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The Effectiveness of The Creative Problem Solving (Cps) Model Assisted by Youme (Youtube Media) in Improving The Creative Thinking Skills of High School Students

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ABSTRACT

This research aims to explore the importance of applying the Creative Problem-Solving model assisted by YouTube media in physics learning to develop students' critical, creative and innovative thinking skills in the Industrial Revolution 4.0 era. The research method used was an experiment with a pretest-posttest control design. The population of this study were class XI students at a private high school in Garut, with sampling using the purposive sampling method. The research results show that the application of the Creative Problem-Solving model assisted by YouTube media results in a significant increase in students' creative thinking abilities, especially in the aspects of flexibility, elaboration and originality. In conclusion, learning that encourages creative thinking can help students generate new and innovative ideas and deepen their understanding of physics concepts. Thus, effective and independent education is the key to creating a quality generation, ready to face the changes and demands of the ever-evolving times.

Keywords: Creative Problem-solving, Creative Thinking Skill, Physics Learning.

I. INTRODUCTION

The current development of the education system is required to be able to follow the Industrial Revolution 4.0, which means that students must be able to follow the education system through the implementation of intelligence and IoT (Internet of Things) as the basis for the movement and affiliation of humans and machines [1]. The role of the teacher as the sole provider of knowledge will shift. In the future, the presence and role of teachers in the classroom will be more challenging. Along with the rapid development of the times, quality generations will be needed. Quality means being able and able to think critically, think intelligently, creatively and innovatively [2]. Good education is education that emphasizes effective and independent learning in learning activities [2], [3]. Effective learning is a learning process that provides opportunities for students to learn independently which can give rise to creativity in learning so that they are able to gain knowledge from their own understanding. Likewise, with today's demands, problem solving ability is the most important ability. Problem solving requires an active role in students' thinking abilities [4], [5].

Physics is part of science which is actually a collection of ways of thinking, knowledge and scientific investigation that can be found from the thought process or scientific mind, as well as science which studies the symptoms and properties of natural objects, which can be experienced by the senses [2]. Teachers can create motivation to increase students' interest in studying physics by stimulating their curiosity through observing natural phenomena that often occur in everyday life. So, learning activities that involve creative thinking enable the creation of something new in the form of ideas and practical work using appropriate learning models. In physics subjects, students' positive attitudes can be influenced by the learning process [6]. It is important for teachers to stimulate students' curiosity through observing everyday natural phenomena. Creative thinking

allows the creation of new ideas, with the use of appropriate learning models. Students' positive attitudes towards physics are influenced by the learning process.

Creative thinking skills are a multi-component process involving the development of new knowledge, ideas and practical solutions involving cognitive, emotional, motivational and social aspects [7]. The most important aspect in learning physics is utilizing students' creative abilities, which can lead to problem solving. Creative thinking is being sensitive to problems, seeking information from various external sources, looking for alternative solutions to everyday problems, guessing, testing various solutions, and communicating the results [8]. According to Torrance, there are 4 characters of creative thinking, including originality, fluency, flexibility, and elaboration [9]. Developing creative thinking abilities involves cognitive, emotional, motivational and social aspects. In physics learning, it is important to utilize students' creative abilities, especially in problem solving. Creative thinking involves sensitivity to problems, searching for external information, exploring alternative solutions, trial and error, and communicating results.

In general, students' or society's interpretation of Physics is that it is a subject that is difficult to learn, especially for high school students. This was stated by Hutabarat, that 62.5% of students in the learning process lacked the courage to express an idea, idea or opinion and were less creative in solving physics problems, so student activity was still considered low in looking for problem solving references [2]. Previous research also shows that the educational process, especially in physics subjects, places more emphasis on memorization and finding solutions or problem solving to physics problems, resulting in higher level thinking processes which include creative thinking.

Based on this, appropriate and effective learning methods or strategies are needed in improving students' creative thinking skills in learning physics [2], [10]. One learning model to solve this problem is by using the Creative Problem Solving (CPS) learning model. The Creative Problem Solving (CPS) model is learning that centers on problem solving skills accompanied by creative thinking skills [11]. In this learning model, students are required to be able to solve problems creatively. The stages of the creative problem solving (CPS) learning method consist of problem clarification, expression of opinion, selection and evaluation and implementation [12]. The Creative Problem Solving (CPS) learning model is an effective approach in improving students' creative thinking skills in learning physics. CPS focuses on problem solving skills and the application of creative thinking.

The application of the Creative Problem Solving (CPS) learning model in physics lessons can stimulate students to think outside the box, stimulate creativity, and develop more holistic problem-solving abilities. By focusing on stages such as problem clarification, expressing opinions, selection and evaluation, and implementation, students not only learn physics conventionally but also train their critical and creative thinking skills [3]. This can help students face complex physics problems and prepare them to face real world challenges that require innovative thinking skills.

