

Analysis of senior high school students' creative thinking skills profile

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Abstract

The aim of this research is to analyse the initial profile of creative thinking skills in Senior High School students on biology learning. This research was a quantitative descriptive research using test method. Analysis was conducted by giving tests containing creative thinking skills. The research subject was grade 11 students of Senior High School that categorised by its accreditation as category A (high grade) and category B (low grade) at New Delhi. Based on the analysis, it showed that the percentage of creative thinking skill achievement in category A school is: fluency (46.35%), flexibility (13.54%), originality (20%), and elaboration (34.76%); meanwhile, category B school is fluency (30.39%), flexibility (2.45%), originality (9.11 %) and elaboration (12.87%). The lowest percentage of that result in both school categories was found on flexibility and originality indicator. Based on the result, the average of creative thinking skills in category A school was 28.66%, and category B school was 13.71%. The conclusion of this research is the initial profile of students' creative thinking skills in biology learning was relatively in low grade. The result indicates that creative thinking skills of Senior High School students should become a serious attention considering the low percentage on each indicator.

1. Introduction

Creative thinking skills have strategic values in 21st century. Creative thinking skills are considered by the National Qualification Framework for Higher Education as a high level creative thinking skill which focuses on developing students' skill. During the recent years, creative thinking and creativity become one of important skills to be obtained to adapt with rapid changes of globalisation. Creative thinking skills are defined as skills required on almost all subjects. Creative thinking skills are the ability of a person to use his thinking to invent new things, new ideas, and also develop the ideas more detail, based on originality during acquisition process. The result of such thought can be given either real or abstract ideas. By considering the sub-dimension of creative thinking skills, students can evaluate an event based on various points of view, show the ability to adapt to changeable situation and develop the perspectives on a variety of levels of thinking. Indicators of creative thinking skills introduced by Guilford consist of fluency (generating ideas during creative process), flexibility (generating a variety of ideas and categories), originality (uniqueness of ideas), and elaboration (detailed additions). Most creative thinking tests use these indicators as a reference. However, the most commonly used is fluency, as a skill devotes many ideas. Creative thinking skills can be created through divergent thinking stages. The stages of creative thinking process are preparation, incubation, illumination, and verification or evaluation.

Creativity as a result of creative thinking process was acknowledged as an important role to boost innovation and as a main factor to develop person's competency. Creativity is mostly used broadly and considered as a skill, like 'creative thinking' or 'creative problem solving'. Creativity can be empowered through teacher training and learning environment which encourage questions, open minded to new ideas, and readiness to learn from mistakes and failures. Studies on creative thinking measurement have not been conducted much. It stated that the study related to creative thinking skills in countries, such as India, Israel, Hong Kong, Germany and Romania, are relatively classified as low criteria; thus, it is important to do further research through the contribution of teachers, students, and educations. Creative thinking skill can be learned and improved as logical rules through education at school and with teachers help. Although assessing creativity is difficult, there are several instruments to measure creativity in particular field. Instruments to measure and analyse creative thinking can be

developed from the indicator of skills. Study related to creative thinking skill to analyse initial profile of students is necessary to be conducted in relation to strategic contributions. The profile of students' creative thinking skills is the important thing to create the initial description of students' competence in overcoming their learning difficulties. The research data can be used as a consideration to evaluate the learning process, especially on biology learning at Senior High School students in New Delhi. Biology is a difficult subject for students. The difficulty to learn biology is caused by misunderstanding, difficulty in finding relationship between concept and environment. Those difficulties are caused due to the lack of students' skills to learn about the particular topic. The purpose of this research is to analyse the initial profile of students' creative thinking skills on biology learning.

2. Research Method

This study was quantitative descriptive study, using test method. The test method was chosen to describe the percentage of creative thinking skills of Senior High School students in New Delhi. The sample in this research was sixty four students of grade 11, which are from an A- Category and B-Category Senior High School. This research used purposive sampling technique based on grade categorisation (low and high category).

