

An Analysis of Creative Thinking Skills among Students of PGSD FIP UNESA

Julianto^{1*}, Mintohari², Farida Istianah³, Suryanti⁴, Supriyono⁵

^{1,2,3,4,5}Department of PGSD FIP, State University of Surabaya, Lidah Wetan, Surabaya, 64732, Indonesia

⁶Department of PGSD FKIP, University WR Supratman, 60111, Surabaya

¹julianto@unesa.ac.id

Abstract: Physics is one of the subjects in the science family that emphasizes the development of inductive and deductive analytical thinking skills. Physics can also be used to solve problems related to scientific problems and also develop students' knowledge, skills and perceptions of the scientific world. One of the main aspects that can be developed further is creative thinking skills, which can be categorized as exploratory activities to generate new ideas that are different from existing ones. Therefore, in carrying out classroom learning, students must be actively involved so that their skills can be developed appropriately. The purpose of this study was to determine the level of creative thinking skills and student responses in the PGSD FIP Department. This research is a descriptive research. The population in this study were all students of the 2018-2020 PGSD FIP Department of Unesa with a total sample of 126. All students were taught by researchers, making it easier to collect all the data. The data collection method used in this study was a test. The instrument used in this research is the Creative Thinking Ability Test, which is a written test consisting of five questions in the form of a description, which is used to measure students' creative thinking abilities. This test instrument has been tested and analyzed its items regarding validity, reliability, level of difficulty, and distinguishing power, so it is feasible to be used as a research instrument. In addition, questionnaires were distributed to students to determine students' responses and perceptions of their creative thinking abilities. Closed-type questionnaire was used to provide a clear picture of the perception of students' creative thinking abilities. Based on the results of the data obtained and discussed, it can be concluded that the ability of students' creative thinking skills still needs to be improved even though the responses given by students related to learning that accommodates creative thinking skills that have been carried out in the Department of PGSD FIP Unesa are in the good and very good categories. Therefore, it is necessary to know that it is necessary to take effective steps and approaches to improve students' creative thinking skills in all upcoming learning semesters to ensure that all students in the PGSD FIP Department reach the desired level.

Keywords: Creative Thinking Skills, Science, PGSD

Abstrak: Fisika merupakan salah satu mata pelajaran dalam rumpun IPA yang menekankan pada pengembangan kemampuan berpikir analitis induktif dan deduktif. Fisika juga dapat digunakan untuk memecahkan masalah yang berkaitan dengan masalah ilmiah dan juga mengembangkan pengetahuan, keterampilan, dan persepsi siswa tentang dunia ilmiah. Salah satu aspek utama yang dapat dikembangkan lebih lanjut adalah keterampilan berpikir kreatif, yang dapat dikategorikan sebagai kegiatan eksplorasi untuk menghasilkan ide-ide baru yang berbeda dari yang sudah ada. Oleh karena itu, dalam melaksanakan pembelajaran di kelas, siswa harus terlibat secara aktif agar keterampilannya dapat dikembangkan dengan tepat. Tujuan dari penelitian ini adalah untuk mengetahui tingkat kemampuan berpikir kreatif dan respon mahasiswa di Jurusan PGSD FIP. Penelitian ini merupakan penelitian deskriptif. Populasi dalam penelitian ini adalah seluruh mahasiswa Jurusan FIP PGSD 2018-2020 Unesa dengan jumlah sampel 126. Semua mahasiswa diajar oleh peneliti sehingga memudahkan dalam mengumpulkan semua data. Metode pengumpulan data yang digunakan dalam penelitian ini adalah tes. Instrumen yang digunakan dalam penelitian ini adalah Tes Kemampuan Berpikir Kreatif, yaitu tes tertulis yang terdiri dari lima soal berbentuk uraian, yang digunakan untuk mengukur kemampuan berpikir kreatif siswa. Instrumen tes ini telah diuji dan dianalisis butir-butirnya mengenai validitas, reliabilitas, tingkat kesukaran, dan daya pembeda, sehingga layak untuk digunakan sebagai instrumen penelitian. Selain itu, penyebaran angket kepada siswa untuk mengetahui tanggapan dan persepsi siswa terhadap kemampuan berpikir kreatifnya. Angket tipe tertutup digunakan untuk memberikan gambaran yang jelas tentang persepsi kemampuan berpikir kreatif siswa. Berdasarkan hasil data yang diperoleh

