materials about their condition of living environment, in which they have really experienced by themselves. Further more, the result of this research on developing the students' activity worksheet is relevant with the research of Andriyatin, et al (2016: 46) that worksheet that is developed has a very easy, interesting, and useful quantity value. While the research by Fauzi (2017) entitled "Developing Worksheet Based *Contextual Teaching and Learning* to Increase Critical Thinking" showed very attractive quantity, easy, and useful.

3.2.3 *The Effectivity of Students' Activity Worksheet Based on Constructivism Approach*

The effectiveness of learning materials can be seen from the increase or not the students' learning result after the application of the learning material given.

To see whether the application of the students' activity worksheet based on constructivism approach is effective or not, it can be known from the students' learning result score before and after applying the students' activity worksheet based on constructivism approach. The learning in the classroom by applying the students' activity worksheet based on constructivism approach can be stated effective if the students' learning result is higher than that before applying the students activity worksheet.

The effectivity test is conducted to see the effectivity of the students' activity worksheet during the learning performed. It is also used to see the students' learning result by referring to critical thinking ability. The effectivity use of the students' activity worksheet learning material is supported by the opinion of Yildirin, et al (2011 : 52) which states that activity worksheet can affect the students' achievements.

Based on the effectivity test using n-gain, the researcher got higher learning result of critical thinking after applying the students' activity worksheet than that of before applying it. The analysis result shows that the average of the small gain group can be reach 0,49 by medium category. Then the bigger gain group got the average score 0,63 by medium category. Thus there is an increase of the students' learning result after applying the students' activity worksheet based on constructivism approach. Beside that, the increase of gain, average between the small and bigger group. That is in line with the research result of Puangtong (2014:4283) which states that the post-test result of critical thinking and constructivism approach significantly increase than that of the test. In addition, the results were the same as Ghazivakili (2014: 95), the results of this study entitled "The Role of Critical Thinking Skills and Learning Styles of University Students in Their Academic Performance" showed that critical thinking and academic achievement have significant relationships with each other. Because of the important role of critical thinking in improving professional competence, it is recommended to use teaching methods that are appropriate to learning styles. Similar research by Secken and Alan (2011:235) shows that the experimental group achievement, in which the treatment of constructivism approach was applied, got higher score than that of control group which is treated by traditional teaching.

4. Conclusion

The conclusion of this development research and development is that the product in the form of the students' activity worksheet based on constructivism approach for Grade IV designed by referring to Curriculum 2013 ; The students' activity worksheet based on constructivism developed has a very attractive quality, the learning result and critical thinking ability of the students is higher than that after applying the students' activity worksheet based on constructivism approach.

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