



Profile of Students' Creative Thinking Skills in Learning Physics on the Topic of Linear Motion

Rahmawati , Mirna, Khaeruddin

Universitas Muhammadiyah Makassar

Jl. Sultan Alauddin No.259, Makassar, 90200, Indonesia

| rahmawatisyam@unismuh.ac.id  | DOI: <https://doi.org/10.37729/radiasi.v15i1.1819>

Abstract

This study aimed to analyze the level of senior high school students' creative thinking skills in the line movement topic. This type of research was ex post facto research. Subjects in this study were 28 senior high school students in one of the South Sulawesi schools. The research instrument used was a test in the essay question form. The results of this research showed that the average score of creative thinking skills was medium category with a percentage of 61%. The study results showed that the most prominent indicator was elaborate thinking with an average score of 15.93 and the lowest indicator was thinking fluently with an average score of 11.14 compared to other indicators. From the results of the study, it was concluded that the creative thinking skills of students were in the medium category. There was a suggestion that the next researcher can continue with creative thinking skills test questions with other materials. In addition, further research can also be carried out by providing innovative learning that trains creative thinking skills so that students are able to develop their creative thinking skills.

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1. Introduction

The 21st century is a time of rapidly developing information and communication technology. This impacts the learning process that must keep up with the changing times and the demands of market share in society. One of them is that the learning process must equip students to have the ability to reason, think critically, and solve problems so that they can make the right decisions to solve the issues they face in everyday life [1]–[3]. Therefore, 21st-century teaching and learning activities in schools should refer to the four competencies formulated into the 4Cs: communication, collaboration, critical thinking, and creativity [3]–[6].

Creative thinking is one of the skills that must be emphasized in learning in the 21st century [6]–[9]. Creating learning conditions by involving students in reasoning activities can be done to develop creative thinking skills in the learning process [9]. Creative thinking activities are identical to expressing a new idea or problem solving in learning that is different from the others [10], [11]. Therefore, to carry out a learning activity in the classroom, students must actively engage in creative thinking activities so that these skills can develop properly. However, the facts found in the field are that the learning process in schools is still minimal in learning activities that provide balanced skills and creative thinking, so students have not been able to maximize the potential of thinking, acting, and behaving creatively in the learning process and in their daily activities. Of all the physics material provided in one semester, 35% of the material is provided with inquiry learning activities through a practicum. The dominant

teacher presents the material by explaining the material through PowerPoint media and giving assignments in the printed book used in learning Physics. In addition, the teacher has not prepared worksheets and task sheets that are oriented to creative thinking skills.

Understanding thinking, in general, is based on the assumption of mental or intellectual activity involving individual awareness and subjectivity [12], [13]. It can refer to an act of thinking or ideas or an arrangement of ideas. Thinking is a mental force that can lay down the relationships between our knowledge [12], [14]–[17]. Furthermore, thinking is a "dialectical" process, meaning that as long as we think, our minds are in a state of question and answer to be able to put our knowledge relations [18]. Thinking is an activity to train ideas precisely and thoroughly, which begins with a problem [19].

Internal in mind but predictable from behavior; (2) thinking is a process that involves some manipulation of knowledge in the cognitive system; (3) thinking is directed and produces behavior that solves or is required to solutions [20]. Thinking skills are skills or abilities that are relatively specific to someone in thinking about something that is needed to be able to understand the information in the form of ideas, theoretical concepts, and so on. Knowledge and thinking skills are mutually supportive units [21].

Many experts have described the definition of creative thinking. Munandar reveals the definition of creative thinking as the ability to find many possible answers to a problem, emphasizing quantity, effectiveness, and diversity of answers based on the data or information provided [22]. Creative thinking also means creating a new idea or idea to produce a new or unique answer or way of solving a problem [23]. Creative thinking is an ability that reflects fluency, flexibility, originality in thinking, and the ability to elaborate (developing, enriching, detailing) an idea [21], [24]. These elements form the basic characteristics typical of the creative thinking process; besides, these elements also make the right development of creative thinking. Activities in creative thinking skills include skills in 1) designing; 2) making changes and improvements; 3) and get new ideas [21]. Creative thinking is a thinking process that has the characteristics of fluency, flexibility, originality, and detailing or elaboration [19]. Creative thinking in learning physics is the main goal in the educational process [10].

