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### RESEARCH ARTICLE

## EFFECTIVENESS OF TEXTBOOK WITH BRAIN-BASED LEARNING APPROACH ACCOMPANIED BY COMIC STRIPS OF LIFE ORGANIZATION MATERIALS TO IMPROVE CREATIVE THINKING ABILITY OF JUNIOR HIGH SCHOOL STUDENT'S

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### Abstract

Creative thinking skill is one of the 21 st century skills targets in implementing the 2013 curriculum. However, the fact is that 90% of 70 junior high school students reveal that they need textbooks to improve their creative thinking skills, namely textbooks with a brain-based learning approach using comic strips. Meanwhile, 88% of the 27 IPA teachers stated that they had never used comics to improve creative thinking. This study aims to determine the effectiveness of textbooks with a brain-based learning approach equipped with comic strips for creative thinking. The design of the research used was one group pretest-posttest design with four meetings. The results showed an increase in learning outcomes and creative thinking skills. The results can be seen from the N-gain value of the first meeting is 0.66, with "medium" criteria. The second meeting is 0.71, with the "high" criteria. The third meeting is 0.71, with the "high" criteria. The fourth meeting is 0.73 with the "high" criteria. The mean creative thinking results from the first meeting to the four meetings were 80, 81.11, 82.78, and 80.56. So it can be concluded that textbooks with a brain-based learning approach effectively improve learning outcomes and creative thinking.

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### Introduction:-

Welcoming the industrial revolution 4.0 in the 21st century, there are increasingly sophisticated technological developments so that this can affect how to think, behave, and change the character of students (Boulhrir, 2017). To face changes in the 21st century, seven skills are needed, namely critical thinking, creativity and innovation, collaboration and leadership, cross-cultural understanding, literacy, information, media and communication, computer and ICT literacy, life and career skills (Serdyukov, 2017). The 21st century skills targeted among them in the application of the 2013 Curriculum is thinking skills. According to experts, creative thinking is categorized as one of the keys to success in life (Joynes, et al., 2019). Creative thinking is a form of ability to find elements that already exist or in new ways because of the strong motivation and desire to face challenges (Nurlaela, 2018). Strategies can be carried out to train intellectual creative thinking skills through synthesis, originality, and flexibility (Samani, et al., 2019).

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One of the main subjects in 21st century learning is Science (Redhana, 2019). Science learning activities can run effectively and efficiently if textbooks are available as a reference for learning activities for students (Suwarni, 2015).

Textbooks play a role as one of the teaching materials that can be used to activate students in facing advances in science and technology (Widita, et al., 2018). Textbooks can be said to be good if they meet valid, practical and effective criteria (Susbandya, 2018).

The results of a preliminary questionnaire study of 27 science teachers in the Besuki Residency namely Banyuwangi, Jember, Bondowoso, and Situbondo stated that out of 27 teachers stated that 88% of teachers often use printed textbooks, 82% of teachers have never compiled text books that function to optimize the brain. Regarding student learning outcomes, there were 81.4% of teachers stated that students had not got maximum scores, 74% of teachers stated that students' creative thinking abilities had not been trained. The results of a preliminary questionnaire study of students were conducted as many as 70 respondents with 94.3% of students wanting an illustration of pictures that supported the material, 89.9% of students stated that the books used by students were not helpful for long-term material recall, 94.3% wanted image illustrations who support the material and 96.6% want a book with a fun picture story. 92.8% of students explained that the printed books used did not require students to think creatively. In addition, 85.7% of students stated that they have never used textbooks with learning that optimizes brain work with a brain-based learning approach. 90% of students agree that the application of brain-based learning (BBL) accompanied by comic strips in life organization system material needs to be packaged in textbooks.

To address the needs in the learning process, textbook development is one of the efforts that teachers can make. Textbooks are related to the learning process. Printed textbooks are a form of learning media needed in the learning process (Tania and Fadiawati, 2015). Similar was expressed by Behnke (2018) that textbooks are effective and efficient in learning. One of the components in the learning process is textbooks that are systematically arranged, including competencies that will be mastered by students, and implemented according to learning objectives (Juwita, 2017). Printed textbooks can provide good information to help improve students' understanding of learning. Textbooks include information, discussion, and evaluation (Nuriyah, 2019). From the results of observations expressed by Hikmayati, et al (2019), it was explained that 74% of students stated that textbooks were efficient in learning, 76% were effective in learning, and 85% were comfortable to read repeatedly for a long time. The development of interesting textbooks, can optimize the work of the brain, and it is easier to have various forms, one of which is the brain-based learning approach accompanied by comic strips. Brain-based learning

