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The Creative Thinking Skills Profile of Primary Education's Perspective Teacher

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Abstract
This study aims to analyze the creative thinking skills of primary education's prospective teachers in science learning. This study uses a descriptive survey to obtain quantitative data without special treatment. The population is students of PGSD Universitas Islam Raden Rahmat for the 2022/2023 academic year who program science courses (125 students). The sample was selected by random sampling technique, which was 84 students. Creative thinking skills are measured by an essay test totaling 8 questions that refer to indicators of fluency, flexibility, originality, and elaboration. The data was analyzed descriptively by calculating the percentage of each indicator to be further adjusted to the level of creative thinking indicator. The results show that students' creative thinking skills is still low in all indicators and included in the non-creative level. Creative thinking skills on the 'fluency' indicator received 'enough', while 'flexibility', 'originality', and 'elaboration' were still at the 'low' and 'very low'.

Keywords: creative thinking skills; primary educations's prospective teacher

INTRODUCTION

Education in Indonesia must prepare students to master 21st century skills, particularly critical thinking, creative thinking, communication, and collaboration (Mahanal, 2014). Among these, higher-order thinking skills, including creative thinking, are essential (Greenstein, 2012; Jackson et al., 2012; Türkmen, 2015). Creative thinking involves applying imagination to solve problems (Yazar Soyadı, 2015) and encompasses cognitive activities tailored to specific objects, problems and certain conditions (Birgili, 2015). According to *Kampylis & Berki*, (2014), it allows students to generate ideas, formulate questions, experiments with alternatives, and evaluate outcomes.

Creative thinking is also known as divergent thinking, productive thinking, or imaginative thinking. Developing these skills enables individuals to express themselve uniquely (Abraham, 2016). Such skills help students generate diverse ideas, ask questions, recognize argument validity, and remain open and responsive to different perspectives (Forrester, 2008). Optimizing of thinking skills is very important as they are crucial life skill (Zubaidah 2010). Some research indicates a positive correlation between creative thinking skills and cognitive learning outcomes (Lin & Wu, 2016; Nami et al., 2014; Vasudevan & Vasudevan Candidate, 2013; Yusnaeni et al., 2017). Empowering student with creative thinking skills is essential for them to lead functional,

meaningful lives and tackle complex problems as science develops (Trilling, 2009). Indicators of developed creative thinking skills in students include a willingness to tackle challenges, share ideas, and respond to feedback (Zubaidah, 2018). Furthermore, Greenstein (2012) identifies curiosity, fluency, originality, elaboration, imagination, and flexibility as key indicators. Treffinger (2002) also emphasizes fluency, flexibility, originality, and elaboration as criteria for creative thinking.

Science education plays a crucial role in fostering creative thinking skills. It aims to help students adapt, think flexibly, ask questions, be creative, think critically, respect society, and be tolerant of ideas (Tendrita et al., 2016). Scientific thinking promotes higher-level thinking, including creative thinking (PISA, 2012). Effective science learning should align with subject's character and domains, encompassing concepts, processes, creativity, attitudes, behaviors and applications (Widhy et al., 2013).

The creative thinking skills of prospective teacher significantly impact the learning experiences they design for their students. Artayasa et al. (2017) revealed that Elementary School Teacher Education students of Mataram University in designing science experiments was only around 50% or indicating weak skills. This issue is prevalent among teachers, leading to infrequent experimentation in schools (Saifuddin et al., 2013). Therefore, this study aims to assess the creative thinking skills of pre-service primary teachers at Universitas Islam Raden Rahmat in science courses. The results provide preliminary insight of challenges in science learning and guide improvements in instructional quality.

METHOD

This descriptive research with a quantitative approach aims to analyze the creative thinking skills of prospective primary education teachers. The study population consist of 125 primary education students studying science at Universitas Islam Raden during the 2022/2023 academic year. Using random sampling technique, 84 students were selected. Creative thinking skills were assessed through an 8-questions essay test, based on indicators from *Treffinger* (2002) and *Greenstein* (2012): 1) fluency, 2) flexibility, 3) originality, and 4) elaboration (Table 1).

