Article

Worksheet Based on Socioscientific Issues to Improve Analytical Skill

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ABSTRACT

The research was intended to develop the worksheet based on socioscientific issues that test expedibility, practical and effective in development the ability to think analytically of learners. The research site was conducted at SMPN 4 Ponorogo. The research method used research and development, with implementing research model of brog and gall. The research tools used were expert validation analysis sheets, assessments response and so on are used to test analytical thinking. And then the data treated was analyzed quantitatively as well as descriptive. Research results suggested that the product was worthy of using in the learning process. The product was also practical and effective in using to improve the ability of student analytical thought

INTRODUCTION

Indonesia's educated have a fairly high percentage of the ability to memorize lessons, while for the percentage of ability to think analyses of students in indonesia is at a lower percentage of 5%. Indonesia's students are still at a lower level of thought, not at the highest level of thinking ability, which is the goal of 21st century learning. Compared to Asian countries such as Japan, Malaysia, brunei, Singapore and other countries. Indonesia ranks to 40 and counting from 40 countries. The statements are based on a global index of cognitive skills and the educational attainment from the Learning Curve Pearson tahun 2014 (Astriani et al. 2017). While learners are required to has the skills of the 21st century especially at science-learning. 21st-century learning alone embeds everything that can train and improve the ability to think analytically or train how learners can make decisions. So that learning is oriented toward the approach of science (scientific approach), which is to observe, questions, memorability, draw conclude, and communicate. Quality education will produce students who have high level thingking skills and are able to present solutions in dealing whit problem (Sulastri and Pertiwi 2020).

The ability of learners to think high levels feels inadequate. Learners tend to understand the lesson by memorizing. The same thing happened at SMPN 4 ponorogo. According to an early survey conducted by researchers at SMPN 4 in ponorogo, on October 20, 2020, there

was a problem of learners' ability, particularly in the ability of analytical states. Based on observation of the value list of worksheet observation at SMPN 4 ponorogo, it can be summed up in the ability to think less well of the student analytical analyses. It show that its show that 15 student got under kkm from 30 student in total. The statement was also strengthened from an interview with educators that the academic ability of learners had the same average average as the other junior high in ponorogo. In the interview, sources reveal that in the learning process, based on a constructive theory of constructive criticism, constructing learners' minds so that the full nature of science can manifest itself and thereby instill an open, scientific attitude, such as curiosity, honesty. And in preparing learning tools already implementing the 4c aspect, which is included in the teaching materials prepared by teacher educators and also practiced by educators during the learning process. Whereas in the process the educator also used the worksheet, which was intended to measure the ability of learners to understand the material given. The given worksheet is the task of observing the environment around learners who deal with the material. Such as observing the plants and then the learners are instructed to observe the plants and write down what is obtained in the worksheet.

Given our initial survey and interview results show that the ability to think analyses of students is not yet in place, it will require action to address the problem. One of the things that can be done is by giving a lot of practice to develop the ability to think the analytical of learners. As dendir described, by giving you that problem different and require analytical states to address them, so a person's analytical thinking ability will work automatically and quickly upon any other problem that needs cledging (Dendir, Orlov, and Roufagalas 2019). Therefore, researchers are attempting to formulate a worksheet on socioscientific issue of this product to improve the ability to think analytical participants. In the arrangement of the lads can measure 3 passes of analitis, which is issued, organizing and connecting. The purpose of this research is produce the produk worksheet based on socioscientific issues worthy and pracrical is used as a learning medium, and effective for enhanced analytically skills is specifically on the subject of the environmental pollution.

METHODS

The research and development method use several stages of the brog and gall development model. The study merely carries out a few stages because of time constraints and costs during the research. The sample used was derived by an impressive sampling technique, located d SMPN 4 Ponorogo. The sample consisted of a class 7 protege divided in the control class and eksperiment. In the experiment class will be treated as a product of worksheet based on socioscientific issue, while the control class is not given a product of worksheet based on socioscientific issues. Data was obtained by presenting pretes and postes from control class and experiment classes, this data was then used to measure the effectiveness of worksheet. As for the feasibility, the data was processed from the validating analysis of 2 validator experts. On the aspect of worksheet based on socioscientific issues use the instrument the student's response size, which contains the likert scale. Pretest results and postes are then analyzed using test t. research carried out from February 22 to March 22, 2021 the research site is SMPN 4 Ponorogo.

