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IMPLEMENTATION OF GUIDED INQUIRY-BASED LEARNING MODEL TO IMPROVE STUDENTS' CREATIVITY THINKING SKILL

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Abstract. The study aims to implement learning media guided inquiry-based to improve students' creativity thinking skill of grade X on Pteridophyte material. The type of research was pre-experimental study which used one class without a control class. The study was conducted on March 2019. The research subject was 22 senior high school students of grade X on Pteridophyte sub material. The research design was One Group Pretest-Posttest Design. The learning media used was lesson plans, student activity sheets, and creative thinking test instruments. The research instrument used was the observation sheet of learning model implementation, the activities of students and the instruments test of creative thinking skills. The data result of creative thinking skills' pre-test and post-test was analyzed by N-Gain analysis which was the result of the students' progress of creative thinking skill after learning conducted. The conclusion was the implementation of guided inquiry-based learning model on Pteridophyte material to improve students' creativity thinking skill. This can be seen from the results of students' thinking skills tests that improved after posttests.

Keywords: *guided inquiry-based learning, Pteridophyta, creative thinking skills*

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INTRODUCTION

Education is an essential element of life since it is a bridge to shape reliable human resources which capable to solve their problems in life. Along with global challenge, the governments make serious efforts for improvement in learning practice with aims to improve the education and to anticipate current development of science and technology by emphasizing the learning to student centered, it is hoped the students are able to be lifelong independent learner for a qualified individuals which are able to manage, use and develop thinking skill, one of which is creative thinking. Creativity is an ability to create an idea or a new invention. Someone who has a creativity is able to solve the problems effectively^[1]. The benefit of creative thinking is not only to enrich and deepen learning experience, but also to prepare the students to be an independent individual^[2]. So, they can solve the problems in their daily life. Therefore, to face a dynamic challenge of modern life and to against uncertainty, it needs to develop creative thinking skill in learning^[3]. Creative thinking has four aspects or indicators, fluency, flexibility, originality, elaboration^[4].

The learning of IPA is a study to recognize natural, which related to ways of finding the nature systematically. So, the students are more active to find and act in developing science which concerns the skill of solving problems, concept understandings, and applications. In fact, the learning of IPA at school particularly biology subject is not the bridge to empower the students' creative thinking skill^[5], because it still focuses on how to understand concept, principal, and memorize biological term so the students' thinking ability are still low. The students do not have opportunity to find answers or other ways and learning process is dominated by teachers (teacher centered) and do not give any access to the students to develop independently through discovery process^[5]. This will affect to the students' demotivation in learning process which finally the students' creativity and activity decrease and become passive students in learning process. Increasing the students' creativity thinking needs the implementation of guided inquiry based since it is considered as a learning model to increase the students' motivation and develop understanding by constructing new knowledge^[6] and independent learning can be activated the students to find concept or new knowledge through hands-on hand mind-on activity^[9]. The learning model of guided

inquiry is one of the learning models which is considered able to increase the students' creativity of thinking skill. This model can be trained for students to solve the problems by investigating and find out some facts which is later examined, evaluated, and used to solve the problems through inquiry ways^[7].

Based on the problems above, it needs an improvement in learning process in which to implement guided inquiry-based learning model to improve creative thinking skill. The study aims to investigate the improvement the students' creative thinking skill through guided inquiry-based learning model.

METHOD

The research design was experiment research design which used one control class. The study was conducted on March 2019. The research subject was 22 senior high school students of grade X on Pteridophyte sub material. The research design was One Group Pretest-Posttest design. The learning media used was lesson plans, student activity sheets, and creative thinking test instruments. The research instrument used was the observation sheet of learning model implementation, questionnaires, assessment sheets.

The data from the pre-test and post-test of students 'creative thinking were analyzed by using N-Gain analysis which is the result of the progress of the students' creative thinking skills after learning, calculated using the following equation:

$$(g) = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

Information:

- S_{post} = average score of posttest
- S_{pre} = avarege score of pretest
- S_{max} = maximum score

From the N-Gain calculation, the results are converted with the criteria as in Table 1.

