

Students' Creative Thinking Ability Profile in Problem Solving of Animals Ecology

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Abstract— In the era of a global economy based on knowledge and technology, lead free competition occurs with the trend of open systems. Therefore, Indonesian nation must improve the quality of human resources. The quality of human resources is marked by rapid development patterns of thinking in the form of creative thinking, critical thinking, problem solving and decision making. Orientation of creative thinking in this research consists of 3 aspects, which are fluency, flexibility and novelty. Creative thinking can be seen from its activities in the problems solving. The purpose of this research was to describe the profile of students' creative thinking in problem solving of animal ecology and to describe the characteristics of students' creative thinking in problem solving of animal ecology. The type of this research is descriptive research with a qualitative approach. The research subjects were students who have taken animal ecology course. Based on the results of written assignment 1 and written assignment 2 done by students, the level of students' creative thinking ability was at quite creative level. The highest aspect of creative thinking possessed by students was fluency, and the lowest aspect was novelty.

Keywords—Animals Ecology, Creative Thinking, Problem Solving

I. INTRODUCTION

Creative thinking ability is one of the essential competencies as part of life skills that become one of the goals of national education. The 2013 curriculum aims to prepare Indonesian generation to have the ability to live as individuals and citizens who believe, are productive, creative, innovative and effective, and able to contribute to the life of society, nation, and state and civilization of the world [1]. Moreover, as described in the Law of the Republic of Indonesia Number 12 of 2012 on Higher Education, in order to enhance the nation's competitiveness in the face of globalization in all areas, higher education is required to develop science and technology, and to produce intellectuals, scientists, and/or professionals who are cultured and creative, tolerant, democratic, have strong character, and dare to defend the truth for the sake of the nation.

Every individual requires the creative thinking ability to solve problems in life. It is because the individual's creative thinking ability can be trained to solve problems in different ways and various with appropriate priority. This is in line with [2] who stated that the creative thinking ability to solve a problem is indicated by the filing of a different idea of solution in general. Creative thinking of each person will be different and related to their way of thinking in the approach to the

problem. Creative thinking related to knowledge is possessed by someone along with relevant ideas or creative measures.

The importance of creative thinking ability is also strengthened by the Guilford in Munandar statement that most of the graduates of our universities are quite capable of performing the tasks given, but they could not solve problems that require new ways. Guilford emphasize how research in the field of creative thinking is very less.

On the other side, the researchers also gained an overview of the biology education program students from S-1 level of Lambung Mangkurat University, Banjarmasin, who have programmed the Animal Ecology course. Based on the interview with a lecturer of Animal Ecology, it was found that early concept of the course was one of the materials which got most attention. If students already have the understanding of the early concept of the Animal Ecology course, creative thinking ability of students can be seen. It is also said that during the learning and teaching in the Animal Ecology course, creative thinking ability is always become a target, especially during the students' practicum on the field.

Based on the information obtained from the lecturer of the course, it is known that the students are trained for creative thinking ability in teaching and learning activities in the classroom and on the field. However, the presence of creative thinking ability of students overall is unmeasured. Students are accustomed to working in groups when solving the problems. According to the lecturer of the course, each group usually divide the tasks to be done by each of their members. A trend that looks is that only one or two people who are very dominant in discussion and problem solving, while others get a little portion of the task. This makes the measurement of creative thinking ability has not been implemented holistically.

Problem solving is the process of activities to sharpen logic, argumentation and problem resolution as well as the ability to determine the cause, develop alternatives, analyze and choose a good settlement. Solving the problem is an attempt to find a way out of a difficulty to achieve a goal soon [3].

Administration of problems to be solved by the students can track the creative thinking ability as well since to solve the problem, one must have the creative thinking ability. This is in line with [4] who stated that the creative thinking ability does not grow in a vacuum. It requires a means. The means refers to the activity of problem resolution. Problem solving activity will be visible for improving creative thinking ability of students. It is also reinforced by [5] who argued that the development of creative thinking ability requires activities.

