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Strengthening Reflective Thinking Ability of Junior High School Students Using Weblog

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ABSTRACT

This research aims to develop weblog media about environmental contamination material to determine the reflective thinking skills of junior high school students. A weblog developed as a learning medium used the ADDIE model in this research up to the development phase. The weblog design has gone through the validation phase. The validation was performed by four validators using a validation sheet. Student responses were collected using a questionnaire and reflective thinking skills using a multiple-choice test. The developed weblog has been tested on 20 students of 8th grade. The results showed that blogging media positively impacted students' reflective thinking skills, given the increase in mean pre-test and post-test scores from 69.5 to 82. The increase in reflective thinking skills was seen in of the three indicators of reflective thinking, namely *reacting* from 79% to 81,5% in the high category, *elaborating* from 50% in the low category to 75% in the high category, and *contemplating* from 67% in normal category to 78,4% in the high category. The use of blogging media to reinforce thinking skills is also supported by student responses, with 92,8% averaging for aspects of reflective thinking.

Keywords: Junior High School, Reflective Thinking Ability, Weblog

INTRODUCTION

Science learning covers various aspects of life. Apart from being a science that studies natural knowledge, science learning, it is also studied about problems in the surrounding environment. Environmental problems, for example, are related to social problems or what is better known as social science issues. Social science issues can be global warming issues, forest fires, environmental pollution, and others (Subiantoro *et al*., 2013). Environmental problems are contextual issues that students can find as learning in the problem-solving process. According to Priyatni *et al*. (2017), solving environmental issues can increase knowledge and understanding. Understanding critical environmental issues can be an effort to change student behavior (Zulfa *et al*., 2016). This problem-solving ability should be supported by thinking skills, one of which is reflective thinking. This reflective thinking ability involves high order thinking skills, namely observing, analyzing, interpreting problems, making conclusions, assessing, considering strategies and actions (Priyatni *et al*., 2017). Suryawati *et al*. (2020) also stated that thinking ability is needed to mediate environmental sensitivity. The development of thinking skills begins with the knowledge to produce attitudes and decision-making. Reflective thinking skills in students cannot develop directly but through development stages. The development of basic reflective thinking skills begins with developing the ability to acquire knowledge Hidayat *et al*., (2020). The process of acquiring student knowledge needs to be supported by meeting learning needs, including learning resources. A student in studying a social science problem or issue needs a learning resource that contains the latest information with accurate data and material that serves to increase literacy (Rohmawati *et al*., 2018)

According to Jalinus and Ambiyar (2016), it is explained that the use of appropriate learning resources can produce exciting and fun learning for students. Learning resources that fit this need are IT-based learning resources, one of which is a weblog. Sulajwo (2017) states that website-based learning media can foster student attractiveness. The reason for that is that website-based learning media are equipped with articles, links, images, and other exciting content to be motivated to access the entire material. Based on these reasons, researchers are interested in researching developing weblogs as a learning resource on environmental pollution material to strengthen reflective thinking. This study aimed to determine the reflective thinking skills of junior high school students using weblog media on environmental pollution material.

METHODS

This research was conducted in two stages. The first stage is product development in the form of a weblog using the ADDIE model development design. Robert Maribe Brach developed the ADDIE model through 5 stages of product development: Analyze, Design, Development, Implement and Evaluate. Development research conducted by researchers only reached the development stage. The weblog was further validated by four validators consisting of two lecturers and two teachers. The validator performs an assessment using a validation sheet consisting of the validation of material and media.

The next stage is the limited trial stage. Limited trials were carried out twice. The limited trial phase I or lab scale was conducted on ten 5th semester students in the Biology Education Study Program, FKIP Riau University. Meanwhile, the phase II trial was conducted on 20 students of SMPN 4 Pekanbaru. The purpose of the trial is to see user responses to the developed weblog. In the phase II trial, a pre-test and post-test were also carried out on students' reflective thinking skills at meetings discussing environmental pollution. Responses to trials I and II were collected using a questionnaire. The stages of the research are explained in Figure 1.