Table 1. Normalized Gain Criteria

N-Gain score	Normalized Gain Criteria
$0,3 \leq \text{N-Gain} \leq 0,7$	Medium
$\text{N-Gain} > 0,7$	High
$\text{N-Gain} < 0,3$	Low

RESULT AND DISCUSSION

The results included the implementation of learning through the implementation of guided inquiry-based learning models, students' creative thinking skills, and student responses. will be described as follows:

3.1 Implementation of Guided Inquiry-Based Learning

The implementation of guided inquiry-based learning is observed through the stages of the lesson plan implementation (RPP) with the teacher's practice when learning activities in class. The implementation aims to determine the quality of the implementation of learning by the teacher. The quality data of the implementation of the lesson plan was observed by two observers during two meetings.

The results of the quality of the implementation of guided inquiry-based learning as in Table 2.

Tabel 2. The quality of the implementation of guided inquiry-based learning

No.	Assessment Aspects	I		Total of average score at the meeting		No.	Name	Pre Test		Post Test		N-Gain	C
		P1	P2	1	2			Score (%)	C	Score (%)	C		
1.	Pre activities	1	1	4	3,8	1	A	29	KK	57	CK	0,40	Medium
						2	B	29	KK	57	CK	0,40	Medium
2.	Whilst activities	1	1	3,5	3,4	3	C	29	KK	57	CK	0,40	Medium
						4	D	43	CK	71	K	0,50	Medium
3.	Post activities	1	1	3,6	3,4	5	E	29	KK	71	K	0,60	Medium
						6	F	29	KK	57	CK	0,40	Medium
	Average Implementation of RPP			3,6		7	G	57	CK	86	SK	0,67	Medium
						8	H	43	CK	57	CK	0,25	Low
						9	∑	43	CK	57	CK	0,25	Low
						10	J	29	KK	43	CK	0,20	Low
						11	K _{SB}	29	KK	57	CK	0,40	Medium
						12	L	43	CK	57	CK	0,25	Low
						13	M _B	43	CK	57	CK	0,25	Low
						14	N _B	57	CK	71	K	0,33	Medium
						15	O _{SB}	57	CK	86	SK	0,67	Medium
						16	P	43	CK	71	K	0,50	Medium
						17	Q	57	CK	71	K	0,33	Medium
						18	R	29	KK	57	CK	0,40	Medium
						19	S	57	CK	71	K	0,33	Medium
						20	T	43	CK	71	K	0,50	Medium
						21	U	57	CK	71	K	0,33	Medium
						22	V	43	CK	86	SK	0,75	High
						Average		41,7	KK	65,4	CK	0,43	Medium

Based on Table 2, it can be seen that the quality score of the implementation of guided inquiry-based learning implementation of the pre, whilst, and post activities has been carried out both at the first and second meetings. The average value of the implementation of the lesson plan at two meetings was 3.6 with a very good category. These results indicate that the teacher was very good at carrying out learning activities in class in accordance with the lesson plan.

3.2 Students' creative thinking skills

The students' creative thinking skills are measured based on the results of creative thinking skills tests. The tests were carried out before (pretest) and after (posttest) learning with guided inquiry methods on Pteridophyte material. The data results of the students' creative thinking abilities tests was further analyzed to determine the categories and improvement of the students' creative thinking skills. The purpose of this categorization is to find out the qualifications of students' creative thinking skills and to what extent the students' creative thinking abilities have improved after being taught using guided inquiry methods. The results of students' creative thinking skills tests are presented in Table 3.

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Table 3. Analysis of N-Gain Score for Creative Thinking

No.	Name	Pre Test		Post Test		N-Gain	C
		Score (%)	C	Score (%)	C		
1.	fluency	0,97	High				
2.	flexibility	0,93	High				
3.	originality	0,37	Medium				

Information: C: Criteria
 KK: Not Creative; CK: Fair Creative;
 K: creative; SK: very creative

Based on Table 3, it can be obtained that from the tests submitted, the students' pretest scores ranged from 29-57 and had an improvement after the posttest with a range of values 43-86 with N-Gain score of 0.43 in the medium category.