Munandar [22] suggests that the ability to think creatively is formulated as an ability that reflects the following aspects: (1) 1) Fluent thinking, namely fluency, causes a person to come up with many ideas, answers, problem-solving, or questions; (2) Thinking Flexibility or flexibility that causes a person to produce varied ideas, answers, or questions; (3) Original thinking, namely original thinking, causes a person to give birth to new and unique expressions or be able to find unusual combinations of ordinary elements; (4) Elaboration ability, namely elaborating, causes a person to enrich and develop an idea.

According to Tringgono [26], everyone has creative potential and different characteristics of creative thinking. The right stimulus is expected to develop the potential for creative thinking. However, in reality, teachers at a senior high school in South Sulawesi only rely on factual dimensions which are measured in the form of physics questions. The emphasis on items to explore creative thinking skills is still 40% of all physics material taught in one semester, including, in this case, the Straight Motion material has not been oriented to creative thinking. Based on the existing problems, this study aims to describe the profile of students' creative thinking skill levels on the topic of linear motion.

2. Method

This research is an ex post facto type of research located in one of the senior high schools in South Sulawesi. The population in this study was all students of class X IPA SMA at the school, totaling 58, divided into two classes. The sampling technique in this study used purposive sampling with a sample of 28 students. The data collection technique used a test technique with the research instrument in the form of a test. Creative thinking skills in the form of 20 essay questions representing all indicators of creative thinking skills (fluent thinking, flexible thinking, original thinking, and elaboration).

All data obtained were analyzed using descriptive statistics by categorizing the level of creative thinking skills based on the students' scores. The reference for categorizing creative thinking skills use Table 1.

Table 1. Creative thinking skills level category

Criteria	Score	Category
$X \geq M + 1SD$	$X \geq 61,70$	High
$M - 1SD < X < M + 1SD$	$45,88 < X < 61,70$	Medium
$M - 1SD \leq X$	$45,88 \leq X$	Low

3. Result and Discussion

The descriptive statistical analysis results related to students' creative thinking skills test scores at SMA Negeri 8 Pangkep showed that the highest score was 70 and the lowest was 38 on a scale of 0-100. Meanwhile, the average score of students has obtained 53.79, with a standard deviation of 7.91. Scores based on the categorization of creative thinking skills are distinguished into high, medium, and low categories, as shown in Figure 1. Figure 1 shows that of 28 students there are 18% of students in the high category in creative thinking skills, 61% in the medium category, and as many as 21% of students in the low category in creative thinking skills.

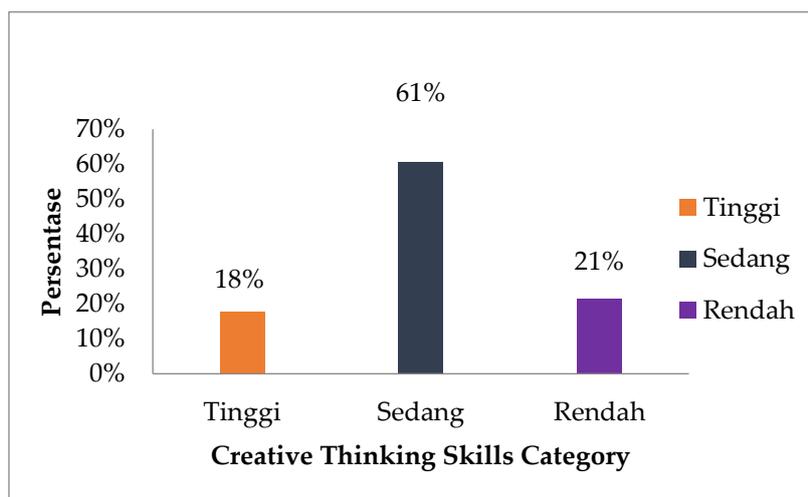


Figure 1. Student Creative Thinking Ability

The categorization of students' creative thinking skill level on each creative thinking skill indicator is shown in Figure 2 shows that the highest average score of the students' physics creative thinking skill indicator is on the elaboration thinking indicator of 60.45, while the lowest average score is seen on the indicator think fluently with an average score of 55.35. Nevertheless, the four indicators of creative thinking skills are in the medium category.