To check the appropriate worksheet of the coroner using an application of the expert validator analysis performed by the two validator which is Mr. Harimanto, S.Pd. M.pd as educators at SMPN 4 Ponorogo and Titah Sayekti, S.pd. M.sc. teachers at lAIN Ponorogo. From analysis of the analysis of the expert analyses using the percentage formula as follows:

$$PPV = \frac{\Sigma \text{ Validator answer}}{\Sigma \text{ Validator highest answer}} \times 100\%$$

The feasibility criteria on the worksheet products developed are:

Table 1. Product eligibility criteria

Interval	Categories
0-20	Very Unworthy
21-40	Not Desetved
41-60	Less Worthy
61-80	Worthy
81-100	Very Worthy

Then to look at the performance of the worksheet products, using the instruments of the student response. The data that goes into analysis quantitatively uses the formula:

$$persentase\ respon = \frac{\text{The number of learners positive responses on every aspect}}{\text{Total students}} \times 100\%$$

Educating participants' responses on the worksheet based on socioscientific issues can be said to be positive if the assessments aspect gets a percentage more than 75%. On the other hand, if the percentage of the assessment aspect is less than 75%, it is said that negative learners' responses would require a revision of the worsheetbased on socioscientific issues.

On the effectiveness aspect is known by using the pretest and postes of learners. Pretest and postes results were analyzed using n-gain tests and t-tests, with the help of the SPSS 16 application. If the t-test results show a value of less than 0.05 then there is a significant difference between control class and experiment. If its value is more than 0.05 then there is no difference between the two (Susiawan 2013).

RESULTS AND DISCUSSION

Based on analysis data result of previous experts' validity. Known worksheet products are worth a percentage of 87.5% on the content or content aspect, while the reading content gets a percentage of 93.75%. Then on the distinctiveness of getting a percentage value of 79% (table 2). The prerequisite for a worksheet can be used is when it qualifies to be taught that the worksheet must meet principles in the learning process and corresponding content with the competence that learners must achieve.

The second requirement, the prescriptive prerequisite for a vocabulary that matches the level of a learner's ability, is the sentence employed so that the learner is well understood. The third requirement of which is the technical requirement of the display presented on the worksheet (Afdareza, Zuhri, and Sakur 2018). Expert validation analysis sheet is as follows:

Table 2. The results of the validationanalysis of conten experts

	Assessment	V1	V2	Total score	% Aspek	X Sub Asepek	Inference
	Content						
1.	Worksheet Aligment with basic competitors.	4	4	8	100%		Worthy
2.	Truth of content.	4	3	7	87,5%	87,5%	Worthy
3.	Collating analytical skills	2	4	6	75%		Worthy
	Reading						
1.	Worksheet can be read as well.	4	4	8	100%		Worthy
2.	Worksheet has a true information..	4	3	7	87,5%	93,75%	Worthy
3.	Worksheet use language at a rate that a student.	4	3	7	87,5%		Worthy

	Assessment	V1	V2	Total score	% Aspek	X Sub Asepek	Inference
4.	Worksheet use EYD and efficient in language.	4	4	8	100%		Worthy
5.	**Distinctiveness**						
6.	Worksheet present socioscientific issues.	4	3	7	87,5%	79%	Worthy
7.	Worksheet conveys civic elements.	2	3	5	62,5%		Worthy
8.	Worksheet presents socioscientific issues latest.	3	4	7	87,5%		Worthy

The validity of the worksheet is based on three aspects, which are content , reading, and peculiarity aspects. On the content aspect indicates the worksheet developed is consistent with the basic competence that learners should be pursuing. On the reading of good writing, word selection, that's very considerate. Indonesian users of good and correct work on paper products needed to be done because Indonesian is the national language. Ideally each generation should understand how to use Indonesian properly , both Spoken and written (rahayu 2015). The truth in language also has a bearing on the truth of the information presented, so it does not create confusion for learners as they work on the worksheet.