The high and low levels of students' creative abilities are mostly caused by the learning models and media applied in the classroom during the learning process [2]. Therefore, the choice of learning media must be more tailored to the suitability of the material to be delivered and the students' circumstances. Based on Indonesian data, it is stated that the total active social media users in Indonesia as of January 2023 are 139 million users with the social media platform being YouTube. According to the We Are Social and HootSuite report, the majority of YouTube users globally are men aged 25-34 years, namely 11.9%, while women in the same age group only make up 8.8%. YouTube can be used as a medium for learning [13]. This shows that YouTube has the potential to be used as a learning medium for students.

YouMe (YouTube Media) is a video website provider that allows users to download, watch and share videos. In the world of education, using YouTube can help students gain new knowledge and experience about using technology and can be used to illustrate a topic that can make students look for information for a project and encourage innovative teaching practices [14]. Using YouTube media can make it easier for teachers and students to generate ideas and improve creative thinking skills in the teaching and learning process in class and listen to teacher explanations in class [15]. This process of generating ideas is important in the creative thinking process.

Based on the statement above, schools still use learning that requires students to be able to master all learning with learning methods that only focus on teachers which can hinder student growth and development and in the learning process students lack the courage to express an idea, idea or opinion and are less creative. in solving problems, especially in physics subjects, students' activeness is still considered low in looking for problem-solving references. With this statement, researchers conducted research entitled "*The Effectiveness of the Creative Problem Solving (CPS) Model Assisted by YouMe (YouTube Media) in Improving the Creative Thinking Skills of High School Students*".

II. METHOD

Researchers use experimental research methods. The experimental research method is research that provides direct treatment of the variables being measured [16]. The type of research approach using experimental methods is a quantitative approach [17]. The experiments carried out in this research were categorized as Quasi-Experimental. In this study, researchers used a pretest-posttest control design type of research design. The population of this study was class XI science students at a private high school in Garut, West Jawa, Indonesia.

The sampling method used was purposive sampling. Purposive sampling is a method of sampling based on certain considerations or objectives (Fraenkel et al., 2018). Sampling is carried out by considering classes that have similar characteristics in terms of grades, expertise and number of students. The hypothesis of this research consists of H0, which states that there is no influence of learning using the Creative Problem-Solving model on Creative Thinking Skills with the support of YouTube Media in class XI, and Ha, which states that there is an influence of learning using the Creative Problem-Solving model on Creative Thinking Skills with Media support. Youtube in class XI. In the sample group research design (experimental class), students were taught using the Creative Problem-Solving learning model with the help of YouTube media, while the sample group (control class) was taught using the Creative Problem-Solving learning model only.

The instruments used in this research were test questions, teaching modules, worksheets and observation sheets. The Creative Thinking Skill test questions used are 4 questions. The test question indicators used are listed in Table 1.

Table 1. Indicators for Creative Thinking Skills Test Questions

Measured skills	Question Form	Number of Questions
Fluency	Essay	1
Elaboration	Essay	1
Originality	Essay	1
Flexibility	Essay	1

To obtain test questions that will be used in research, a trial is carried out first, then the validity of the test items is determined. Reliability is calculated using the Cronbach's Alpha formula. Analysis of learning outcome data involves descriptive analysis such as presenting student learning outcome scores in tables and calculating average scores (mean). Inferential statistical techniques are used to test research hypotheses by analyzing learning outcome data from the experimental class and control class. Inferential statistics involves parametric statistics to test population parameters through sample data. Make sure the data is normally distributed before carrying out statistical tests; otherwise, use non-parametric statistical tests. Evaluation of the effectiveness of the model is carried out using Effect Size according to Cohen [18].

III. RESULTS AND DISCUSSION

This research involved two classes, namely class XI MIPA 2 as the control class and class XI MIPA 3 as the experimental class. Experimental class students receive learning by applying the Creative Problem-Solving model using student worksheets based on Creative Problem Solving. Before the learning process begins, both classes are given a pretest to measure the students' initial abilities. The pretest for the creative thinking skills test was carried out during physics class time, while the pretest learning results were combined into one pretest session. The creative thinking skills pretest data was tested for normality and it was found that both data were not normally distributed. The differences between the two data were tested using the Mann-Whitney test, which

shows differences in pretest learning outcomes between the two classes. These findings indicate the continuation of research in these two sample classes.

After learning using different treatments, students' creative thinking was obtained which can be seen in Table 2.