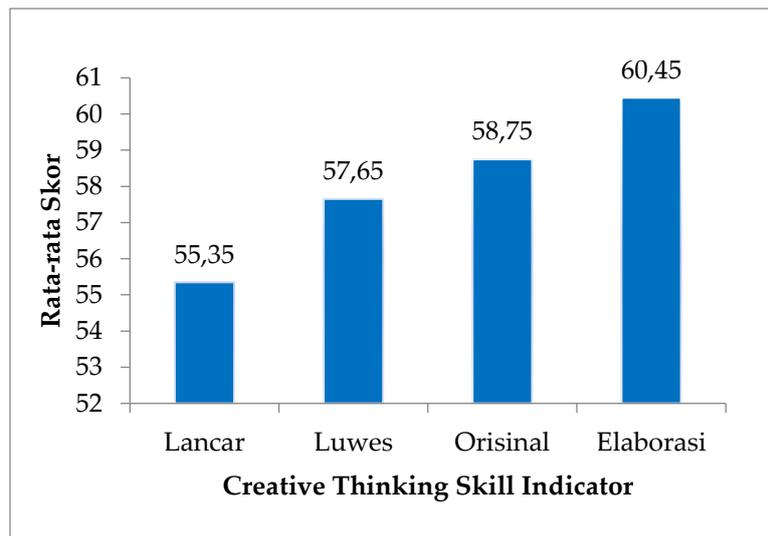


Figure 2. Average Score of Students' Creative Thinking Skills on Each Indicator

The results showed that students' creative thinking skills in class X IPA 1 SMA Negeri 8 Pangkep were in the moderate category, both in terms of overall and based on indicators. Each indicator was in the medium category if viewed on each indicator of creative thinking skills. Fluent thinking in creative thinking skills shows that students can provide several answers to the questions given. Based on the analysis results, students' creative thinking skills in this indicator category are at the lowest score of the four creative thinking indicators. Fluently indicates that some students have not been able to express their ideas optimally. Students only answer with modest answers. The findings of this study are in line with the results of Wahyu's research on the obstacles faced by students. The indicator of fluency is that some students do not seem to understand the concept; students also do not know what is meant by the question, answer with only one answer and provide relevant examples, only mentioning theoretically, not relating to life [27].

The next finding on the flexible thinking indicator is that the average score obtained by students is slightly higher than the fluent thinking indicator. Based on the analysis of student answers, some students have not been able to provide solutions from the results of their thoughts; students still tend to rely on only one answer and have not been able to provide answers. This is in line with research conducted by Armandita that students' responses in working on physics problems are only part of all students who can produce different ideas or answers [10].

The third indicator of creative thinking skills is original thinking. The data obtained regarding the average score of this indicator, which is 58.75, is also in the medium category. The average score on this indicator is slightly higher than fluent thinking and flexible thinking indicators. In this indicator, students seem to be more able to give original answers. Furthermore, based on the results of the analysis of students' responses, it can be seen that most of the students have been able to give answers that are different from the others or unique. Repetitive thinking activities cause habituation that causes students' creative thinking skills to be honed to arrive at indicators of original thinking. This is in line with research by Jumrodah *et al.* [3] real-life experience. Students should be able to answer with various ideas different from the others (unique); students should be able to answer things that other people don't think of [27].

It looks different from the habit pattern seen in this study; namely, the average score of the elaboration thinking indicator is the highest score of all the indicators of creative thinking skills. In this indicator, students can provide answers that follow the problems given and detail an idea to make it appear clearer. The findings of this study are in line with the results of Nurlaila's research [21], which

states that most students can achieve elaboration indicators, where students can enrich ideas in detail in answering questions. Solving problems systematically, sequentially, in more detail, and full of explanations is the tendency of someone who has good elaboration thinking skills. Based on the results of data analysis, it can conclude that the level of student's creative thinking skills in physics class X IPA 1 SMA Negeri 8 Pangkep is still in the medium category. The interviews with educators in learning physics show that students have not been accustomed to creative thinking activities.

4. Conclusion

Based on the results of the data analysis, in all stages of research related to students' physics, creative thinking skills in class X IPA, one of the senior high schools in South Sulawesi, is improving. Students' dominant creative thinking skills are in the moderate category with a percentage of 61% of all students. Furthermore, students' creative thinking skills on the indicators of fluent thinking, flexible thinking, original thinking, and elaboration thinking, respectively, were 55.35 %, 57.65 %, 58.75 %, and 60.45 %. The percentage values for each indicator of creative thinking skills all show that they are in the medium category. The results of this study can be used as a consideration for future researchers in analyzing students' creative thinking skills on different physics materials using similar or different test instruments. The results of this study have implications for considerations in designing innovative learning that has the potential to develop students' creative thinking skills.

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