Table 1. Creative thinking indicators

No.	Indicator	Sub Indicator
1	Fluency: Ability to think fluently	Have a lot of ideas
		Have a lot of questions
		Has many alternative answers and problem solving
2	Flexibility: Ability to think flexibly	Have a variety of approaches to solving problems
		Not fixated on the old mindset
		Have the ability to convey various ideas without fear of being wrong
		Provides a variety of interpretations
3	Originality: Ability to think original	Have the ability to generate ideas
		Able to create new and unique combinations
		Using unusual ways of expressing oneself, and being able to explore possible solutions
4	Elaboration: Ability to evaluate	Giving consideration based on one's own point of view
		Determining an opinion about a thing
		Analyze critical issues or regrets by always asking "Why?"
		Have a rationale that can be accounted for

(Source: Greenstein, 2012)

Data analysis was carried out by calculating the percentage of correct answers for each respondent on each creative thinking skills indicator. The rating scale used starts from 0-4 that converges to 0-100 with the criteria "very low" to "very good". The criteria for assessing creative thinking skills are presented in Table 2 and the level of creative thinking skills are shown in Table 3. The validity test of the questions is carried out by matching the developed items with creative thinking skills indicators. Based on the results of the item validity test, it was found that there were 10 valid items out of a total of 20 items. Testing the reliability of the questions was carried out with the Quest program. The results of the reliability test developed have a very high reliability or level of reliability, with a number of 0.81.

Table 2. Criteria for Assessment of Creative thinking skills

Interval	Criteria	Code
85-100	Very good	VG
70-84	Good	G
55-69	Enough	E
50-54	Low	L
0-49	Very low	VL

(Source:Riduwan, 2015)

Table 3. Level of Creative Thinking Skills

Level	Characteristic
Level 4 (Very Creative)	Students were able to demonstrate fluency, flexibility, originality and elaboration in solving problems.
Level 3 (Creative)	Students were able to show 3 out of 4 indicators of creative thinking skills (fluency, flexibility, originality, elaboration) in solving problems.
Level 2 (Creative Enough)	Students were able to show 2 out of 4 indicators of creative thinking skills (fluency, flexibility, originality, elaboration) in solving problems
Level 1 (Less Creative)	Students were able to show 1 of 4 indicators of creative thinking skills (fluency, flexibility, originality, elaboration) in solving problems.
Level 0 (Not Creative)	Students were not able to show the four indicators of creative thinking skills.

RESULT AND DISCUSSION

The scoring of creative thinking skills is carried out based on the results of student answers with scoring criteria on a scale of 0-100 with the benchmark achievement score divided by the maximum score multiplied by 100, which is served below.

$$N = \frac{a1}{an} \text{ x } 100$$

Based on the results of the calculations and analysis carried out by the researchers, the data obtained from the average ratio of the creative thinking skills scores of primary education's prospective teacher. Ratio data is indicated by numbers, as an indicator of the value of the object that has been measured. The results are presented in Table 4.

Table 4. The Creative Thinking Skills Scores

No	Indicator	Score	Category
1	Fluently	56.55	E
2	Flexibility	54.17	L
3	Originality	45.24	VL
4	Elaboration	47.02	VL

Based on Table 4, it appears that out of a total of 84 prospective teacher students, the average score of students' creative thinking skills on the fluently indicator is 56.55 and is in the sufficient category. The average score on the flexibility indicator is 54.17 and is in the low category. The average score on the originality indicator is 45.24 and is in the very low category. The average score on the elaboration indicator is 47.02 and is in the very low category. Figure 1 presents a recapitulation of the creative thinking skills score data of prospective elementary school students in science courses.

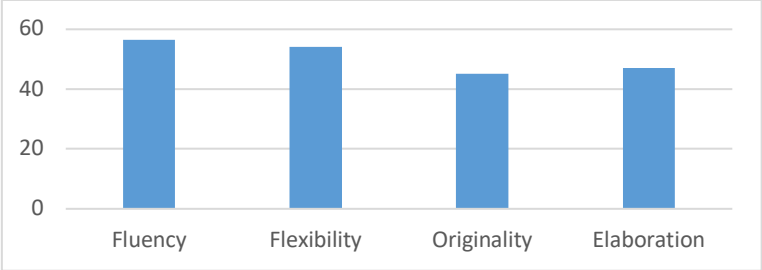

Figure 1. Creative Thinking Skills for each Indicator of prospective elementary school students

The fluency indicator has the highest percentage of 56.55%. These results show that students are able to find more than one answer to solve a problem. In line with the opinion of (Febrianti et al., 2016) that students who have fluent thinking skills are students who can ask several questions, are proficient in conveying ideas or ideas, and have the ability to think quickly from students in general.

The flexibility indicator has a percentage of 54.17%. It means that students have not been able to provide a varied solution to a problem. In line with the opinion of Fajriah & Asiskawati (2015) that the indicator of flexibility in creative thinking is related to the many variations of ideas that can be raised by students.

The originality indicator has a percentage of 45.25%. In this indicator, students cannot explain the answer in their own language. In this case, students are still fixated on textual sentences from the references they read. Students have difficulty improvising new ideas and sentences to answer the questions given. Based on *Ode Samura* (2019), authenticity is a student's skill in solving problems in their own way or in other words, in a way that most people do not think of.

The elaboration ability indicator has a percentage of 47.02%. This indicates that students have difficulty in describing an idea. This skill can be identified from the way students answer a question in detail and can expand an idea (Febrianti et al., 2016).