One way to achieve it is by doing the activity of problem solving.

II. RESEARCH METHODS

This research was descriptive research with a quantitative approach, which described the incident as the center of attention (creative thinking ability of students) and based on quantitative data.

Subjects in this study were students of the Biology Education at S-1 level of Lambung Mangkurat University who have been taking course of animal ecology in the second semester of the academic year 2015/2016.

Instruments used to obtained, process and analyze the data in this study were the written assignment for creative thinking ability and the assessment rubric of written assignment. The researchers set written assignment customized with steps to problem solving. In the assessment rubric of written assignment, scores were assigned by the researchers and adjusted to the aspect of creative thinking ability. Thus, from the results, the researchers could determine the creative thinking ability.

Data obtained were then assessed using an assessment rubric of creative thinking ability that have been developed by the researchers. Subsequently, the percentage of the achievement indicating each level of creative thinking ability was determined by the following formula:

$$NP = \frac{R}{SM} \times 100 \quad (1)$$

Information:

NP = Percentage

R = Raw scores obtained by student's

SM = Maximum score

Source: [6]

III. RESULTS AND DISCUSSION

A. Results

1) Aspects of Creative Thinking Ability

Based on the results of written assignment 1 and written assignment 2 done by students of biology education FKIP Lambung Mangkurat University, the percentage of achievement for each aspect of creative thinking ability is listed in Table 1 and Table 2.

TABLE I. ASPECT OF CREATIVE THINKING ABILITY (ACTA) OF STUDENTS IN A WRITTEN ASSIGNMENT I

Num.	ACTA	The Number of Values	Percentage (%)
1.	Fluency	308	20.62
2.	Flexibility	246	19.22
3.	Novelty	174	13.59

Notes:

Percentage fluency = $(\frac{\text{The Number of Values}}{448}) \times 30\%$

Percentage flexibility = $(\frac{\text{The Number of Values}}{448}) \times 35\%$

Percentage novelty = $(\frac{\text{The Number of Values}}{448}) \times 35\%$

The data obtained from the written assignment 1 done by students of Biology Education FKIP Lambung Mangkurat University showed that the three aspects possessed by students in a sequence are aspect of fluency (20.62%), aspect of flexibility (19.22%), and aspect of novelty (13.59%).

TABLE II. ASPECT OF CREATIVE THINKING ABILITY (ACTA) OF STUDENTS IN A WRITTEN ASSIGNMENT II

Num.	ACTA	The Number of Values	Percentage (%)
1.	Fluency	311	20.83
2.	Flexibility	255	19.92
3.	Novelty	166	12.97

Notes:

Percentage fluency = $(\frac{\text{The Number of Values}}{448}) \times 30\%$

Percentage flexibility = $(\frac{\text{The Number of Values}}{448}) \times 35\%$

Percentage novelty = $(\frac{\text{The Number of Values}}{448}) \times 35\%$

The data obtained from the written assignment 1 done by students of Biology Education FKIP Lambung Mangkurat University showed that the three aspects possessed by students in a sequence are aspect of fluency (20.83%), aspect of flexibility (19.92%), and aspect of novelty (12.97%).

B. Discussion

1) Aspects of Students' Creative Thinking Ability

Creative thinking ability is the ability to see or think of extraordinary, unusual, combining seemingly unrelated information and sparking new solutions or ideas that are reflected in the fluency, flexibility, and novelty of thinking [7]. This study describes the context in creative thinking ability profile in students' activity to solve the problem. Giving students a problem to be solved by creative thinking ability enable us to track the ability well. It is because to solve the problem, one must have the creative thinking ability. This is in line with [4] who stated that creative thinking ability requires a means in the form of the activity of problem-solving.

Based on Figure 1, the highest aspect of creative thinking ability seen in Students's of Biology Education FKIP Lambung Mangkurat University highest was fluency, followed by the aspect of flexibility, and the lowest aspect was the aspect of novelty.