The product has a feature that involves a socioscientific approach to the content of the worksheet. Social scientific issues involved include frequent forest and land fires in Indonesia. In using the socioscientific approach issues are encouraged to harmonize with the scientific arguments of citizenship (zeidler L, Dana & Nichols h 2009). So it is expected that it can become knowledge for the people.

Socioscientific Issues Worksheet Practicality

The level of worksheet practicality developed is measured by the questionnaire of participants' response. After the phase of the data analysis results from that learners' responses on worksheets are good, this is seen from learners' positive responses. On the analysis results get a positive response gets a 91% score, whereas the negative response gets a 9% score. There are two measurable aspects of attraction and design aspects. The area of interest receives a positive 93%, while response is 7%. On aspect of worksheet design, positive responses 90% and 10% negative responses (table 3). Positive responses are generated from affirmative and highly agreeing responses. Whereas negative responses are generated by disapproving and disapproving responses.

Table 3. The result of learner's respon

Assesment	Estimation			
	Disagre	Less agreed	Agre	Fully agred
Facets of attraction	3%	4%	59%	34%
Product design	1%	9%	57%	33%
Average	**2%**	**7%**	**58%**	**33%**

Learners tend to overlook something that has nothing to do with their personal lives. But learners are more interested in a meteri involving their own person, or influence their social and natural environment (Zeidler and Nichols 2009)So it was a good move when it involved socioscientific issues of forest and animal rights issues into the product Worksheet develope

In design aspects the use of forest fires and land production worksheets affected learners' responses when working on the worksheets. Giving the drawing on the worksheet will facilitate the interaction between the learner and the educator. The pictures used require

other means for learners to understand, giving the text to be a medium of delivery to learners. primary color selection will more interest and interest learners. Primary color use is more effective when combined with a secondary color, so it does not wear out the eyes quickly (Sulistyono 2015)

Socioscientific Issues Worksheet Effectiveness

The data used is obtained from the results of learners' performance during the trials of pretes and postes given. The analysis using the t two tailed test shows a significant difference between control class and experiment. In this hypothetical Ho test: there is no significant distinction between experimental class control class. Ha: There is a significant difference between experiment class and control class. The value value of the t-two tailed test is 0.021 less than a significanci (0.05) (table 4). So the decision taken was Ho rejected, which means there was a significant difference between control class and experiment.

Tabel 4. Test Result *t-Test Two Tailed*

T test	Aritmatic Value	Significance	Decision
Eksperimen-kontrol	0.021	0.05	Ho ditolak

The ability to think analytically of learners is measured by 3 indicators, which is the ability to discern, the ability to organize, and the ability to connect. Use of a worksheet as a learning medium can help educators to direct learners to discover a concept through the activity in the worksheet (jowita, v. 2017). The activity of learners doing worksheets leaves room for learners to develop creative ideas, so the ability to think high levels of the learner is well adjusted (jowita, v. 2017). One of the highest levels of cognitive thinking is the ability to think analytically.

When learners often use their anal thinking system by working out exercises (Dendir, Orlov, and Roufagalas 2019). Then, the ability to be characterized as analytical attendees will automatically work when faced with other issues by using socioscientific worksheets effectively to enhance the ability of protege analytical candidates.

CONCLUSION

Based on the above description, the work sheet based on socioscientific issues is deemed worthy of improvement, so that it is a socioscientific worksheet worthy of inclusion in both content and constructive. Socioscientific practical worksheet products are used by learners with a 91% positive response rate. The product of an effective socioscientific worksheet is used as a study medium to help improve the ability of educational analytical participants. With the t two tailed 0.021 minus the scale of significant 0.05. After doing this research, some limitations in the research process have been found, among other things, the lack of interaction between researchers and learners because of learning done online. So the advice might be given is that researchers will be more active in interactions with learners even though at online learning, one way is by personally using whatsapp to learners.

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