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Effectiveness of The Fish Diversity in Kampar Regency Book to Promote Creative Thinking of High School Students

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Abstract. The diversity of fish in Kampar regency is quite high and it can be used as information for World education, especially for teachers and students in the school, thus the book of fish diversity in Kampar was developed. This research aimed to analyze the effectiveness of the fish diversity book to see the creative thinking skills. This quasi-experimental study used a pretest-posttest control group design. The independent variable was learning using the book Fish Diversity in Kampar, and the dependent variable was the students' creative thinking ability. Data were collected using a multiple-choice test with four creative thinking indicators: fluent, flexible, original, and detailed thinking. Hypothesis analysis used an Independent t-test. The result showed that the experiment class performed better than the control class in all indicators. Fluent thinking was 66 (adequate) for control, and 88 for an experimental class or very good; flexible thinking was 74 for control and 88 for the experiment; original thinking in the control class was 74 and scored 93 for the experimental group; detailed thinking in the control class was 71 and scored 91 in the experimental group. The hypothesis test showed that $t_{\text{-count}} > t_{\text{-table}}$ with a value of -12.883> 2.002. In conclusion, the Book Fish Diversity Kampar Regency effectively improved the creative thinking of students on the topic of biodiversity.

Keywords: *The Book of Fish Diversity, creative thinking, biodiversity*

INTRODUCTION

Riau Province is located on Sumatera Island, which has a very wide landscape, particularly in terms of water. Riau Province is irrigated by four large rivers, namely, the Siak River, Indragiri River, Rokan River, and Kampar River Rita and Elvyra (2020). Kampar River is formed from tributaries in Riau and West Sumatra then empties into Meranti Estuary in Pelalawan, Riau Province (Yustina et.al 2019). Kampar Regency has enormous fishery potential. According to the Department of Fisheries in 2016 Kampar Regency has great potential in the field of freshwater fisheries and has abundant species of fishes (Ramadona et. Al. 2019). This diversity should be considered as a source for educational activities in a closed area. However, these natural sources have not been documented and utilized in such educational activities, particularly to introduce the localities to the students.

The preliminary study showed that there are no documents of fish diversity in Kampar, and its utilization as teaching and learning sources have not been explored yet. This data also revealed that 62% of students did not know the diversity of fish in their river. Teachers also found difficulties and lack of awareness to explore the Kampar river diversity as teaching materials. Therefore, it is necessary to develop a book on the fish diversity of Kampar River as basic teaching material on introducing local wisdom. Teaching materials are important to increase students' knowledge (Nafiah et al. 2019). Moreover, students' knowledge is the essential element to improve students' creative thinking.

The student's creative thinking skills are divided into some indicators: fluent thinking, flexible thinking, original thinking, and detailed thinking (Munandar 1999). To train students' creative thinking optimally, the teaching method of teachers is also crucial (Ermatita et al. 2019). While creative thinking abilities are the basic skills to create faithful, productive, innovative, and creative students who are expected able to contribute to society (Patnawati et al. 2019). The purpose of this study was to analyze the effect of using fish diversity enrichment books in Kampar regency to improve the creative thinking abilities of the students.

METHOD

This research is a quasi-experimental study following the pretest-posttest control group design. The subjects of this study were 59 students of SMA Negeri 1 Kampar Kiri Hilir in grade 10. The control and experimental classes were selected randomly using random sampling. The control class was taught using a general textbook that teachers used to teach biodiversity, and the experimental class was taught using the Fish Diversity Book in Kampar District. Before and after the treatment, the students' creative thinking ability was measured. Indicators of creative thinking are smooth thinking, flexible thinking, original thinking, and detailed thinking, which were adopted from Munandar, 2009.

The creative thinking was assessed through pretest at the beginning of the lesson before using the fish diversity enrichment book. After the initial data were obtained, the learning process was carried out using the developed book. After the intervention, a posttest was applied to measure students' creative thinking abilities. And for the control class, the research procedure was given a pretest and posttest without a fish diversity book.