dan dibahas, dapat disimpulkan bahwa kemampuan keterampilan berpikir kreatif siswa masih perlu ditingkatkan meskipun tanggapan yang diberikan siswa terkait pembelajaran yang mengakomodasi keterampilan berpikir kreatif yang telah dilakukan dalam pembelajaran. Jurusan PGSD FIP Unesa berada pada kategori baik dan sangat baik. Oleh karena itu, perlu diketahui bahwa perlu dilakukan langkah dan pendekatan yang efektif untuk meningkatkan kemampuan berpikir kreatif mahasiswa pada semua semester pembelajaran yang akan datang untuk memastikan seluruh mahasiswa di Jurusan PGSD FIP mencapai level yang diinginkan.

Kata kunci: Keterampilan Berpikir Kreatif, IPA, PGSD

INTRODUCTION

Physics is one of the subjects in the science family which refers to the development of inductive and deductive analytical thinking skills. Physics can also be used to solve problems related to scientific issues and also develop students' knowledge, skills and perceptions of the scientific world. One of the objectives of physics is that students are able to master the knowledge, concepts and principles and have the ability to develop knowledge that can be applied in everyday life and as a provision to continue education at a higher level. One thing that can be done is to develop creative thinking skills, where creative thinking is an exploratory activity to generate new ideas that are different from existing ones. So that in conducting a study in the classroom must involve participants learners actively so that the skills they have can be developed with the well. However, this has not been achieved properly because the learning process is more oriented towards developing and testing students' memory and is simply understood as a memory skill. In physics learning, students are guided to work on questions or conduct an experiment or observation related to the material being studied. The purpose of guiding students to work on physics problems is so that later when students are faced with physics problems, they are able to solve them and provide applications in everyday life. However, in reality, there are still students who have not been able to work on physics problems or provide concrete examples of applications in everyday life. If there are students who are able to work on the questions, on average these students will rely on the formulas in the books or those given by the lecturer but when the editorial questions are changed, the students will have difficulty doing it or designing an experiment according to the given task. The general objective of this research is to identify and determine the level of creative thinking skills and responses of students in the PGSD FIP Department.

Creativity in learning physics is known as scientific creativity (Mukhopadhyay & Sen, 2013). Scientific creativity includes the ability to generate new ideas or new products that are relevant to the context and have scientific uses (Ayas & Sak, 2014). Scientific creativity has similarities with creativity in general in divergent thinking (has dimensions of fluency, flexibility, originality); but more emphasis is placed on scientific experiments, creative problem-solving and scientific problem-solving, and creative science activities (Raj & Saxena, 2016; Siew, Chong, & Chin, 2014). Hu & Adey (2010) developed the following hypotheses related to scientific creativity: (a) emphasis was placed on scientific experimentation, problem finding and creative science problem solving; (b) includes intellectual abilities; (c) creativity and analytical intelligence including two different factors on a single function derived from mental abilities; and (d) rely on scientific knowledge and science process skills. Based on the explanation above, scientific creativity has similarities with creativity in general in the dimensions of fluency, flexibility, and originality; but more emphasis is placed on creative science experiments, creative problem-solving and scientific problem-solving, and creative science activities .

The development of scientific creativity in physics learning involves generalizing hypotheses, designing experiments, and evaluating evidence. Hypothesis generalization involves

students in formulating hypotheses based on knowledge or data from previous experiments, then verifying the rationality of the hypotheses to be investigated. Experimental design involves students in designing and carrying out experiments to test the proposed hypothesis. Evaluation of evidence involves students in verifying the suitability of the theory with the results of the investigations that have been carried out (Ayas & Sak, 2014; Mukhopadhyay & Sen, 2013). Based on the explanation above, the development of scientific creativity in physics learning can be done through scientific investigations (involving generalizing hypotheses, designing experiments, and evaluating evidence), scientific creativity tasks, and good scientific communication. In relation to the world of education, especially in the learning process in the classroom, Wang (2011) states that there are four aspects that affect students' creative thinking skills, namely cognitive factors, motivation, personality, and social factors. Cognitively Williams (in De Caroli, 2013) says that there are four abilities that are used as indicators of creative thinking abilities which are included in cognitive factors, namely *fluency*, *flexibility*, *originality*, and *elaboration*. These four indicators can be used as a benchmark for one's creative thinking ability.

