The Effect of ERCoRe Learning Model Assisted Kumatalibi.com Media on Creative Thinking Skills in the Ecosystem

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Abstract

Creative thinking skills are becoming increasingly important in the era of Industry 4.0, particularly in addressing challenges in biology learning, which often involves misconceptions. This study aims to analyze the effect of the ERCoRe Learning model assisted by the kumatalibi.com media on students' creative thinking skills in the Ecosystem topic. The research method employed is a quasi-experimental design using a pretest-posttest control group. The experimental class applied the ERCoRe Learning model, while the control class used the Problem-Based Learning (PBL) model. The research instrument consisted of tests based on indicators of creative thinking skills. The indicators are fluency, flexibility, originality, and elaboration. The results showed a significant effect of implementing the ERCoRe Learning model, assisted by kumatalibi.com, on improving students' creative thinking skills, with an effect size of 0.725 based on Cohen's test, which falls in the high category. Students also showed positive responses toward the use of the model and media in learning. This study recommends the use of ERCoRe Learning as an alternative constructivist-based innovative learning model to enhance creative thinking skills in the classroom.

Keywords: creative thinking skills, ecosystem, ERCoRe learning

INTRODUCTION

Development of industry 4.0 forced students to possess many skills to fill the needs in society, but the development grew too fast, so education cannot be done by the conventional method (Pablos et al., 2017). Facing the challenges of Industry 4.0, one of the skills students need is creative thinking. This set of basic skills is what a student needs to create something different, creative, and innovative, enabling the student to produce alternative solutions to every problem (Susilowati et al., 2021). According to Munandar (2014), creative thinking skills have four indicators. Among them are fluency, flexibility, originality, and elaboration.

Many models can be implemented to develop creative thinking skills, including ERCoRe Learning. ERCoRe Learning is a constructivist model, as evidenced by its characteristics: teachers facilitate students in building their own knowledge by suggesting learning sources, fostering curiosity, and exploring new inventions (Ismirawati et al., 2018). This model consists of four syntaxes: eliciting, restructuring, confirming, and reflection (Ismirawati et al., 2015). According to Mustaqim (2022), ERCoRe Learning increased creative thinking skills by 52%, compared with the conventional method, which increased them by 43%.

Ecosystems are one of the topics studied in Biology subjects at the Senior High School level or equivalent, which require students to understand the concepts of ecosystems, energy flow,

biogeochemical cycles, and the relationships and interactions that occur within them. However, this material is still often considered easy by students, yet Ecosystem material still needs to be understood by students because it relates to events they experience every day (Nilasari et al., 2016).

Yulis (2022) designed a website to support the learning of Ecosystem material, making the learning process more interactive. This led the researcher to use a website called kumatalibi.com to support the learning process for the ecosystem material. Kumatalibi.com is a website that consists of learning materials on biology, including the Ecosystem. The advantage of these websites is their various interactive and fun feature that can be accessed. This website contains content that supports learning based on the ERCoRe model, including Video AP, Crosswords, and Wordsearch, which is why this media was chosen for the learning media.

Although previous studies have shown that the ERCoRe Learning model can improve higher-order thinking skills, including creative thinking, most have not integrated a web-based learning medium that is specifically aligned with the ERCoRe syntax. In addition, research on website-based Biology learning media has largely focused on conceptual understanding and motivation, with limited investigation of creative thinking skills, including fluency, flexibility, originality, and elaboration. Moreover, empirical studies examining the use of ERCoRe Learning assisted by kumatalibi.com in Ecosystem learning are still limited. Therefore, this study addresses the research gap by investigating the effect of ERCoRe Learning assisted by kumatalibi.com on students' creative thinking skills.

RESEARCH METHOD

This study is a quasi-experimental research using a quantitative approach. The research design applied is the Non-equivalent Control Group Design, involving two non-randomly selected groups: one as the experimental class and the other as the control class. The research used purposive sampling. The experimental class received treatment using the ERCoRe Learning model assisted by the kumatalibi.com media, while the control class used a different instructional model. To measure the effect of the learning model on students' creative thinking skills, both groups were given a pre-test and a post-test. Data was collected using observation, a test, and a questionnaire. Data collection instruments used in the research were test and questionnaire sheets. The purpose of the questionnaire given to the students was to assess students' responses during learning with and without using the ERCoRe Learning model. According to Sugeng (2020), the students' creative thinking skills were measured using a test and then analyzed using Cohen's test. The creative thinking skills indicators that were measured in this research were fluency, flexibility, originality, and elaboration. The formula for Effect Size Cohen's is as follows:

$$r^2 = \frac{Z^2}{n-1}$$

Description:
r2   = Effect size
n   = Number of students
Z2   = Z value of the Mann-Whitney test
The results of the effect size Cohen's then interpreted as follows:

Table 1. Effect Size Cohen's Criteria

Effect Size	Presentation (%)	Interpretation
D ≥ 0,70	80–100	High
0,30 ≤ D < 0,70	50-79	Medium
D < 0,30	<49	Low

In order to analyze the response of the students who used ERCoRe Learning and kumatalibi.com media, the formula used is as follows:

$$\text{Response percentage} = \frac{Total\ score\ obtained}{Maximum\ total\ score} x100\%$$

The questionnaire, analyzed using a Likert scale to measure students' learning responses, can be interpreted according to the following criteria.

