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Contextual-Based Animal Encyclopedia: HOTS on Elementary School's Students

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ABSTRACT

This study aims to determine the effect of contextual use of animal encyclopedias in developing HOTS ability of Elementary School students. The subjects of this study were fifth grade students in 15 elementary schools in Malang Regency. The Data was collected using a test instrument consisting of indicators from C4 to C6. The design used in this study is *non equivalent control group design*. The results showed Animal encyclopedia contextual- based learning effect on HOTS ability of fifth grade students on 15 elementary schools in Malang Regency. The gain score test results showed that from 15 SD trials showed 11 elementary schools using contextual animal-based encyclopedias were effective in increasing students' HOTS. Contextual learning can develop students' high-level thinking skills.

Keywords: HOTS , animal, encyclopedia, contextual, elementary school

1. INTRODUCTION

The 21st century is characterized by 4C capabilities namely Creative, Collaborative, Critical thinking and Communicative. The 4C ability is part of the higher order thinking ability. Higher order thinking skills (HOTS) are thinking abilities that not only require the ability to memorize and remember, but also require other higher abilities, such as the ability to think creatively and critically [1]. Bloom classifies high levels of thinking in the cognitive realm in the form of analyzing/C4, valuing/C5, and Creating/C6 [2]. High-level thinking ability is an ability that must be developed by students [3], because high-level thinking skills can make students learn deeply, students understand concepts well [4], distinguish ideas and ideas clearly, able well-reasoned, able to solve problems, construct explanations, hypothesize and understand complex things [5], able to think concretely [1], as problem solvers [6], and able to interpret, analyze and manipulate information [7], and be able to make students become independent thinkers [8]. The use of HOTS in the learning process will produce learning activities that can improve students' thinking abilities. Therefore, high-level thinking skills are needed and useful for elementary students.

However the fact is students still have difficulty in thinking at a high level. According to research conducted by (Henniengsen & Stein [9]), states that learning still leads to conceptual limitations on students, starting with thinking problems, reasoning, and problem solving skills. [10], states that the elementary students' thinking abilities only display limited understanding and no complex systems, students lack in constructing concepts and theories in a complex manner [5], students have not been able to think hypotheses and solve abstract problems [1], performing demanding tasks to think at a high level is still low [11], students have not been able to apply information to solve problems [7].

All this time HOTS has been developed in several ways including through PBL-based mobile phones [12], Collaborative learning [13]; Flipped classroom [14], 5P model [15]; Problem based method [16]; E-learning [17]; exploring the potential of students directly with a broad, systematic and detailed scope of objects and environments [18]. But so far the development of HOTS has never been through encyclopedias adapted to the characteristics of the child's environment. Even though the encyclopedia is able to facilitate students in accessing information sought alphabetically [19], [20]. encyclopedias discuss topics of knowledge and cognitive development from various perspectives [21]; Acquisition of complete knowledge so that it becomes easier and more enjoyable, reliable and clear because it comes from several experts and compiled with a hierarchical system (Sader in [22]: improving learning outcomes, understanding concepts and

student motivation [23], [24], and [25]; [26]; [27]; [28]; [29]; Enhancing Creativity [30]. Encyclopedia will be preferred by students when contextual - based or appropriate to the student's environment. Contextual based learning, will help students link material taught with real-world situations and encourage students to make connections between knowledge and application in their lives [31]. With the linkage of the learning process with student experience, will make learning more meaningful [32], [33]; students are more productive and innovative [34]. So that the learning process takes place naturally in the form of students' activities in work by experiencing, not transferring teacher knowledge. For this reason, this study examines the effect of using encyclopedia-based animal encyclopedias in improving HOTS or high-level thinking skills of elementary school students.

2. METHOD

This study uses a quantitative approach that aims to determine the effect of animal encyclopedias contextual -based in improving students' HOTS abilities. The study design uses *non equivalent control group design*. The sample in this study was fifth grade elementary school students in 15 elementary schools in Malang City and Regency. Data collection using the HOTS ability test instrument of students. Before the instrument was used the validation, reliability, difficulty level and different test problems were tested. The following development of HOTS students' ability instruments is shown in table 1, as follows:

Table 1 Development Of HOTS Students' Ability Instruments

Indicator	Sub Indicator Question
C4 (Analyze)	Analyze (search and select) information appropriately
	Find assumptions in a text
	Analyze parts of text
	Analyze the relationship between the text information read with the experience gained
C5 (Evaluates)	Draw conclusions from the text
	Find the implications of a text
	Assess the truth of messages in a text
C6 (Compose)	Convey clear information using your own language

Hypothesis testing uses Independent Sample t-test, with the following formula:

$$t = \frac{\bar{x}1 - \bar{x}2}{Sg\sqrt{(\frac{1}{n_1} + \frac{1}{n_2})}}$$

(Prayitno D, 2010)

With the following criteria:

a. Ho is accepted if t table $\leq$ t count $\leq$ t table

b. Ho is rejected if ttable <tcount> ttable

Then the gain score test is performed with the formula:

$$N = \frac{Posttest\ score - Pretest\ score}{ideal\ score - pretest\ score}$$

(Hake,R.R 1999)

The gain test criteria are shown in table 2.

Table 2 The Gain Test Criteria

Precentase (%)	Criteria
< 40	Ineffective
40 – 55	Less effective
56 – 76	Effective enough
>76	Effective

(Hake,R.R 1999)

3. RESULTS AND DISCUSSION

The results of the study at 15 elementary schools in Malang City and Malang regency are shown in table 3.