METHODS

The type of research used is descriptive research. The population in this study were all students of the PGSD FIP Unesa Department and the sample used for the 2018-2020 class. The sample used for the class of 2019 classes D, E and F, totaling 126 students, this is because the class is taught by researchers in lectures this semester, making it easier to collect data during learning. The data collection method used in this research is the test. The instrument used in this research is the Creative Thinking Ability Test, which is a written test consisting of five questions in the form of a description, which is used to measure students' creative thinking abilities. This test instrument has been tested and analyzed items regarding validity, reliability, level of difficulty, and distinguishing power, so that it becomes feasible to be used as a research instrument. In addition, questionnaires were distributed to students. Questionnaires were given to students to determine students' responses and perceptions of their creative thinking abilities. The questionnaire used is a closed type of questionnaire. This questionnaire is expected to provide a clear picture of the students' perceptions of their creative thinking abilities

RESULT AND DISCUSSION

Results

In accordance with the research objectives stated in this study, namely to identify and determine the level of creative thinking skills and responses of students of the PGSD FIP Department. In this study, researchers have developed instruments for data collection related to creative thinking skills and learning responses that have been taking place in the Department of Elementary School Teacher Education, Faculty of Education, Unesa. For data collection, researchers used the Google Form platform facility, data related to creative thinking skills were collected by providing students with a link to the page <https://forms.gle/6Lc6e65PoC8Aevbx8> and the collection of learning questionnaire data so far has been carried out at the Department of PGSD FIP Unesa using the following page link <https://forms.gle/S92qWNYAj9gd69ig9>. The data obtained from the two links can be presented as follows:

1. Creative Thinking Skills

According to the results obtained on the google form link to find out the creative thinking skills of PGSD FIP Unesa students online and the filling is done objectively using the <https://forms.gle/6Lc6e65PoC8Aevbx8> page, so researchers can take pictures related to creative

thinking skills in PGSD FIP Unesa students . The data obtained shows that there are 108 students who are representatives of each batch, namely 2019 (79.6%) and 2020 (20.4%) and each class has representatives from classes A - F. According to the results obtained from the search via google form can be described as follows:

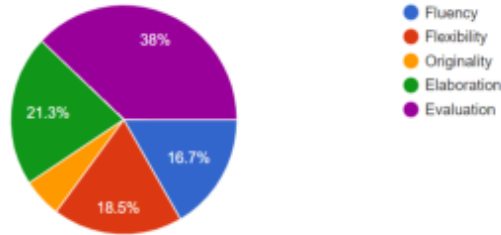


Diagram 1. Based on the results of environmental observations, do you think there is a change in the environment? If yes, give an example or If not, give an example!

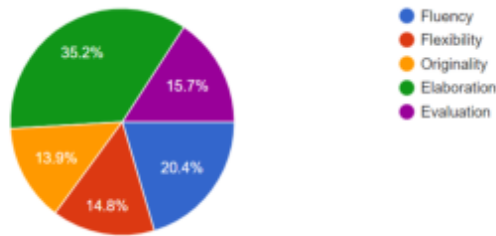


Diagram 2. What are the factors that cause environmental changes that can cause pollution in the school environment!

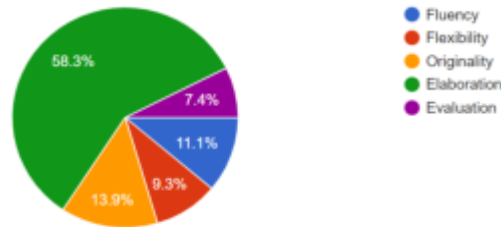


Diagram 3. Identification of waste by type and method of processing. The identification data is entered into the table provided.

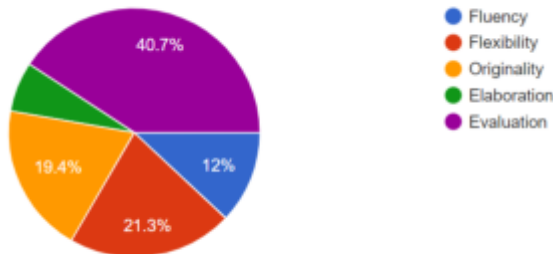


Diagram 4. Based on the results of environmental observations, do you think that there have been measures to handle waste in schools? Give the reason. Why is there still so much trash lying around?