The pretest and the posttest of students' creative thinking were calculated by the following formula:

$$\text{Score} = \frac{The\ total\ score\ obtained}{Maximum\ number\ of\ scores} \text{ x } 100\%$$

To find out the categories of creative thinking, data were analyzed using criteria as in Table 1.

Table 1. The Interval and Category of Students' Creative Thinking

Interval %	**Category**
85 ≤ x < 100	Very High
76 ≤ x < 85	High
60 ≤ x < 76	Moderate
55 ≤ x < 60	Low
≤ 54	Very Low

(Source: Purwanto, 2014)

Effectiveness testing was calculated as the normalized gain. According to Hake (2007), the normalized gain index (g) is obtained from the average posttest (Sf) minus the pretest average (Si) divided by the maximum value (Smax) minus the pretest average (Si).

$$(g) = \frac{(Sf) - (Si)}{S - (Si)}$$

The interpretation of the normalized gain index (g) and classification is shown in Table 2.

Table 2. The Value of Normalized Gain Index and its Classification

Normalized Gain Index	**Classification/Category**
(g) ≥ 0,70	High / Very Effective
0,30 ≤ (g) ≥ 0,70	Moderate/ Effective
(g) < 0.30	Low/ Less Effective

Modified from Hake (2007)

RESULT AND DISCUSSION

Students' creative thinking in the study was seen from the comparison of learning outcomes between the control class and the experimental class based on the results of the pretest and posttest. Data on creative thinking in the control and experimental class can be seen in Figure 1.

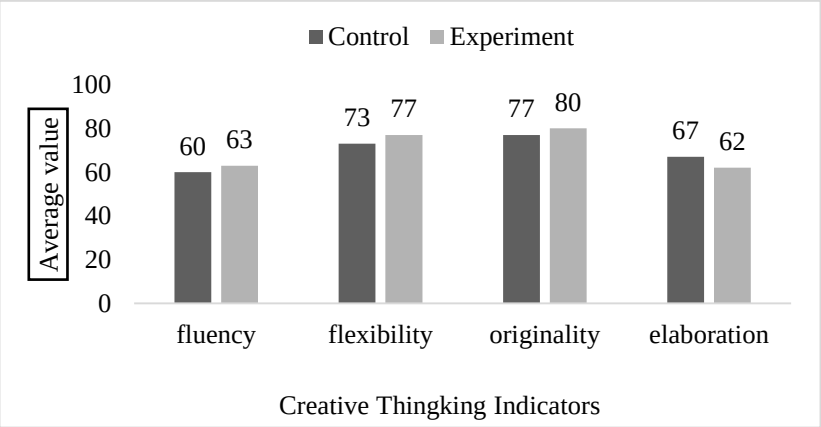

Figure 1. Histogram of Pretest Creative Thinking Ability

The ability to think creatively showed in the pretest of the control class from the indicator of the ability to think fluency has an average value of 60, it is not much different from the experimental class with an average score of 63, flexibility thinking in the control class with an average score of 73 and the experimental class is 77, at originality thinking in the control and experimental class with an average score respectively of 77 and 80, the indicator of elaboration thinking in the control class with an average score of 67 and the experimental class is 62. The value of creative thinking skills in the form of posttest in the control and experimental classes can be seen in Figure 2.