The brain-based learning approach is learning to optimize brain work by creating a learning environment that is challenging, fun and active and meaningful learning for students (active learning) (Jensen, 2011; Yulvinamaesari, 2014). The brain-based learning approach can be poured into teaching materials, namely textbooks. The results of research related to the development of brain-based learning include (1) Akyurek & Afacan (2013) revealed the influence of short-term and long-term attitudes and motivation in eighth grade students with brain-based learning, (2) Prihatin et al. , (2017) and Milada (2019) also show that brain-based learning can increase enthusiasm and fun in the student learning process. In line with Yulyatno et al., (2019), Yustitia, Wardani, and Juniarso (2019) brain-based learning approach can improve learning outcomes.

This study was structured to determine the effectiveness of textbooks with a brain-based learning approach and comic strips on organizational material in improving learning outcomes and creative thinking of junior high school students.

### **Research Method:-**

The research design used was a one-group pretest-posttest design, a research activity by providing a pretest and the end of learning given the final test (posttest). At the same time, creative thinking tests are given after posttest activities. The research subjects consisted of 30 grade VII students of MTs Nurul Huda Blimbingsari Banyuwangi. This research was conducted in the even semester of 2020/2021. Learning outcomes were obtained from the pretest and posttest, while the assessment of creative thinking skills was obtained from each meeting's test scores at the end of the lesson. Learning outcome are analyzed using N-gain (formula 1), and creative thinking is analyzed using formula 2.

$$N - gain = \frac{Sp_{ost} - Sp_{re}}{100 - Sp_{re}} \dots\dots\dots(1)$$

**Description:**

- N-gain = Normalized gain
- Sp<sub>re</sub> = average pretest score
- Sp<sub>ost</sub> = average posttest score

The obtained normalized gain criteria in Table. 1

**Table 1:-** Classification of n-gain.

Gain Score	Criteria
$g \geq 0.7$	High
$0.3 \leq g < 0.7$	Medium
$g < 0.3$	Low

Hake(2002)

$$N - gain = \frac{Sp_{ost} - Sp_{re}}{100 - Sp_{re}} \dots\dots\dots(2)$$

**Table 12:-** The criteria for the level of creative thinking.

Value	Criteria
$75 < x \leq 100$	Super Creative
$50 < x \leq 75$	Creative
$25 < x \leq 50$	Quite Creative
$0 < x \leq 25$	Less Creative

In this research, there are four aspects of Torrance's creative thinking indicators: fluency, flexibility, originality, and elaboration.

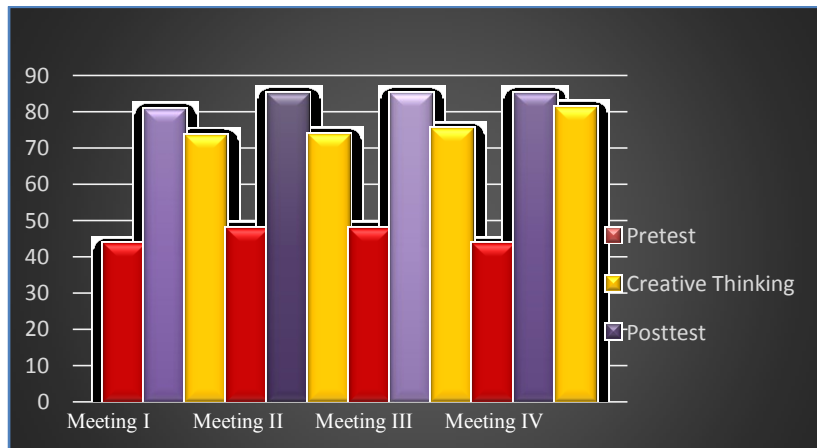
**Results:-**

The research conducted by this author aims to determine the effectiveness of using science textbooks with a brain-based learning approach equipped with comic strips to improve learning outcomes and creative thinking. The research results can be seen in Table. 3

**Table 3:-** Average Pretest, Posttest, and Critical Thinking.

Meeting	Cognitive learning outcomes	Average Score	N-gain	Categories
I	Pretest	43.22	0.65	Medium
	Posttest	80.44		
	Creative thinking	73.13		
II	Pretest	47.6	0.71	High
	Posttest	84.8		
	Creative thinking	73.54		
III	Pretest	47.6	0.71	High
	Posttest	84.8		
	Creative thinking	75		
IV	Pretest	43.2	0.73	Medium
	Posttest	84.8		
	Creative thinking	80.83		

Based on data in Table 3, textbooks with a brain-based learning approach accompanied by comic strips on cell material can improve learning outcomes and creative thinking skills. The percentage of students' creative thinking skills and learning outcomes can be seen in the following histogram.