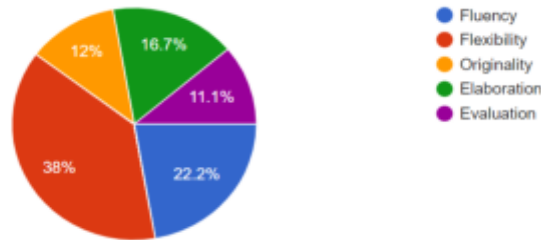


Diagram 5. What are the possibilities that can happen if the waste/waste in the school environment is not managed properly?

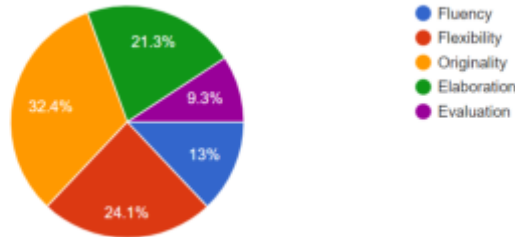


Diagram 6. Based on the results of environmental observations, from the various examples of waste handling that have been carried out, of course there are still many opportunities / possibilities to make something different and have not been thought of by other people to handle the waste. Give 5 examples of these ideas!

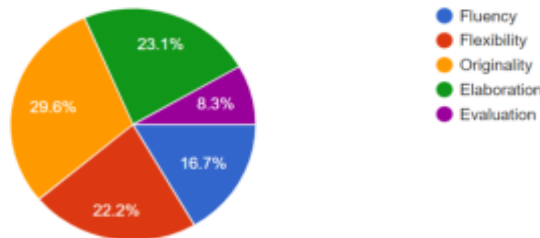


Diagram 7. Based on observations, the waste found can be made into trash fashion / clothing from waste. Design a trash fashion recycling project to address environmental issues related to waste treatment

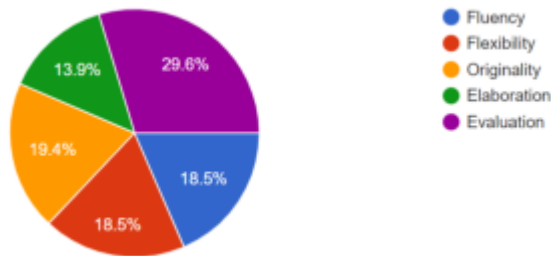


Diagram 8. In the school environment, there is still a lot of garbage scattered around. What do you think caused this? What should schools do to address this?

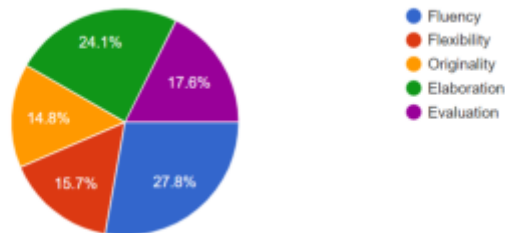


Diagram 9. The problem of handling waste has been carried out by the government to prevent environmental pollution. Give an example of what the government has done

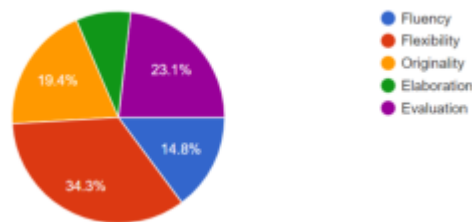


Diagram 10. As a student, what concrete actions can you take to address environmental problems at school, at home and in the neighborhood where you live?

2. Student responses regarding learning in the Department of PGSD FIP Unesa

The second data collected by researchers is related to student responses to learning that has been carried out at the PGSD FIP Unesa Department, whether the learning that has been carried out so far has accommodated creative thinking skills or not. To collect student response data related to learning, use the google form platform with the following page link address <https://forms.gle/S92qWNYAj9gd69ig9>. The reason the researcher uses the google form platform in collecting student response data is to provide opportunities for students to be open and objective in filling out questionnaires related to the learning that they have taken so far in lectures organized by lecturers according to the schedule given by the PGSD FIP Unesa department. In addition, researchers can take pictures related to learning that has been carried out at the PGSD FIP Unesa Department objectively and provide applicable solutions in practicing creative thinking skills in learning for the next semester.