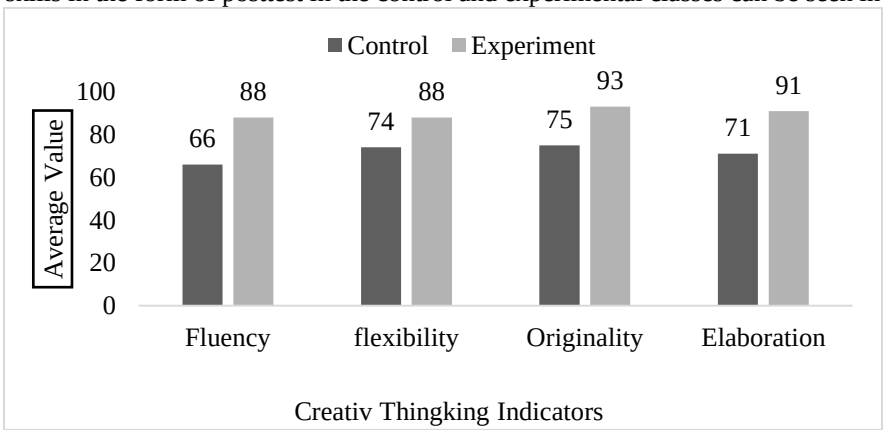

Figure 2 Histogram of Postest Creative Thinking Ability

The value of the posttest creative thinking ability points out that the difference between the control class and the experimental class on the indicator of fluency thinking, the control class has an average score of 66, the experimental class has an average value of 88. The flexibility thinking in the control class with an average value of 74 and the experimental class has an average score of 88, at the originality thinking in the control class gets an average score of 75 while in the experimental class has an average value of 93. The elaboration thinks indicators in the control class get an average score of 71 while the experimental class has an average score of 91. The posttest average in the experimental class is categorized as very good when it is compared to the control class, with the average value tends to be low which is categorized as sufficient. The experimental class is better in creative thinking due to the use of learning media in the form of an enrichment textbook of fish diversity in Kampar regency. The process and results of teaching concerning the level of creativity of students' thinking can be improved through learning media (Talakua and Elly 2020) . This research was analyzed using N-gain to find out the difference in the

increase of creative thinking between the control class and the experimental class, to discover the N-gain value shown in Table 3.

Table 3. N-gain Index of Contro Class and Experimental Class

N-gain	Control Class	Experimental Class
	0.1	0.7
	Low	High

From Table 3, it can be seen that the difference in the N-gain value in the control class and the experimental class, namely the control class is 0.1 and the experimental class is 0.7. According to the classification by Hake, (2007) if the N-gain value is ≥ 0.70 thus the N-gain value is in the high classification, then if the N-gain value is $0.30 \leq (g) \geq 0.70$, thus The N-gain value is in the medium classification and if <0.30 it is classified as low. Based on this classification, the N-gain value in the control class is classified as low and the N-gain value in the experimental class is high.

1. Hypothesis testing of creative thinking

The next phase is hypothesis testing. Hypothesis testing is the t-test to think creatively about variables in the control class and the experimental class. To discover the results of the t-test can be seen in table 4:

Table 4. Independent Testing on a t-test of Students' Creative Thinking

Class	N	Df	Sig 2t	T-Count	T-Table
XII IPA 1	29	28	0.081	-1.813	2.048
XII IPA 2	30	29	0.000	-17.787	2.045

(-) *Significant Difference*

Based on Table 4, the result of hypothesis testing indicates that t-count> t-table with the value of -17.787> 2.045 so that there is a significant difference between the control and experimental classes so that it can be concluded that the hypothesis shows that if tcount> t table, thus Ho is rejected and H1 is accepted. It signifies that the enrichment book of fish diversity affects the students' creative thinking skills. Research by (Sriyati et. al. 2019) explain that education based on local potential provides knowledge, skills, and behavior to students so that they have deep insights about environmental conditions and the need of society in which it is in line with the values of the rules that apply in its area. Learning with environmental insight and regional potential can improve creative thinking (Herianingtyas and Harmawati 2018). The increase of student's creative thinking skills in the experimental class is related to the use of enrichment book that can act as learning media, attracting students' curiosity and learning motivation about the local potential in the area. According to

Yustina et al., (2020a), that the implementation of the diversity book of fish species through online learning is effective in increasing motivation of student in learning, further, it is also argued that the increase of learning motivation can improve students' creative thinking skill (Yustina et. al. 2020b).

CONCLUSION

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