Tabel 1. Average Pretest and Posttest Scores for Students' Creative Thinking Skills

	The number of students	Average pretest score	Average posttest score
Experimental Class	34	26,912	70,147
Control Class	33	22,576	60,152

After ensuring that all posttest data from both classes were normally distributed, the independent two-sample t-test was used to evaluate the increase in students' Creative Thinking Skills after treatment in these classes. The Creative Problem-Solving model with the help of YouTube media used in experimental classes allows students to be actively involved in the problem-solving process, practicing problem solving skills both individually and in groups. Students collaborate and discuss while using student worksheets as a guide in solving problems. They then relate the solutions found to real everyday situations to strengthen understanding of the concepts studied. On the other hand, the control class only applies the Creative Problem-Solving model without the help of YouTube Media. A comparison of the improvement between the experimental class and the control class can be seen in Figure 1.

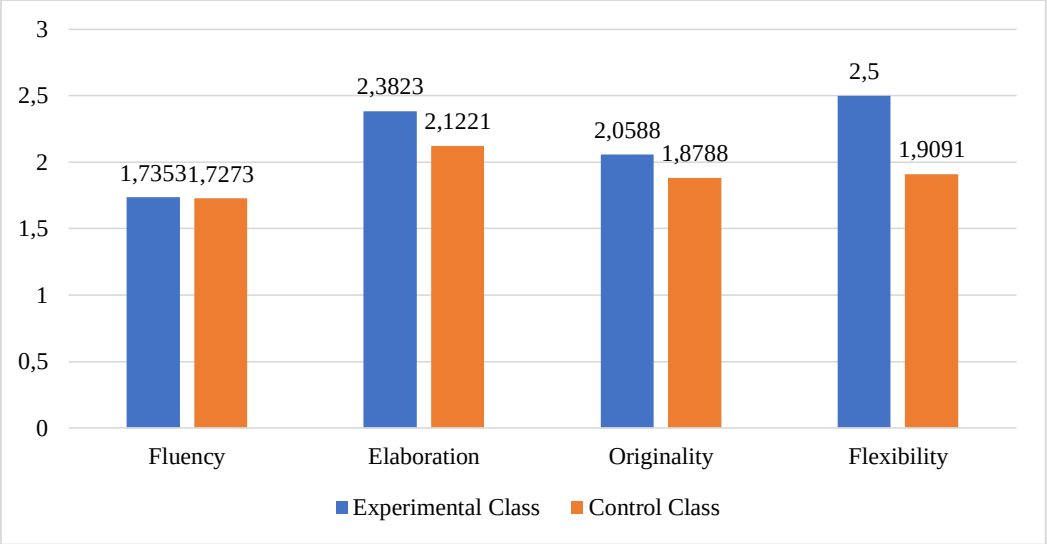

Figure 1. Comparison of N-Gain Values for Creative Thinking Skills in Experiment Class and Control Class

Based on Figure 1, the experimental class shows the highest increase in the flexibility indicator, where students are able to produce answers with ideas from various different perspectives. Creative thinking skills as a whole show a significant variety of points of view in producing diverse and unlimited ideas and thoughts. Flexibility plays a key role because of its relationship to science process skills. The ability to think creatively is also related to the number of ideas that students can generate, which must be varied. A significant increase in the flexibility indicator in the experimental class shows that students are able to produce answers with ideas from various different perspectives [19]. Creative thinking skills produce ideas and ideas that are infinitely diverse, showing diverse points of view. Flexibility is crucial because it relates to science process skills and the number of varied ideas that students can produce, which is an important aspect of creative thinking abilities.

The Fluency indicator showed the lowest increase in the experimental class, indicating that students had difficulty finding more than one idea or answer to solve a problem. This illustrates the lack of variety of ideas produced by students, which directly affects their ability to think creatively. The ability to think creatively in the fluency aspect is still low due to a lack of creativity in formulating answers. The lowest increase in the Fluency indicator in the experimental class indicates students' difficulty in finding more than one idea or answer to solve a problem [20]. The lack of variety of ideas produced directly affects students' creative thinking abilities. The low ability to think creatively in the fluency aspect shows a lack of creativity in formulating answers.

The elaboration indicator shows the second highest increase after flexibility, indicating students' ability to explain ideas in detail. This skill reflects students' ability to provide detailed answers and be able to develop ideas in more depth. By being able to explain ideas in detail, students can demonstrate a more mature understanding and the ability to expand the concepts they learn. The second highest increase in the elaboration indicator in the experimental class shows students' ability to explain ideas in detail. This skill reflects students' ability to provide detailed answers and be able to develop ideas in depth [21]. With this ability, students can demonstrate mature understanding and the ability to expand the concepts learned.