For data related to student responses to learning so far that has been carried out, what has been obtained shows that there are 123 students who are representatives of each generation, namely 2019 (16.3%) and 2020 (83.7%) and each class has representatives from grades A - F.

According to the results obtained from the search through the google form, it can be described in diagrams 11 – 20.

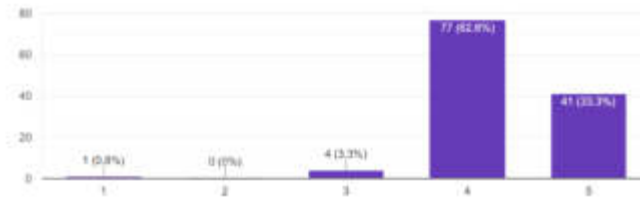


Diagram 11. RPS MK learning that is guided by the lecturers trains creative thinking skills

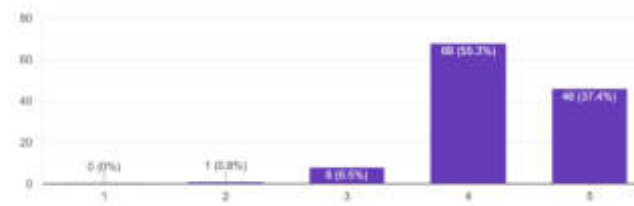


Diagram 12. The learning carried out by the lecturer trains creative thinking skills

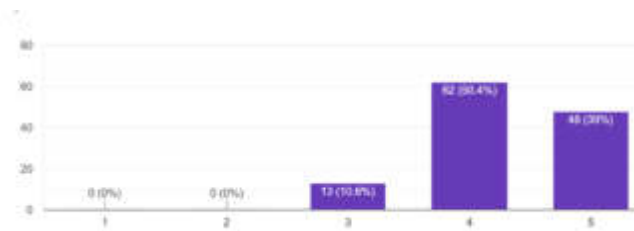


Diagram 13. In providing examples of the application of the material taught in learning to practice creative thinking skills



Diagram 14. Submission of material in learning trains creative thinking skills

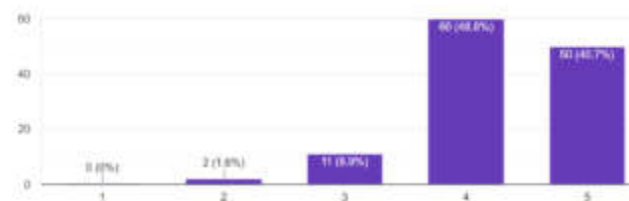


Diagram 15. Giving assignments in teaching lecturers train creative thinking skills

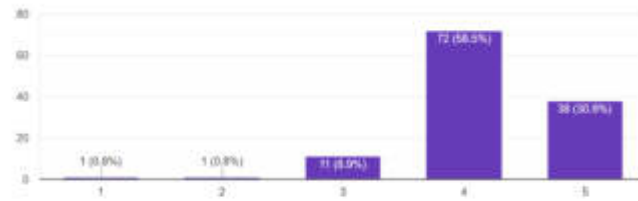


Diagram 16. The mid-semester exam questions used by the lecturers train creative thinking skills



Diagram 17. The final exam questions used by the lecturers train creative thinking skills



Diagram 18. Group presentations in teaching lecturers try to practice creative thinking skills

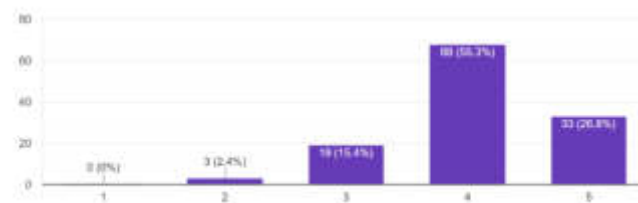


Diagram 19. The learning media used in learning train creative thinking skills

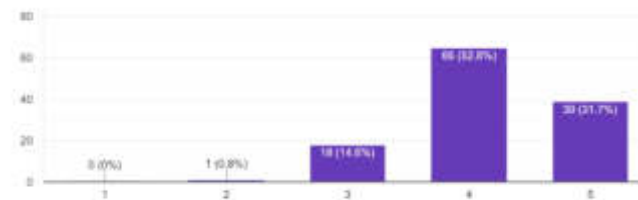


Diagram 20. Teaching materials used in learning to practice creative thinking skills

Discussion

According to the research results obtained by researchers related to the ability of creative thinking skills of students of the PGSD FIP Unesa Department and student responses to the learning that has been carried out so far. Based on the data obtained can be analyzed as follows.