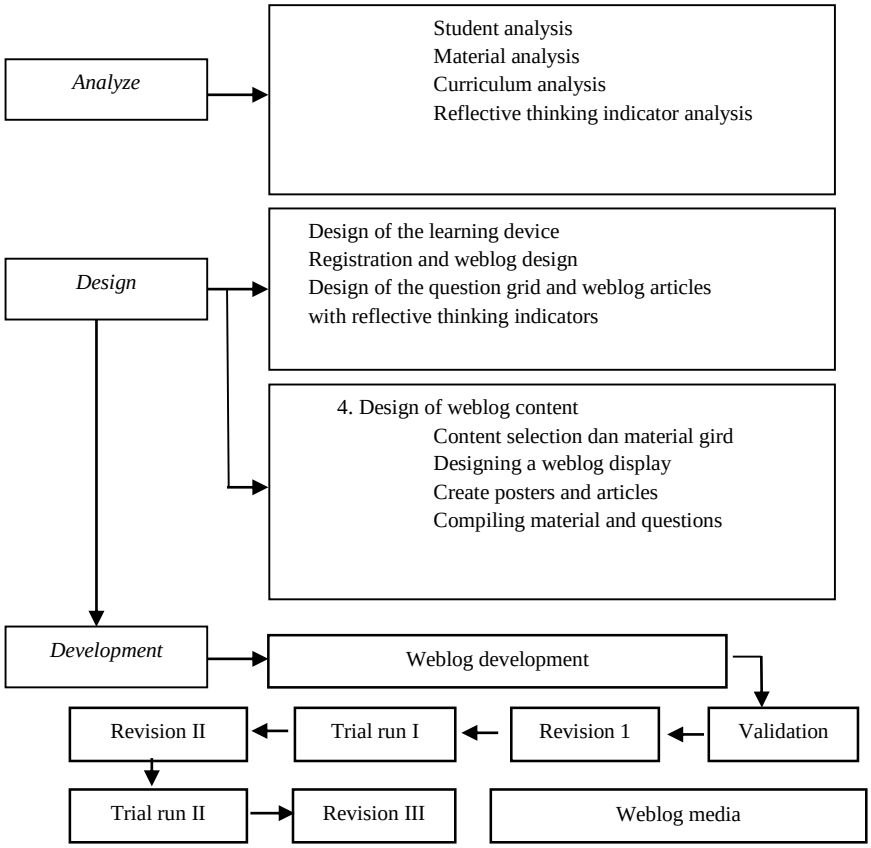

Figure 1 The stage of Research and Development design in the ADDIE model

Students' reflective thinking skills were collected using multiple-choice tests developed based on reflective thinking indicators, namely reacting, elaboration, and contemplating. The results of the reflective thinking ability from the pre-test and post-test are then analyzed to know the comparison of the mean value of the two tests. The value obtained for each aspect of the ability to think reflective (reacting, elaboration, and contemplating) is then analyzed through the correct answers to each question on these indicators. The data were calculated using the mean formula and grouped based on students' reflective thinking skills level. The range of reflective thinking skills can be seen in Table 1.

Table 1. Interval score of reflective thinking

No	The Score Interval	Reflective Thinking Level
1	$0 \leq x \leq 60$	Low
2	$60 \leq x \leq 75$	Middle
3	$75 \leq x \leq 100$	High

(Prihatini, 2019)

RESULTS AND DISCUSSIONS

The developed blog consists of design, content, and articles. The weblog design is selected and adjusted to the material topic. The weblog content developed consists of pictures, posters, and articles. The weblog article consists of seven meetings with ten articles, and each article is

equipped with a news link directly linked to the news website. The weblog display can be seen in Figure 2.

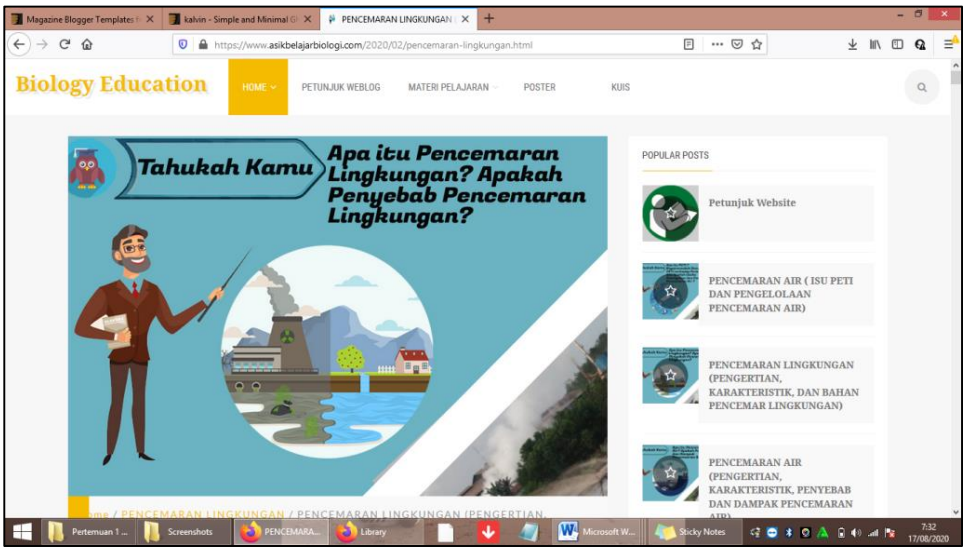

Figure 2. Display of the learning weblog

The results of weblog validation as a learning resource for improving reflective thinking skills were obtained based on material validation with four aspects of assessment, namely learning, content, curriculum, and reflective thinking. From this validation, it was obtained an average percentage of 86.3% with the very feasible category. Media validation with three aspects of assessment, namely the general design of the weblog, the content of the weblog, and its use, got an average percentage of 87.27% and was categorized as very feasible. This result can be seen in Tables 2 and 3.