**Figure1:-** AveragePretest, PosttestandCreative ThinkingSkills Histogram.

Based on Table 3 and figure 1, there is an increase in the average value of learning outcomes and creative thinking skills. The mean score at the first meeting, the pretest, posttest average value, and creative thinking were 43.2, 80.4, and 73.13. At the mean score obtained at the second meeting were 47.6, 84.8, and 73.54. While at the third meeting, an average score was obtained 47.6, 84.8, and 75. At last meeting the mean score 43.2, 84.8, and 80.83. the n-gain mean of the first to the four meeting was 0.65, 0.71, 0.71 and 0.73 with "high" categories. The data has been tested with SPSS for windows series 21 with Kolmogorove smirnov analysis to find out that the data is normally distributed. The data obtained has a significance level above 0.05, so it can be concluded that the pretest, posttest and creative thinking are normally distributed.

### Discussion:-

Based on research data, textbooks with a brain-based learning approach equipped with comic strips about life's organizational systems material improve student learning outcomes and creative thinking skills. This is in line with the opinion of Rachmawati et al (2017), that textbooks can improve students' creative thinking skills, Martina, et al (2018), can increase student learning motivation by 78.45 compared to before using comic strips, Lailiyah and Istianah (2020) and Febriyanti (2020) explain that comic strips are effective in improving learning outcomes. In addition, comics can facilitate student learning about concepts as a whole, such as cognitive development, motivation and information processing (Gary, 2012). The creative thinking study (Table 1) shows that the mean score of the pretest and posttest has increased at each meeting. At the first meeting, the pretest score (before being given treatment) was 43.22, there was an increase (after being given a textbook with a brain-based learning approach and comic strips) 80.44 with an N-gain score of 0.65 in the criteria of "moderate", while the average average creative thinking 73.13 with "good" criteria. The average pretest value at the second meeting the pretest value (before being given treatment) was 47.6, there was an increase (after being given a textbook with a brain-based learning approach equipped with) 84.8 with an N-gain score of 0.71 criteria "moderate ", While the average creative thinking is 73.54 with " good "criteria. The average pretest value at the third meeting the pretest value (before being given treatment) was 47.6, there was an increase (after being given a textbook with a brain-based learning approach equipped with comic strips) 84.8 with an N-gain score of 0.71 criteria "moderate ", While the average creative thinking is 73.54 with " good "criteria. The average pretest value at the fourth meeting the pretest value (before being given treatment) was 43.2, there was an increase (after being given a textbook with a brain-based learning approach equipped with comic strips) 84.8 with an N-gain score of 0.73 criteria "moderate ", While the average creative thinking is 73.54 with " good "criteria. This increase is supported by the use of features that conform to the twelve principles of applying brain-based learning and comic strips in textbooks that have been compiled by researchers. This is because the technique of applying brain-based learning can create active, collaborative learning and stimulate student curiosity (Prihatin, 2019).

The features in the textbook are adapted to different student learning styles, namely auditory learning styles, visual learning styles, and kinesthetic learning styles (Craig, 2007; Hervianto, 2020; Wulandari, 2020). In textbooks, a brain-based learning approach includes comic strips, pictures, video to facilitate students in visual learning. Evagorou et al (2015) stated that the use of visual images can improve students' conceptual understanding. Before

the activity begins, students receive information about preparing to meet their nutritional and drinking needs before learning begins so that the learning body is better. Then the students did brain exercises supported by barcodes or YouTube links related to this. In accordance with the principles of brain-based learning which refers to efforts to optimize the potential of the brain through creating a pleasant learning environment, active and meaningful situations (Chamidiyah, 2015). Furthermore, students do brain exercise by involving the whole body such as head, hands and feet so that it can stimulate the brain to work optimally through a "brain gym". According to the results of research by Liegro et al, (2019) physical activity can improve cognitive and memory. In addition, students are invited to sing about the material on life organization systems that have been compiled by the author with the "sing a song" feature. The following are examples of the features of "brain gym" and "sing a song" in textbooks.