1. Creative thinking skills

The data obtained related to the ability of creative thinking skills in students of the PGSD FIP Unesa Department are shown in diagrams 1 – 10. Based on the questions asked regarding the indicators of questions referring to creative thinking skills, it can be explained as follows: questions (1) students who can answered correctly by 38% of the 108 students who answered; questions (2) students who can answer correctly are 15.7% of the 108 students who answered; questions (3) students who can answer correctly by 11.1% of the 108 students who answered; questions (4) students who can answer correctly amounted to 21.3% of the 108 students who answered; questions (5) students who can answer correctly by 38% of the 108 students who answered; questions (6) students who can answer correctly are 32.4% of the 108 students who answered; questions (7) students who can answer correctly are 23.1% of the 108 students who answered; questions (8) students who can answer correctly are 29.6% of the 108 students who answered; questions (9) students who can answer correctly are 17.6% of the 108 students who answered; and questions (10) students who can answer correctly by 23.1% of the 108 students who answered.

In accordance with the data obtained, it can be seen that the ability of creative thinking skills in PGSD FIP Unesa students still needs to be improved, this is because of the 10 indicator questions referring to creative thinking skills, answers are below 50%. Therefore, it is necessary to hold an innovation in learning that is carried out by the teaching lecturers so that the ability of students' creative thinking skills can be improved and in accordance with the learning objectives set by the government as stated in the IQF. One thing that can be done by lecturers to improve creative thinking skills is that students are given scientific creativity tasks to provide space for creativity development and responsibility for applying, discovering, comparing, connecting, imagining, creating, and planning scientific activities creatively. (Rotteram, 2014). In addition, to develop creative thinking skills in physics learning for students, it can also be done by involving generalizing hypotheses, designing experiments, and evaluating evidence. Hypothesis generalization involves students in formulating hypotheses based on knowledge or data from previous experiments, then verifying the rationality of the hypotheses to be investigated. Experimental design involves students in designing and carrying out experiments to test the proposed hypothesis. Evaluation of evidence involves students in verifying the suitability of the theory with the results of the investigations that have been carried out (Ayas & Sak, 2014; Mukhopadhyay & Sen, 2013).

2. Student responses regarding learning in the Department of PGSD FIP Unesa

For student response data related to learning in the PGSD FIP Unesa Department, it is shown in diagrams 11 – 20. In the questionnaire used to determine the learning carried out in the PGSD FIP Unesa Department, 10 questions were developed that asked about learning tools, implementation of learning and evaluation of the assessment used to train students' creative thinking skills. Based on the data obtained on each question asked related to learning that trains creative thinking skills, it can be explained as follows: questions (1) students gave a maximum response of 62.6% with a good category of 123 respondents who answered; questions (2) students gave the most response of 55.3% with a good category of 123 respondents who answered; questions (3) students gave a maximum response of 50.4% with a good category of 123 respondents who answered; questions (4) students gave a maximum response of 60.2% with a good category of 123 respondents who answered; questions (5) students gave a maximum response of 48.8% with a good category of 123 respondents who answered; questions (6) students gave a maximum response of 58.5% with a good category of 123 respondents who answered; Questions (7) students gave a maximum response of 60.2% with a good category of

123 respondents who answered; questions (8) students gave a maximum response of 45.5% with a very good category of 123 respondents who answered; Question (9) students gave the most response of 55.3% with good category of 123 respondents who answered; and questions (10) students gave a maximum response of 52.8% with a good category of 123 respondents who answered. Based on the results of the questionnaire obtained, most of them gave good - very good responses related to learning that has accommodated creative thinking skills in the learning process that has been carried out so far. This needs to be maintained or even improved in subsequent learning by linking learning with the environment around students. Hu & Adey (2010) recommend a learning model to practice scientific creativity in the classroom which emphasizes on: (a) determining the use of an object for scientific purposes (*unusual uses*); (b) *creatively science problem solving* and (c) *creatively experiment designing*.