Table 2. The validation on the aspect of material

No	Aspect	Percentage (%)	Category
1	Learning	86	Very High
2	Content	85,5	Very High
3	Curriculum	86,3	Very High
4	Reflective thinking	86,3	Very High
	Average	86,3	Very High

Table 3. The validation of media

No	Aspect	Percentage (%)	Category
1	Design	88,5	Very High
2	Content	88	Very High
3	Utilization	85,4	Very High
	Average	87,27	Very High

Based on the table, the material that got the highest percentage (86.3%) was the curriculum aspect and reflective thinking. The aspect gets the highest assessment score because the material prepared in the weblog article is by the provisions of the curriculum. These results are by the principles of learning media conveyed by Cahyadi (2019) that good learning media has a principle of compatibility between the material presented with the learning objectives and the characteristics of students. The material developed in the weblog

is compiled using a reflective thinking framework. Additional content in articles such as pictures, posters, cases, and news links that reveal environmental problems serves to develop students' knowledge exploration skills. Fitriani *et al*. (2019) stated that exploring this knowledge will help develop critical thinking and analysis skills that consist of sound interpretation of problems and the ability to explain and self-regulate. The validation of the weblog media got the highest category on the design aspect with a percentage of 88.5%. The weblog developed has a simple design but is still interesting to look at, and the article content is well organized. The development of a weblog design is seen from the use of background images, menu layout, and article layout tailored to the needs and neatness of the media. Following what was conveyed by Rahman (2018), a good website design is simple but neat, and the content in the article is well organized. The overall results showed that the weblog could be used as a learning resource on environmental pollution material.

Validation weblog supported by the result of trial 1 to students at Riau University. The result showed that the weblog that had developed got an excellent category with a score of 98.5. This score indicates that based on student assessments, after using the weblog, get a good response. Respondents stated that the weblog developed was interesting. The material presented was following the material for lessons in school content related to facts and knowledge development supporting thinking skills. The analysis of the students' pre-test and post-test scores indicated the development of reflective thinking skills. The average initial pre-test value obtained was 69.5, included in the medium category. Then, after implementing the weblog, the post-test average score increased to 82, included in the good category. The description of the pre-test and post-test results for each indicator of reflective thinking can be seen in Figure 3.

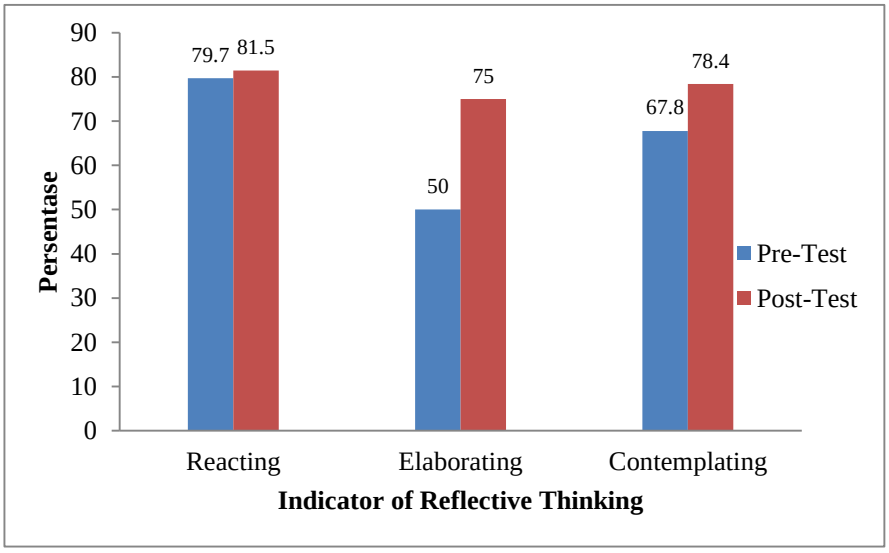

Figure 3. The explanation of students' reflective thinking skills from the test result