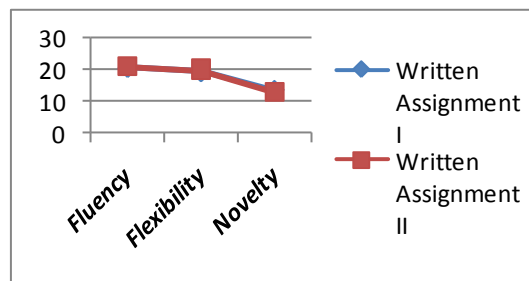


Fig. 1. Graphic Aspects of Creative Thinking Ability of Students

2) *Aspect of Fluency*

Fluency in problem solving refers to the many answers given by students. The results of the written assignment 1 and written assignment 2 showed that almost all the students have been able to provide an answer to fulfill aspect of fluency. Look at Figure 1 showing fluency as the highest aspect which is owned by the students in creative thinking ability. This indicates that the students have good ability in providing a wide variety of ideas/solutions on problems. This aspect of fluency is an aspect of creative thinking ability which ranks the lowest when compared with the aspect of flexibility and novelty [8]. Thus, students' achievement on the aspect of fluency of the highest rank.

The students are more likely to have a dominant aspect of fluency. This can be proved by looking at the results of written assignment 1 and written assignment 2 done by the students. They were able to give more than one answer to each given question. This is in line with the opinion [7] that fluency can be seen from how the students like asking a lot of questions, respond with a number of answer to any questions/problems, have many ideas about a problem, and fluently express ideas.

3) *Aspect of Flexibility*

Flexibility in problem solving refers to provide many different answers by students. The results of the written assignment 1 and written assignment 2 showed that the students were able to provide answers to fulfill aspect of flexibility. While looking at the Figure 1, the aspect of flexibility occupied the second position under the aspect of fluency, with the achievement percentage which was not much different. This indicates that the students have good ability in providing a wide variety of ideas/solutions to given problems. Aspect of flexibility is the second most important aspect after the aspect of novelty because the aspect of flexibility shows of productivity ideas/solutions that are used to solve a problem [8]. Aspect of flexibility applies when students are required to be able to provide various ideas/solutions.

Students have been able to show the aspect of flexibility in problem solving. This can be proved by looking at the results of written assignment 1 and written assignment 2 done by students. They were able to give more than one answers which were diverse to each given question. This is in line with the opinion of [7] in that flexibility can be seen from how the students give a variety of unorthodox use of an object, providing all kinds of interpretation of a problem, and give consideration to the different situation given by others.

4) *Aspect of Novelty*

Novelty in problem solving refers the ability of students to answer the question or problem with several different answers but it is true or unusual answer given by other students. Based on the results of the written assignment 1 and written

assignment 2, not all students showed the aspect of novelty in solving the given problem. Most students still gave an answer that was similar to the other students. Only a few students gave a unique answer or unusual.

This indicates that not all students have good ability in providing a wide variety of answers/ideas/solutions which were unique and unusual. Aspect of novelty is placed in the high position between two other aspects of creative thinking ability because aspect of novelty is the main characteristic in evaluating a product or idea creative thinking that should be different from the previous or the others [8]. Thus, the aspect of novelty is considered very important to know the level of creative thinking ability of students.

Although most students have not been able to demonstrate the aspect of novelty in solving the problems, there were some students who were able to show it. This can be proved by looking at the results of written assignment 1 and written assignment 2 done by some students. They were able to give answers that were true or unusual (unique). This confirms that novelty can be seen from how students think about problems or things that are not thought by others [7].

IV. CONCLUSION

Based on the results and discussion in this research, the aspect of creative thinking ability that can be achieved by the students with the highest percentage was aspect of fluency, while the aspect of creative thinking ability with the lowest percentage was the aspect of novelty. This research revealed the level of creative thinking ability of 28 students from the overall written assignment. Based on this research, 4 students were at the level of very creative, 4 students were at the level of creative, 15 students were at the level of quite creative, and 5 students were at the level of less creative.

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