Referring to Table 4, the creative thinking skills of prospective teachers at Universitas Islam Raden Rahmat in science courses are still low on all indicators except fluently indicators which are in the sufficient category. The low score of each indicator of creative thinking skills leads to a low level of creative thinking skills of students. Most college students are at a less creative and uncreative level. This shows that most of the primary education's prospective teacher students at Universitas Islam Raden Rahmat still do not have the ability to think creatively (83.71%). Therefore, efforts are needed to practice creative thinking skills so that learners can be successful in life.

Furthermore, the measurement of the level of creative thinking skills students of prospective teachers at Raden Rahmat Islamic University in science courses was carried out based on the criteria of Table 3. The data is presented in Table 5.

Table 5. The Level Creative Thinking Skills Students of Prospective Teachers at Universitas Islam Raden Rahmat in Science Courses

No	Criteria	Percentage (%)
1	Very creative (VC)	0
2	Creative (C)	0
3	Creatif Enough (CE)	16.29
4	Less Creative (LC)	33.5
5	Not Creative (NC)	50.21

From Table 5, we can see that the level of creative thinking skills of prospective teachers at Raden Rahmat Islamic University in science courses does not meet the very creative (V) criteria, as well as the Creative criteria. The Creative Enough (CE) criteria get a percentage of 16.29%. The Less Creative (LC) criteria get a percentage of 33.5%. The Not Creative (NC) criteria get the largest presentation, which is 50.21%. This shows that more than half of the students (out of a total of 84 samples) are still at the Not Creative (NC) level. Figure 2 shows the level of creative thinking skills more clearly.

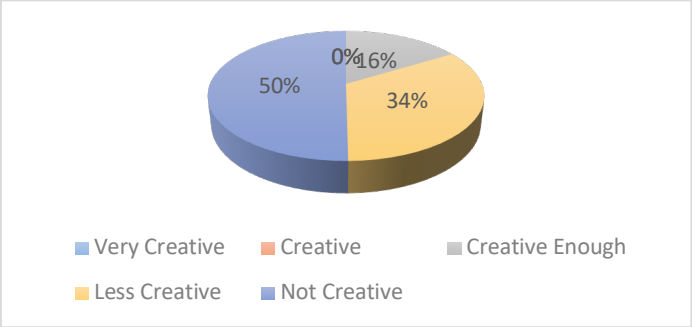

Figure 2. The level of creative thinking skills of prospective teachers at Raden Rahmat University in science courses

The low of creative thinking skills are likely to occur because they have not been handled properly during the learning process. Integrating creative thinking skills should be done in each subject. Low creative thinking skills may occur due to the teacher's lack of understanding to integrate these creative thinking skills in his teaching and learning activities (Laius & Rannikmäe, 2011). Learning that integrates creative thinking skills trains students to develop ideas and arguments, ask questions, acknowledge correct arguments, and influence students to think openly

and be more responsive to different perspectives (Tendrita et al., 2016). On the other hand, the application of learning approaches to develop students' creative thinking skills is too difficult for students who have limited creativity, knowledge, and skills (Lin & Wu, 2016).

The creative thinking skills can be developed in science learning through several methods or approaches, for example the inquiry learning model (Budiman, 2017). Problem solving-based models can be used to develop creative thinking skills such as through the implementation of demonstrations, discussions, or question and answer sessions (Kadir et al., 2017). Therefore, it is necessary to transform science education as a shallow/simple learning model into a complex learning model. Learning of science in the era of 21st Century Skills should be carried out in a scientific inquiry with a student-centered learning approach to foster creative thinking and critical thinking skills, be able to solve problems, train innovation skills and emphasize the importance of collaboration and communication (Widhy et al., 2013).

CONCLUSION

Conclusion

Based on the results of the study, the creative thinking skills of primary education's prospective teachers at Raden Rahmat Islamic University in science courses are at a 'not creative' level. The creative thinking skills in each indicator show that 'fluency' gets enough criteria, while for 'flexibility', 'originality', and 'elaboration' indicators, are still at 'low' and 'very low' criteria. The role of the teacher is needed to design innovative learning to integrate and train creative thinking skills. Thus, students' creative thinking skills should be improved. Therefore, to be able to improve students' creative thinking skills, learning methods or models and teaching materials are needed that can train students' creative thinking skills.

Acknowledgement

The low profile of creative thinking skills of prospective teachers in primary education students at Raden Rahmat Islamic University can be a basis for consideration by lecturers and education administrators in developing and implementing learning that is able to optimize the development of students' creative thinking skills. There needs to be further research to test and compare innovative learning models that are effective in improving the creative thinking skills of prospective teachers in primary education at Universitas Islam Raden Rahmat.

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