Developing creative thinking skills of STKIP weetebula students through physics crossword puzzle learning media using *eclipse crossword* app

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**Abstract.** This study aims to describe the role of physical crossword puzzle learning media using the *Eclipse Crossword* app to develop the creative thinking skills of STKIP Weetebula students. The research method used was quantitative descriptive method. The sampling technique which was used in this study was Nonprobability Sampling, a type of purposive sampling. Second semester students of the Physics Education Study Program were the sample of this research. The instrument of the data collection used was questionnaire; this is to measure creative thinking skills of the students. Based on the results of the data analysis, it is found that the learning media of physics crossword puzzle using the *eclipse crossword* could develop creative thinking skills of STKIP Weetebula students.

1. **Introduction**

Industry revolution 4.0 has become a great topic to discuss in various chances. Era of 4.0 revolution is pointed out through the existence of Internet of Things (IoT), big data, artificial intelligence, cloud computing, block chain and so on [1]. Industry 4.0 is pointed out by the digitalization revolution. Machine is replaced by intelligence artificial. The existence of revolution 4.0 gives impact to various aspects of human life such as industry world, information technology, business and tourism and also education field.

Education field is one the important components in producing human resources and it must adopt between curriculum and the demanding of Industry revolution 4.0 in order to face the era development in revolution era 4.0, education and culture also must be alert to adapt with various developments. School reforms are needed, capacity building, teacher professionalism, dynamic curriculum, reliable facilities and infrastructure, and advanced learning technology to be ready to face the era of revolution 4.0. Former of Minister of Education and Culture Muhadjir Effendy assessed that aspects of Indonesian education need to revise the curriculum by adding five competencies possessed by students. The five competencies are really needed by the students to be able to compete in the era of industrial revolution 4.0. The five competencies are: critical thinking skills, innovative creativity and abilities, good communication skills and abilities, cooperative ability, and high self-confidence. These five competencies can be applied through integrating learning [2]. One of the important skills possessed by students is creative thinking skills. Creative thinking skill is an individual skill in using his/her thinking process to produce a new rational constructive idea that involves ratio and intuition.
Creative people are being positive in solving the problem. These skills can be developed in learning through using creative learning media.

Learning media is a tool used by teachers to convey information or knowledge to make it easier for students to receive the information. The use of appropriate learning media can help train thinking skill. One of them is creative thinking skill. Creativity or creative thinking cannot exist by itself but rather requires an exercise. In this case the teacher must be able to train and sharpen students’ creative thinking skills by creating a creative learning environment [3].

College of Teacher Training and Education Weetabula (STKIP) as an educational institution for prospective teachers have the obligation to prepare professional teacher candidates who are ready to compete and enter the industrial era 4.0. One of the steps chosen is by providing the Active Learning Seminar (SPA) course. In this course students are introduced to a various methods and active and interactive learning media, after that, the students simulate the learning activities using the method. Finally, the students make the learning design using the learning method. In one semester, there are ten learning methods or media that must be introduced to students. One of the methods taught is the learning method using cross-learning learning media using the Eclipse Crossword application.

The example of learning method which has proven could provoke students’ active response is Crossword Puzzle, it is well known as Teka-Teki Silang (TTS). Puzzle is an entertainment media or game in the form of squares in black and white, consisting of two lanes, which are horizontal and declining. It is prepared with clue (instructions) and it must be filled with words in each of the boxes [4]. The crossword puzzle will be very appropriate if we use it to review the material that we have delivered. Clues or instructions in crossword puzzles are different from the questions they usually face, sometimes even requiring their logic. For example, the instructions which or only in form of one word, students must look for the meaning or the synonym of the word.

Eclipse Crossword application is an application which is useful for making TTS (Cross Puzzle). Crosswords are very entertaining and can be used as learning media in education. The easiest tool to make crossword puzzles from a set of words is the Eclipse Crossword. Learning media for Cross Puzzle using the Eclipse Crossword application is a learning media that can be used by the candidate of teacher in conducting classroom learning activities because it can help developing creative thinking skills. There are 4 main indicators of creative thinking skills, namely: the ability to think fluently, the ability to think flexibly, original thinking skills and the ability to think in detail. Creative thinking skills that are raised in learning using eclipse crossword can be seen in the process of developing crossword puzzles and also when the students answer questions in the crossword puzzle.

Based on the description of the background above, the researcher intends to describe analyse the role of physic crossword puzzle learning media using the Eclipse Crossword app to develop the creative thinking skills of STKIP Weetebula students.