Table 3 Table of T-test Result

		Paired Differences							
		Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**		**t**	**df**	**Sig. (2-tailed)**
					Lower	**Upper**			
Pair 1	**Pre-Post Test C4**	-2,8282	2,72478	0,12946	-3,0826	-2,5738	-21,847	442	0,000
Pair 2	**Pre-Post Test C5**	-3,7409	2,42446	0,11519	-3,9673	-3,5145	-32,477	442	0,000
Pair 3	**Pre-Post Test C6**	-4,6508	3,24204	0,15403	-4,9536	-4,3481	-30,194	442	0,000

Based on table 3, it can be explained that the results of the analysis through hypothesis testing, the results of the posttest values obtained t_{counts} of -21,847, -32,477, and -30,194, because t_{count} was negative, the researchers wrote | t_{count} | to posit with values 21,847, 32,477, and 30,194, and t_{table} obtained values of 1,648. Results | t_{count} | > t_{table}, so that you can write 21,847, 32,477, and 30,194 > 1,648, and the value of sig. (2-tailed) 0,000 < 0.05. So it can be concluded that there are differences in the ability of HOTS students before and after using Animal Encyclopedias Contextual-based.

Based on the results of the gain test shown in Figure 1. Based on figure 1 the calculation of *the Gain Score test* shows that the average value of the *N-Gain Score* on SD 1 gets 65% (quite effective), SD 2 gets 48% (less effective), SD 3 gets 67% (quite effective), SD 4 gets 67 74% (quite effective), SD 5 got 89% (effective), SD 6 got 79% (effective), SD 7 got -0.1% (not effective), SD 8 got 71% (quite effective), SD 9 got 89% (effective), SD 10 got 96% (effective), SD 11 got 76% (quite effective), SD 12 got 74% (quite effective), SD 13 got 35% (not effective), SD 14 got 72 % (quite effective), SD 15 gets 56% (less effective).
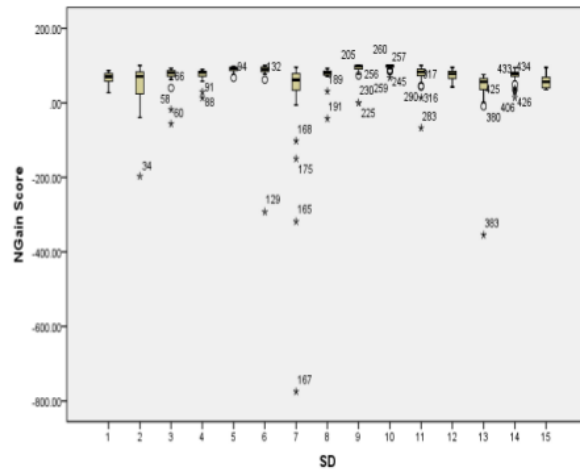

Figure 1 *Gain Index Test* Bar Diagram

Based on the description it can be stated that from 15 elementary schools in Malang City and Regency there are 4 elementary schools in the effective category, 7 elementary schools in the effective category, and 4 elementary schools in the category of ineffective use of animal-based contextual encyclopedias to determine the HOTS of fifth grade students.

So if it is concluded that the encyclopedia Contextual-based animals are generally effective in increasing students' HOTS.

4. DISCUSSION

The increase in students' HOTS on the use of contextual -based Animal Encyclopedias can be seen from several factors, including: First, in terms of theoretical foundation, the contextual approach provides an opportunity for students to be actively involved in building their own knowledge through the process of observation. Students are required to find out for themselves the truth of a concept, so students better understand the concept [31]. This is consistent with the opinion [35], which says that learning is an active activity of students building their own knowledge or concepts so they understand it. In addition, the contextual approach provides capacity for students to reflect back on the activities or learning that has been taught. According to [36], states that by thinking about what has just been learned, examine, and respond to an event and experience, students are able to revise previous concepts into scientific concepts. In line with [34], states that the learning process that uses contextual will require students to use their critical and creative thinking skills, as well as being fully involved in working for an effective learning process, taking responsibility for the occurrence of effective learning processes, and bringing their own schemata - into the learning process, so students can develop higher-order thinking skills or HOTS. Second, seen from the learning aid in the form of animal encyclopedia. Students who learn about animal recognition through contextual based encyclopedias, will strengthen students' understanding of animal concepts, the use of animal encyclopedias as a medium that can be easily accessed by students, because the encyclopedia itself is a list of subjects accompanied by definitions, backgrounds, and data bibliographies are arranged systematically [37], This encyclopedia has the advantage of making it easier for students to access information sought alphabetically [19], [20]. In addition, the encyclopedia also features pictures of animals with information that can make students more interested in learning it. This will make students have a learning experience, so students can remember the concepts taught. According to [38], stating that involving students will make them remember concepts by 90%. Not only that, the development of students in understanding objects through images and visualization as well as symbols and languages, so that the use of contextual- based animal encyclopedias will improve the ability of high-level thinking in grade V students in 15 elementary schools in Malang City and Regency.

5. CONCLUSION

The use of contextual-based animal encyclopedias can improve students' higher order thinking skills. Contextual based learning can develop meaningful learning for students. Meaningful learning will be easily remembered by students because it matches with the daily lives of students so that students are able to develop the ability to reason and creativity of students, especially in everyday life.

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