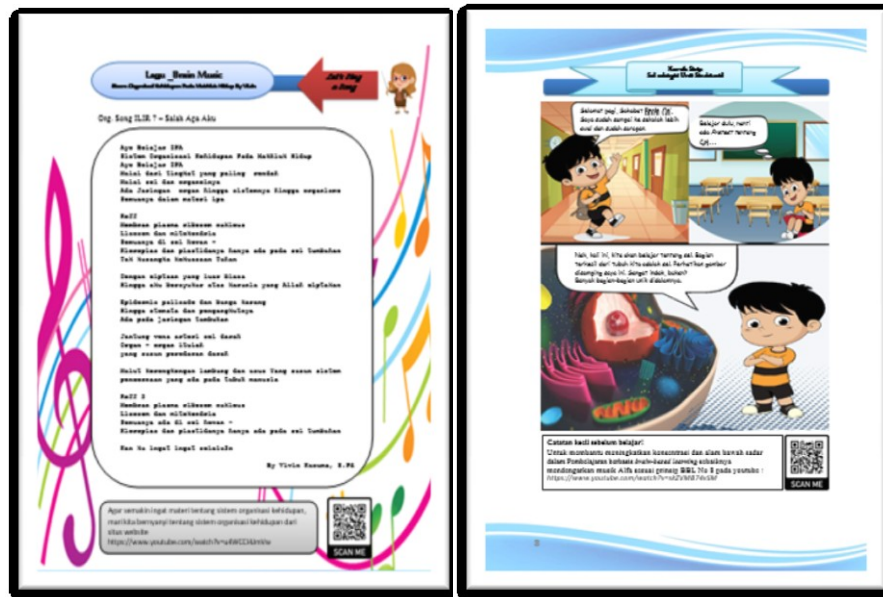


Figure2:-Feature“Brain Gym” and “Sing a Song”

Supporting factors that support the increase in creative thinking are students who are ready to solve questions on thinking skills at each meeting in accordance with the material in the subsection of life organization systems which include questions of fluency, flexibility, originality and elaboration. In the question, there is a question of the ability to think creatively to compose comic strips and mnemonics. Activities carried out in groups. The comic strips were made in groups. Making comic strips with groups can encourage students. Comic strips are used as a learning medium to describe material in order to help facilitate student understanding. Textbooks with a brain-based learning approach with comic strips can improve creative thinking skills. This is in accordance with the statement of Ratnawuri (2016); comics with communicative image media can be used as a learning medium so that students can easily understand concepts. In addition, comic strips can enrich the learning experience in developing creative thinking skills. The following is an example of a comic strip from student learning outcomes.

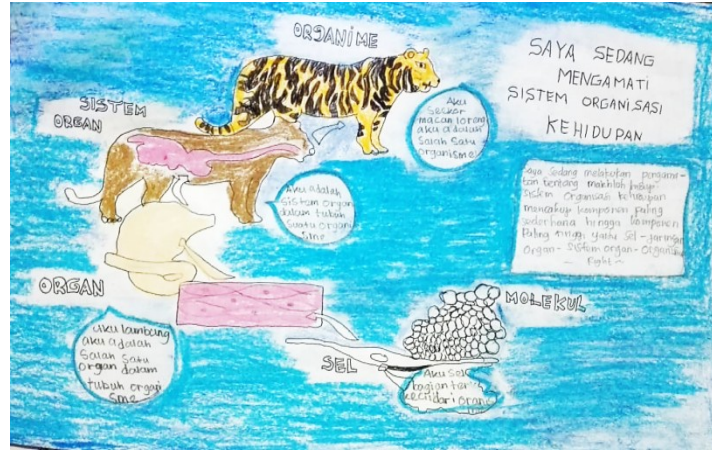


Figure 3:- Picture product about the Organisation of life from students' results.



Figure 4:- Picture product about the fun learning with brain based Learning from students' results.

### Conclusion:-

Based on presentation of the results and discussion, the results of these studies indicate that there has been an increase the average score of the creative thinking ability and learning outcomes of the school studied after participating in learning using textbook learning with a brain-based learning approach equipped with comic strips on organization system of life material. This can be seen at the first meeting the results obtained n-gain of 0.65 with the criteria of "medium" increase, the second meeting is 0.71, with the "high" criteria, the three meeting is 0.71, with the "high" criteria and the four meeting is 0.73 with the "high" criteria. The mean results of creative thinking from the first meeting to the four meeting were 80, 81.11, 82.78, and 80.56. it can be concluded that the textbooks with a brain-based learning approach accompanied by comic strips on organisation of life material are effective in improve learning outcomes and creative thinking skills.

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