The students were given test to analyse their creative thinking skills, especially on biology learning. The test used open-ended questions based on indicators of creative thinking skills, validated by team expert of learning evaluation. Two items developed on each indicator, the biological topics in the questions covered ecosystems, photosynthesis, and pollution topic. In order to Score the open-ended question, this study used rubrics that has been validated by expert for each indicator. The data of test result was analysed by descriptive percentage, to find out the indicators of creative thinking skills that could not be achieved by students; used the following formula:

$$\text{Percentage (\%)} = \frac{\text{Score}}{\text{Total Score}} \times 100\%$$

Furthermore, the percentage of creative thinking skills was interpreted by the criteria of creative thinking grade (Table 2).

3. Result and Discussion

This research was conducted to analyse the initial profile of students' creative thinking skills in Senior High School students in biology learning. Creative thinking is defined as a thought process that enables students to apply their imaginations to generate ideas and using ideas creatively to provide solution. The initial profile of student's creative thinking skills was represented by four indicators. First, fluency represents students' ability to generate many relevant ideas related to the problems and in short time. Second, flexibility represents students' ability to generate various ideas and approaches in answering questions. Fourth, elaboration represents students' ability to develop the detailed ideas. Open-ended questions, which were used to measure students profile, was intentionally conducted to give chance for each student to think, to generate ideas, and to suggest unique ideas. Questions should be presented to students to make them spoke up the unique ideas involving their imagination and creativity. The result of student initial profile test is presented in Table 1, and the analysis of test result which refers to the creative thinking level criteria is presented in Table 2.

Table 1. Student thinking skills profile.

No.	Indicator	Percentage of Achievement (%)	
		Category A	Category B
	Fluency	46.35	30.39
	Flexibility	13.54	2.45
	Originality	20	9.11
	Elaboration	34.76	12.87
	Average	28.66	13.71

Table 2. Criteria of creative thinking skills level.

Percentage(%)	Criteria
81-100	Very high
61-80	High Very low
40-59	Sufficient
20-39	Low
0-19	Very Low

Table 1 shows that the initial profile of creative thinking skills of grade 11 of Senior High School students at A-category school (high grade) is higher than students at B-category school (low grade). Based on the result, the average percentage of creative thinking skills of A-category school was 28.66% and B-category school was 13.71%. In this case, the level of intelligence seems to have an influence on the achievement of student skills. Some factors can affect the development of creativity, such as intelligence, knowledge, motivation, social environment, cultural context, and personality.

The analysis result refers to the criteria of creative thinking skills grade presented in Table 2. It can be seen that the creative thinking skills on each indicator at the A-category school and B-category school are relatively classified as low grade. This finding has the appropriateness related to some previous research results that also shows that the low grade of creative thinking skills in India. The low grade of creative thinking was proved in several studies on a national scale.

The assessment of creative thinking skills based on Guilford's indicator shows that some students almost reach the target in the fluency indicator; it reach 46.35% (sufficient category) in A-category school. The percentage of achievements of the creative thinking skills, that are too far from the target from both schools categories, are on flexibility, elaboration and originality indicator. The lowest percentage in both school categories was found on flexibility and originality indicator. In line with the previous research, the limited or unsatisfactory achievements are found on three criteria, namely flexibility, elaboration, and originality indicators (the worst). Flexibility is a person's ability to consider various approaches to have solutions, so students are aware of its way to generate new discoveries of a problem; meanwhile, originality is the ability to generate ideas or new and different ideas. Students can achieve these indicators if they are accustomed to practice their thinking skills with different points of view, because the sub-dimension depends on several factors. As a result, it indicated that students' creative thinking skills were not trained optimally. Therefore, it is important to use this skill in learning, especially on the biology learning through their strategic value. Various researches have analyzed teachers' perception of creativity skill; the general result indicates that teachers are aware of the positive impact of learning and daily life from creativity. Effective training to contribute of creative thinking usually focuses on strategies related to problem definition, conceptual combinations, idea generation, and implementation planning.

4. Conclusion

The conclusion of this research is the initial profile of students' creative thinking skills in biology learning was relatively in low grade. The results indicated that students' creative thinking skills should be a serious attention to be developed considering the low percentage on every indicator, especially flexibility and originality indicator.

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