The originality indicator shows the third increase after elaboration. Students can provide answers with new ideas or ideas that have not been considered before. This originality ability shows that students are able to solve problems in a unique and unconventional way, illustrating creativity and the courage to think outside the box. This enriches students' learning process with fresh and innovative ideas. The third increase in the originality indicator in the experimental class shows students' ability to provide answers with new ideas or ones that have not been considered before. This originality ability indicates that students are able to solve problems in unique and unconventional ways, showing creativity and the courage to think outside the box [22]. This enriches students' learning process with fresh and innovative ideas.

In the control class, as in the experimental class, the highest indicator is Elaboration. This shows that students in both classes have good abilities in providing detailed explanations about the ideas they have. Elaboration skills reflect the extent to which students understand a concept and the extent to which they are able to explain solutions to a problem. However, differences were seen in the experimental class which showed the highest increase in the Flexibility indicator, followed by Elaboration. Meanwhile, in the control class, the highest order of improvement was Elaboration followed by Originality. This shows that although both classes have good skills in elaboration, the different learning approaches in the experimental class have more influence on increasing Flexibility abilities, which are important for creativity and problem solving. Thus, the Creative Problem Solving (CPS) learning model used in the experimental class can be considered successful in stimulating key aspects of students' creative thinking abilities.

After learning with different treatments, both experimental and control classes were given a posttest to evaluate their Creative Thinking Skills. The pretest average for the experimental class was 26.912, while the control class was 22.576. Even though the pretest data for both classes is not normally distributed, the non-parametric Mann-Whitney test shows a significant value (<.001) in table 3. This result shows that there is no significant difference between the pretest scores of the experimental class and the control class in Creative Thinking Skill.

Table 3. Mann Whitney Test Results

Statistic test	
Mann-Whitney U	290.000
Wilcoxon W	851.000
Z	-3.603
Asymp. Sig. (2-tailed)	<.001

After carrying out learning using the Creative Problem-Solving model assisted by YouTube Media in the experimental class and Creative Problem Solving in the control class, the posttest average for the experimental class was 70.147 and the control class was 60.152. After ensuring normal distribution in the posttest data for both classes, a parametric T test was carried out which produced a significant value of 0.006 as listed in table 4. These results show that the increase in Creative Thinking Skill was significantly greater for students who used the Creative Problem-Solving learning model assisted by YouTube Media compared to with students who only use the Creative Problem-Solving model without the help of YouTube Media.

Furthermore, the utilization of YouTube Media as an auxiliary tool in the Creative Problem-Solving model in the experimental class seemed to have a noticeable impact on students' engagement and comprehension. The multimedia approach provided by YouTube likely enhanced the students' learning experience by offering visual and interactive content, potentially increasing their motivation and interest in the subject matter. This result underscores the potential benefits of incorporating multimedia resources like YouTube into educational practices to amplify student learning outcomes and foster a more dynamic and engaging classroom environment.

Moreover, the findings suggest that integrating YouTube Media into the Creative Problem-Solving model not only creative thinking skills but also promotes digital literacy and technological proficiency among students. By engaging with educational content through digital platforms like YouTube, students are exposed to a diverse of learning materials and formats, encouraging them to adapt to evolving technological landscapes and develop

essential for the digital age. This holistic approach to education equips students with the necessary tools to navigate an increasingly digital world while fostering creativity and critical thinking in tandem with technological fluency.

Table 4. Results of Different N-Gain Tests for Creative Thinking Skills in Experimental and Control Classes

Paired Sample Test

	Pired Diferesces					T	df	Significance	
	Mean	Std. Deviasion	Std. Error Mean	95% Confifence interval of the Difference				One-Sided p	Two-Sidded P
				Lower	Upper				
Pair 1 N-Gain Eksperimen dan kontrol	-.1179	.23172	.04034	-.20013	-.03580	-2.924	32	.003	.006

By using Effect Size to evaluate the effectiveness of the Creative Problem Solving (CPS) model assisted by YouTube Media in improving the Creative Thinking Skills of high school students, a value of 0.5401 was obtained. With this value, the effectiveness category based on Cohen's d is "medium," indicating the level of effectiveness of the Creative Problem Solving (CPS) model assisted by YouTube Media in improving the Creative Thinking Skills of high school students is moderate.

IV. CONCLUSION

In the context of the Industrial Revolution 4.0, the teacher's role is expected to stimulate students' curiosity through observing everyday natural phenomena and using appropriate learning models. Based on the results of research and data analysis, it can be concluded that the experimental class that implemented the Creative Problem Solving model assisted by YouTube media showed a significant increase in students' creative thinking abilities, especially in the aspects of flexibility, elaboration and originality. This confirms that learning that involves creative thinking can generate fresh and innovative ideas and increase students' understanding of the concepts being studied. Thus, effective and independent education is the key to producing a quality generation, able to think critically, creatively and innovatively to face the demands of the ever-growing era.

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