Humans live in a dynamic and changing environment. Change itself always brings consequences for every aspect of life, both in aspects of social, cultural, and economic life that have an impact on the environment. This change is the main reason why creativity is so important to have (Glavenau, 2010). Creativity in social life is needed. The world of work and society need creative people to find new innovations for human life. Creativity can also guide and encourage someone to continue working to produce something that can be useful for others. Someone who is creative will find it easier to do work so that they can improve performance in any field of work. Creativity is needed for students. Various tasks given to students, especially those that contain various types of problems in everyday life, require students to apply their creative thinking skills to analyze problems, find ideas, and argue (Alias, 2013). In addition, Runco (2004), argues that creativity can help a person to achieve goals and targets as an individual or as a group of people. Another view from experts regarding creativity and its role in everyday life, which states that “*Creativity is considered important for our society to maintain its current economic status. Creativity is the key to achieving a better standard of living; this makes creativity an important element in a students' education.*” (Robinson, 2010). Creative thinking is an original cognitive ability and problem solving process, creative thinking is also a cognitive ability and problem solving process that allows a person to use his intelligence (Potur & Barkul, 2009).

CONCLUSION AND SUGGESTIONS

Based on the results of the data obtained and the discussion, it can be concluded that the ability of creative thinking skills in students still needs to be improved and the responses given by students to learning that accommodates creative thinking skills so far have been carried out in the PGSD Department of FIP Unesa received responses in the good - very good category. Therefore, students' creative thinking skills must be improved in the next semester's learning by linking the material with the environment around students. According to the conclusions obtained in this study, the following suggestions can be put forward:

1. In learning carried out the material discussed must be related to activities or problems in everyday life.
2. To improve the ability of creative thinking skills, experimental-based learning can be used and provide broad learning autonomy to students in solving a phenomenon or problem posed by the teacher.
3. Learning models that can be used to improve creative thinking skills are student-centered learning models, such as problem-based learning models, inquiry learning models, group investigation learning models, and others.

REFERENCE

- Arikunto, Suharsimi. (2010). *Research Procedure: A Practical Approach*. Jakarta: Rineka Cipta.
- De Caroli, ME, & Sagone, E. (2012). *Creative Thinking and Big Five Factors of Personality Measured in Italian School Children*. Faculty of Educational Science University of Catania, Italy.
- Fasko, D. (2001). Education and Creativity. *Creativity Research Journal* , XIII (3 & 4) 317-327.
- Glavenau, V. (2010). Paradigms in The Study of Creativity: Introducing The Perspective of Cultural Psychology. *New Ideas in Psychology* . 28(1) 79-93.
- Hadzigeorgiou, Y., Fokialis, P., & Kabouropoupou, M. (2012). Thinking about Creativity in Science Education. *Creative Education* . 3(5), 603-611.
- Munandar, U. (1999). *Developing Talent and Creativity of School Children* . Jakarta: Gramedia.
- Nazir, M. (2005). *Research Methods*. Bogor: Ghalia Indonesia.
- Potur, AA, & Barkul, O. (2009). *Gender and Creative Thinking in Education: A Theoretical and Experimental Overview* .
- Robinson, J.R. (2010). Webster's Dictionary Definition of Creativity. *Online Journal of Workforce Education and Development* , III(2).
- Runco, M. (2004). Creativity. *Annual Review of Psychology* , 55, 657-687.
- Santrock, J. W. (2011). *Educational Psychology* 5th Edition. New York: McGraw-Hill Companies, Inc.
- Semiawan, C. (1984). *Cultivating Talent and Creativity of Middle School Students* . Jakarta: Gramedia.
- Shively, CH. (2011). *Grow Creativity-Learning & Leading with Technology* . USA: International Society for Technology in Education (ISTE).
- Snowman & McCown. (2012). *Psychology Applied to Teaching, Thirteenth Edition* . China: Wadsworth, Cengage Learning.
- Stenberg, RJ. (1997). The Concept of Intelligence and its Role in Life-long Learning and Success. *American Psychologist* , 52, 1030-1037.
- Suratno, T. (2012). *Development of Student Creativity in Science Learning in Elementary Schools* . Sampoerna Foundation Teacher Institute.
- Tarbizi, EA, Talib, MA, Yaacob, SN. (2011). Relationship Between Creative Thinking and Anxiety Among Adolescent Boys and Girls in Tehran, Iran. *International Journal of Humanities and Social Sciences* . I (19) 60 – 66.
- Weisberg, RW. (1986). *Creativity: Genius and other myths* . New York: Freeman.