If it was analyzed for each indicator of creative thinking such as fluency, flexibility, originality, and elaboration, it was obtained an improvement in the value of pretest and posttest can be seen which can be seen in Table 4.

Table 4. Enhancing Each Indicator of Creative Thinking Ability

No.	Indicator of creative thinking	N-Gain score	Categori
1.	fluency	0,97	High
2.	flexibility	0,93	High
3.	originality	0,37	Medium

4.	elaboration	0,16	Low
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The results of the analysis of creative thinking skills indicators showed the value of N-Gain in each indicator increased with a high category for fluency and flexibility indicators, while the originality indicator increased with a medium category, and the elaboration indicator increased with a low category

3.3 Student Responses

Questionnaires were used to collect information about the students' response to developed learning media. They were given to the students after learning. The result of analysis can be seen on Table 5.

Table 5. Results of Analysis of Student Responses

No.	Description	Responses		Criteria (%)		Category
		I	NI	Yes	No	
1.	The learning process of Pteridophyta material biology using the guided Inquiry learning model is very interesting and fun	19	3	86	14	Very strong
2.	Learning biology in Pteridophyta material using guided Inquiry learning model is new to you	18	4	82	18	Very strong
3.	Pteridophyta material biology learning using guided Inquiry learning model can help you in understanding the concept of material	18	4	82	18	Very strong
4.	Using the guided Inquiry learning model, you are interested in learning Pteridophyta material	19	3	86	14	Very strong
5.	Using the guided Inquiry learning model attracts your interest in learning other material	17	5	77	23	Strong
6.	You feel happy with the learning model applied by researcher	19	3	86	14	Very strong
7.	Guided Inquiry learning model can increase your interest in understanding the material	18	4	82	18	Very strong
8.	By applying the guided inquiry learning model you feel you have the opportunity to show your ability to express opinions	17	5	77	23	Strong
9.	The teacher conveys	19	3	86	14	Very strong

No.	Description	Responses		Criteria (%)		Category
		I	NI	Yes	No	
	information clearly					
10.	The test given is in accordance with the material being taught	20	2	91	9	Very strong
Average of students responded				83	.5	Very strong

Information:

I: interested; NI: not interested

Based on the students' response analysis to the development of learning media and the implementation of guided inquiry-based learning was obtained the result that 83,5% students responded positive with very strong criteria.

DISCUSSIONS

4.1 Implementation of the Implementation Lesson Plan

The implementation of lesson plan's observation was conducted to investigate how big was teacher's success in applying the steps in learning. The implementation of lesson plan can be known by the result of percentage. It was given by two observers which are stated in the implemented and not implemented criteria. The observations made by two observers showed that the developed lesson plans in the trials were obtained an average of 100%, so it can be said that the lesson plans in the trials were well implemented.

Assessment of lesson plan's implementation was given by two observers and it obtained high score with an excellent category because all stages of learning were done. In addition, the students were given opportunities to observe phenomenon on worksheets. It brought opinion and idea of the students to formulate the problems based on the topics. The process of observation which was further added by asking and analyzing the results of questions was the individual process to be creative. After the students succeeded formulating the problems or questions, the problems would be the students' reference as the process of investigation. The process of finding temporary answers was a hypothesis of the problems by exploring the students' previous knowledge from their textbook and various sources. This was suitable with the theory of Ausubel that highlighted the form of early organization to relate new ideas to previous knowledge of the subjects as a main idea. After

formulating the hypothesis, the students designed an experiment. In this stage they determined the variables of experiments, tools, materials, and the steps of experiment organization. Each stage such as displayed the problems, made the hypothesis, determined the experiments' variable, determined the tools and materials, and organized the steps. The last stage, the teacher gave opportunities to representation of group to present and deliver the result of experiment. Then, the teacher gave feedback about the process of discussion and strengthened the concept. Guided inquiry learning was the activities which involved the students, helped the students to develop deep comprehension and to construct science process and attitude. The display of results' experiment utilized a presentation which helped the students to increase creativity and thinking skill.