2. Methods
This research belongs to the type of quantitative descriptive research. The research was conducted at STKIP Weetabula in March 2019. The population of this study was all students of physics education study program at STKIP Weetabula. While the samples of the study were 30 semester IV students of physics education study programs. The sampling technique in this study was purposive sampling technique. Students who become the samples are the students who are taking the learning seminars. The data collection techniques in this study were obtained through a questionnaire of creative thinking skills. The instrument of this study uses a questionnaire with the model check list of Likert scale where the respondent just needs to put a tick (v) on the answer column consisting of 4 scales, namely: Always with a score of 4, Often with a score of 3, Rarely with a score of 2, and Never with a score of 1. Data the results of the study were analysed by descriptive quantitative method.

3. Result and Discussion
Data collection on creative thinking skills is done through questionnaires where the instruments are divided into four main components of creative thinking skills are thinking fluently, thinking flexibly,
thinking originally and detailed thinking. Each of these components is divided into several indicators. Details of components and indicators of creative thinking skills can be seen in Table 1.

### Table 1. Components and Indicators of Creative Thinking Skills

| Skills             | Component          | Indicator                                                                 |
|--------------------|--------------------|---------------------------------------------------------------------------|
| Creative Thinking  | Thinking Fluently  | 1. Skills in creating ideas, answers, solving problems or questions       |
|                    |                    | 2. Skills in providing ways or suggestions                                 |
|                    |                    | 3. Skills in thinking of alternative answers                               |
|                    | Thinking Flexibly  | 1. Skills in producing varied ideas, answers or questions                  |
|                    |                    | 2. Skills in observing problems from different perspectives               |
|                    |                    | 3. Skills in finding many different alternatives                          |
|                    |                    | 4. Skills in ways of approach or way of thinking                          |
|                    | Thinking Originally| 1. Ability to create new and unique ideas                                 |
|                    |                    | 2. Ability to combine                                                     |
| Detailed Thinking  |                    | 1. Skills in enriching or developing ideas                                |
|                    |                    | 2. Skills in adding or detailing the details of an object                 |

The research instrument used in this study based from the indicators above. One example statement to ask about think fluently is “learning with crossword media can help me to find the right answer to a problem”. The result of data research is collected in the form of questionnaire. The data about creative thinking skills were analysed descriptively quantitatively and then compared the results with the categories in Table 2.

### Table 2. Range of Values and Categories of Assessment

| Range of Values | Category     |
|-----------------|--------------|
| 80-100          | Very Good    |
| 70-79           | Good         |
| 60-69           | Enough       |
| Less than 60    | Not Good     |

Based on the result of data research, the details of components of the creative thinking skills of STKIP Weetebula students in learning to use crossword media with the eclipse crossword application can be displayed in the diagram as follows:

![Figure 1. Component of Creative Thinking Skills Value](image-url)
The diagram above shows that the use of crossword puzzle as the learning media using eclipse crossword application can develop the creative thinking skills of STKIP Weetebula students. The component of creative thinking that has the highest value is original thinking. While the lowest score is detailed thinking. In general, the value of creative thinking skills are obtained from learning using crossword media with the eclipse crossword application is 71.1 and is in the good category. Learning activities that can build skills in creative thinking through the use of crossword media with the application of eclipse crossword can be seen in the entire learning process starting at the preparation stage, answering crossword questions prepared by the facilitator, and at the stage of making puzzle by students using the eclipse crossword application. The implementation of the four components of creative thinking cannot be carried out separately but integrated with one another.

The relevant research is doing by Orawiwatnakul [5]. The research conclusion is Crossword puzzles can help students improve vocabulary knowledge, meanwhile increase their learning motivation. The findings revealed that the students' overall post-test score was higher than their pre-test score at a significance level of 0.05. When classifying students into three groups based on their vocabulary proficiency, it was found that students in all groups could improve their vocabulary knowledge at a significance level of 0.05. The results from Repeated Measures Analysis of Variance test showed that significant differences existed in the scores of the three tests which students gained from the tests and the final exam. The results of the questionnaire also illustrated their very favourable attitudes toward learning vocabulary through crosswords as a whole.

Other research is doing by Serna and Jose about “Active learning: creating interactive crossword puzzles” [6]. Results on a sample of 84 students are very encouraging. Most students considered this activity as enjoyable and useful for learning [7-9]. In this study we have also found that students’ perceived value of crosswords for their learning is positively correlated with both their perceived learning in the course and their attitude toward the course.

4. Conclusion
Based on the result of the research, it could be concluded that learning media of puzzles using Eclipse Crossword App could develop creative thinking skills of STKIP Weetabula students. It could be seen from the analysis result gained that the value of creative thinking skills are on the Good category with score 71.1. The value on each component of creative thinking skills is on Good category which are thinking fluently, thinking flexible and thinking originally with the score 70.2; 72.6 and 76.3. While the component of thinking detailed in on enough category which score 64.4.

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