The diagram shows an increase in students' reflective thinking skills on each indicator after accessing the weblog article content. The average initial pre-test value with the answer score for each reacting indicator is (79.7), which is in the high category, elaboration (50) is in a low category, and contemplating (67.8), which is in the medium category. These results illustrate that most students can only answer questions for reacting indicators or the lowest stage in reflective thinking. The problem with reacting indicators is related to basic knowledge about environmental pollution. Furthermore, the answers to the elaboration and contemplating indicators are still low because the responses from some students are wrong

on questions that ask students to analyze, describe and detect errors. According to Dewey in Nisak (2013), to achieve reflective thinking skills, students must have the ability to organize their knowledge and make decisions. Based on these results, it indicates that students' knowledge has not been well organized so that students find it challenging to carry out analysis, describe, and summarize a problem. Egmir and Ocak (2020) state that students' ability is low when answering questions related to reflective thinking. It is because students do not use reasoning and evaluation skills in the problem-solving process.

After students accessed the weblog article, the acquisition of post-test scores showed a positive change, which was shown in the student's average score. Overall, the post-test mean score was 82, and it was in a good category. The description for each student's reflective thinking indicator consisting of reacting indicators is (81.5) in the high category, elaboration (75) is in the high category, and contemplating (78.4) is also in the high category. These results indicate that students' reflective thinking skills for each indicator or stage of thinking get a high category even though the elaboration and contemplating stages are still below the reacting indicator. The increase in the mean value of answers for elaboration and contemplating indicators can be seen in several questions that characterize these indicators, such as analyzing discourse, describing problems, and detecting errors in activities conveyed in the discourse.

The analysis of these questions shows that most students have been able to answer correctly. The reflective thinking process at the reflection stage is the student's ability to analyze a situation, provide an assessment, and recommend the next (Funny et al., 2019). The development of reflective thinking skills cannot occur immediately but needs further development gradually. It follows what is stated by Salido and Dasari (2019), namely that reflective thinking occurs gradually, starting from habitual action, understanding, reflection, and critical reflection. Actions of habit and understanding are obtained from seeking information by developing student curiosity. Early development of reflective thinking skills can also be done by familiarizing students with problem-based material. According to Meni Elpita and Irwandi (2019), reflective thinking cannot be separated from the ability to think critically. Therefore, problem-based learning materials are very suitable to be applied to develop students' reflective thinking skills. Juhaevah (2017) said that the elaboration stage is a stage of thinking where students can relate the information they get and explain students' initial knowledge. Problem-based learning invites students to develop the ability to analyze, weigh, make decisions and solve problems. The weblog material developed refers to various environmental issues and can help students find information and build knowledge about environmental issues.

The test results are supported by student responses to the use of the weblog product. Based on these results, it appears that students give good responses to weblog product development. Recapitulation of the respondent's results on the weblog developed for each aspect of the assessment can be seen in Table 4.

Table 4. The Questionnaire result of trial 2 response on the weblog

No	Aspect	Score	Category
1	Display and Usage	92,8	SB
2	Material	93,3	SB
3	Reflective Thinking	92,8	SB
	Average	93,01	SB

Exp. = SB (Excellent)

Student responses as weblog users for reflective thinking aspects get an average of 93.01 and are included in the very good category. The students responded well to the description

of blog material using reflective thinking indicators. A negative statement states that the weblog material does not relate to problems found in the environment. The material does not solve problems related to the environment and does not help collect information, and students reject data. Conversely, students commented that "using this developed weblog has enabled me to explain and relate problems related to environmental pollution material." The results obtained generally indicate that the articles developed in the weblog make students interested and want to find out more about the material presented.

Curiosity is the first step required for the development of reflective thinking skills. Another response, for example, is the response saying that students can explain and relate problems related to environmental issues after using the weblog. Piyatni *et al.* (2017) also stated that reflective thinking is a high-level thinking ability where this thinking activity starts from observing, analyzing, interpreting problems, making conclusions, and considering actions. The ability to explore this knowledge will help students develop critical thinking and critical analysis skills that consist of good interpretation of problems, explaining, and self-regulation (Fitriani *et al*., 2019). Based on this, students' curiosity to study the material and the urge to explain problems related to the material already reflect that there have been activities to develop students' thinking abilities to lead to reflective thinking skills.

CONCLUSION

The results of validation and testing show that the developed weblog is in a very feasible category as a learning resource on pollution and global warming material to strengthen students' reflective thinking. The results of the development of reflective thinking skills can be seen from the increase in the pre-test results of students who were previously in the good enough category when implementing the post-test. Reflective thinking skills development looks good at the three stages: reacting, elaboration, and contemplating stages, where the highest score is in the reacting stage. Future research needs to be implemented on a large scale related to weblogs usage using reflective learning. Reflective learning with weblog learning resources in the future is expected to improve students' reflective thinking skills to become better.

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