4.2 Student Creative Thinking Skill Test Results

In this study, the students' creative thinking skill was measured by giving students' thinking skill test which aimed to investigate the improvement of the students' creative thinking skill. Therefore, this instrument was given before learning and after learning. The assessment sheet of creative thinking skill was developed by the researcher using four creative assessment such as fluency, flexibility, originality, and elaboration. This test was related to Pteridophyte lesson. The item selection referred to Guilford's intellectual theory which stated the creative thinking or also called divergent thinking, which was the ability of the students to provide a variety of alternative answers.

Creative thinking skill or divergent thinking was defined as the skill to find many answers to a problem (based on available information) with an emphasis on the quantity, accuracy, and diversity of answers^[7]. Furthermore, the more possible answers given to a problem, the more creative a person was, but the answers must be relevant to the problems.

Creative thinking was an important component in the development of science and technology because creative thinking insisted the individuals solve a problem^[2]. Based on the data analysis results of the creative thinking skill assessment, there was an improvement of the students' scores from an average pretest of 41.7 with a less creative category to an average posttest of 65.4 with a very creative category, and N-Gain score with an average of 0.43 in the medium category. The gain value which included in the medium category stated that the developed guided inquiry-based learning device can improve students' creative thinking skills. This was consistent with the statement of Kuhlthau stated that the guided inquiry-based learning model can help students' think creatively and find solutions in solving a problem^[8].

The scores of creative thinking skills have improved after applying guided inquiry based learning models since all aspects of creative thinking can be improved by the

students included 1) fluency aspects, indicators of this aspect was being able to make as many questions as possible that relevant to the topics that have been presented^[7]. The second was flexibility aspect, an indicator of this aspect was someone produced several ideas so they can change the way or method. The third aspect was authenticity (originality), an indicator of this aspect was to form new ideas so they can provide answers that were different from the others. Munandar stated that original thinking caused a person to be able to deliver a new variety and unique expressions^[7]. Fourth was elaboration aspect, the indicator was be able to add or detail the ideas of others so they can describe in detail of an idea^[7]. This result was in line with research conducted by Zubaidah^[10] that the inquiry learning model significantly contributed to the improvement of creative thinking skills scores.

4.3 Response of the Students

Based on the analysis of the students' responses to the development of learning tools and the implementation of guided inquiry-based learning. It was found 83.5% of students on average gave positive responses with very strong categories.

There were several sections of responses which must be filled by the students as follow: the first part was about the students' interest in the material using the guided inquiry learning model. In this section, 86% of students expressed their interest in very strong category. The second part was to find out the students' opinions about the newest components in the first part, and 82% of students think with very strong categories. The third part was to find out the conceptual understanding of material using the guided inquiry model, 82% of students were able to understand the material's concept using the guided inquiry learning model with a very strong category. The fourth part was to find out the students' interest in learning pteridophyte material using the guided inquiry learning model, and 86% of students were interested in very strong category. The fifth part was to find out the students' interest in using the guided inquiry learning model in learning other material, and 77% of the students expressed their interest in strong category. The sixth part was to find out how students feel about the learning model that was applied, and 86% were happy to apply the guided inquiry learning model with very strong character. The last part was to find out the students' opinions about proper material with the tests given, 91% of the students' think in accordance to the category was very strong.

Based on the analysis, it can be concluded that the students' response to the development of teaching administrations and the implementation of learning was positive with very strong category. This showed *R. S Oktavia, et al.*

some facts that the students were feeling supported, glad, and interested in learning using guided inquiry model to improve the students' creativity thinking skill.

CONCLUSION

The conclusion of the study was the implementation of guided inquiry-based learning model on Pteridophyte can improve the students' creativity thinking skill. This can be seen from the test of the students that increasing after having posttest.

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