Table 2. Questionnaire Response Criteria

Percentage (%)	Interpretation
25% – 43%	Very Poor
44% – 62%	Poor
63% – 81%	Good
82% – 100%	Very Good

RESULT AND DISCUSSION

This stage shows the result of the data analysis obtained after the research was completed. The data obtained from the creative thinking skills test was developed based on its indicators. According to Munandar (2014), creative thinking skills have four indicators. Among them are fluency, flexibility, originality, and elaboration.

Table 3. Results of Effect Size Analysis of Experimental Class

Data Analysis	Results of Effect Size Analysis of Experimental Class
Mann-Whitney U	0
Z	-7,318
Z^2	52,235
n (amount of data)	72
Result of *Effect Size Cohen's*	**0,725 (High)**

According to the data shown in the table, the Effect Size (Cohen's result) is 0,725, which can be interpreted as high; compared to the control class, the result is 0,439, which can be interpreted as medium. This indicates that the use of the ERCoRe Learning model has a strong effect on the development of students' creative thinking skills. Learning with ERCoRe Learning encourages the development of creative thinking through syntax such as eliciting (generating ideas), restructuring (reconstructing ideas through mind maps), confirming (discussion), and reflecting (concluding ideas), according to Mustaqim et al. (2022).

The first syntax, namely eliciting, involves searching for information related to the material, which improves creative thinking skills. At this stage, students use kumatalibi.com as a medium for searching for information; this process of gathering information is facilitated by the Video AP feature. Students see the video and gather information from that feature. Besides looking for information, students can also do exercises on the website features, such as crosswords and word searches. These features can improve students' fluency. In addition to the kumatalibi.com media, students also read textbooks they own. Someone who spends a lot of time reading will improve literal understanding and interpretation, and then be able to make conclusions and develop creative understanding (Nur et al., 2020).

In the second syntax, namely restructuring, a knowledge reconstruction process can improve creative thinking skills by involving the creation of mind maps. Mind maps can train students' creative thinking skills by emphasizing visualization in organizing their ideas (Mustaqim et al., 2022).
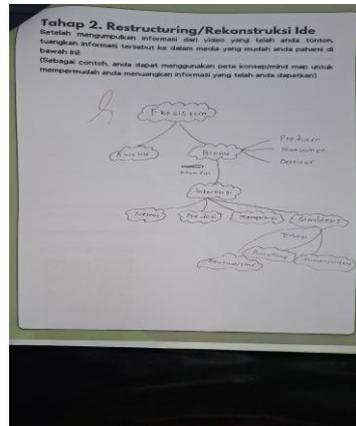
Figure 1. Mind Map

In the third syntax, namely, confirming, students engage in discussions that can increase their sensitivity to problems and their ability to find solutions. Discussions can improve creative thinking skills by encouraging students to actively participate in learning. Discussions can also help students work together, support one another, and achieve a common understanding. This Confirming syntax can develop students' creative thinking skills by fostering their sensitivity to a problem, helping them identify their weaknesses and find solutions. Providing a learning environment that supports active and collaborative interactions among teachers and students, this method enables students to develop their creative thinking skills within the context of their surrounding socio-cultural realities (Budianto, 2024).

Then the last syntax, namely reflecting, where students carry out activities to draw conclusions and correct various issues in the discussions. This activity improves students' creative skills because, in this process, students are asked to summarize the results of the mind map presented by the previous student group in front of the class into a new mind map. Students with good creative thinking skills will be able to think synthetically, connect things that are not visible to others, analyze ideas, and evaluate their own qualities. They can also translate an abstract theory into something simpler and easier for others to accept. The higher level of creative thinking skills that someone possesses shows a greater probability of solving a problem (Salsabila, Rahmi, & Delyana, 2023)

Students' responses to the use of the ERCoRe Learning model and kumatalibi.com media were in the good category with an average of 69%, as shown in the following table:

Table 4. Students Response

Rated Aspects	Average (%)	Category
Biology learning	74	Good
Media kumatalibi.com	69	Good
ERCoRe Learning Model	65	Good

According to **Table 4**, we can see that the biology learning average rate is 74%, the media kumatalibi.com average rate is 69%, and the ERCoRe Learning Model average rate is 65%, all of which are categorized as good.

The first-rated aspect, biology learning, achieved a 74% score, showing that learning with the ERCoRe Learning model is suitable for contextual learning. The second-rated aspect is media kumatalibi.com, which received a 69% score. The media can support the learning model and be suitable for the syntax. The last-rated aspect is ERCoRe Learning Model, with a score of up to 65%. It improved students' problem-solving and critical thinking, leading them to create new ideas and perspectives.

CONCLUSION

The conclusion that can be drawn from this research is that there is a strong effect on students' creative thinking skills through the application of the ERCoRe Learning model, assisted by the kumatalibi.com media. The syntax contained in ERCoRe Learning enhanced students' creative thinking skills through activities such as reading, watching videos, making a mind map, discussing, and drawing conclusions. Student responses to the implementation of the ERCoRe learning model are generally positive.

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