The Effect of the Comic-Assisted Concrete Pictorial Abstract (CPA) Approach on the Fifth Graders' Ability to Read Statistics

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ABSTRACT

The ability to read is a necessary skill for students to possess since it has numerous benefits when studying various fields of study. One of the abilities required of upper elementary school children is reading comprehension, which is acquired through information absorption and refers to the ability to comprehend or understand the inferred or implicit meaning of reading material using media. Reading comprehension ability is also advantageous for studying fundamental statistics in mathematics education, particularly in circumstances involving word problems. As a result, reading comprehension ability, aided by instructional media, is required for completing mathematical word problems. For students in this study to learn about basic statistical concepts, they must read the reading text on the questions generated using the comic-assisted CPA (Concrete Pictorial Abstract) approach. The current study was conducted to investigate the increase in students' reading comprehension ability following the implementation of the comic-assisted CPA approach for data processing lessons. The study employed a quasi-experimental design and included 24 fifth-grade elementary school pupils. The research instrument consisted of two essay questions, each of which contained five derived questions. The results indicated that: 1) the comic-assisted CPA approach affected fifth-grade students' reading comprehension ability; and 2) students' reading comprehension ability increased following the implementation of the comic-assisted CPA approach.

Keywords: Comic, CPA, Reading comprehension ability, Statistics.

1. INTRODUCTION

Reading is a key skill today because it serves as the foundation for all other skills (Suyono, 2005). Reading is a means of communication as well as a source of information for the community in culture and plays a role in social life. Research shows that many children aged 10 years and over or children who are in elementary school age prefer watching television to reading printed media (Kepala Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan, 2019). The Indonesian population, particularly students, can be regarded as an illiterate society because they can read but have not been able to develop the habit of reading (Nurdiyanti & Suryanto, 2010). Due to the rapid pace of information and rising levels of activity, there is very little time for reading (Saddhono & Slamet, 2014). People have more knowledge the more they read. Reading is a comprehensive activity that involves a variety of abilities and understanding to comprehend the content. Every child does not naturally possess the ability to read; instead, this skill must be carefully taught.

Reading comprehension can be defined as the process of accurately understanding and interpreting a reading text (Lestari, 2019). In essence, reading comprehension will help students comprehend a wide range of other topics, including mastering math for data processing. Learning data processing focuses on understanding the story before it is solved in mathematical symbols, rather than just counting. Reading comprehension is a literacy action that can be understood in the context of life and skills in the twenty-first century. Literacy is the capacity to read, comprehend, and use written language as well as images and other reading materials (TIM GLN, 2017). This goes hand in hand with the intent and essence of the reading comprehension process.

The lecturing technique used to teach data processing in one of the elementary schools in West Bandung Regency prevents pupils from fully comprehending the

subject matter. The students also lacked vocabulary and comprehension of the material, particularly when it came to reading data presented in the form of graphs and tables (Jazimah, 2020). Additionally, data processing is viewed as a very challenging and frightening subject, making it difficult for students to comprehend. In short, students' reading comprehension of data processing is underdeveloped. Therefore, it is important to promote an engaging learning process to improve students' reading comprehension of data processing.

Comics-assisted Concrete Pictorial Abstract (CPA) is a learning approach that can improve students' reading comprehension of data processing (Putri, 2017). The CPA approach offers an alternate strategy for reading data. Integrating comics into instructional content can support students in their academic endeavors. The benefits of the CPA approach are that it provides students with a structured stage for learning mathematical concepts; helps students build better relationships as they progress from concrete to abstract levels of understanding; involves all students, including those with learning disabilities in mathematics; can be studied explicitly through a multi-sensory approach; and refers to the universal design as a learning guide. Multiple studies have demonstrated the efficacy of the CPA approach. It can be utilized from elementary school to early high school. The CPA approach is also consistent with NCTM standards and can assist students in acquiring ideas before entering learning procedures. Lastly, this approach can be used in both small groups and classrooms. purpose of the CPA approach is to increase and develop students' in-depth grasp of a concept (Benard, 2012). The use of media in the classroom will stimulate students' interest, motivation as well as their willingness to participate in educational activities (Subroto, Qohar, & Dwiyana, 2020). Comics is a collection of images that are used to communicate the ideas and themes of stories that typically depict daily life (Gumelar, 2011). The advantage of the CPA approach expressed by The Access Center American (2004) is that it can be implemented at the elementary to intermediate levels, either individually, in large groups or small groups. In addition, the CPA approach plays a manipulative role that appears amusing so that learners are enthusiastic about learning and feel joyful about it. As a result, the use of comics-assisted CPA will aid students in developing their knowledge of concrete, visual, and abstract concepts.

In line with this, the main problem of this research is described in more detail in the following questions:

1) How are students' reading comprehension of data processing before and after the implementation of the comics-assisted Concrete Pictorial Abstract (CPA) approach?

2) Does the comics-assisted Concrete Pictorial Abstract (CPA) approach affect the fifth graders' reading comprehension of data processing?

2. METHOD

This study used a pre-experimental one-group pretest-posttest design that has no control variable and used to differentiate the scenario prior to and after treatment (Lestari & Yudhanegara, 2015). The treatment utilized in this study is the comics-assisted Concrete Pictorial Abstract (CPA) approach. The research hypothesis was formulated as follows.

H1: The comic-assisted CPA can improve students' reading comprehension of data processing.

H0: The comic-assisted CPA cannot improve students' reading comprehension of data processing.

During field data collection, a serious obstacle was found. Since this study was conducted during the Covid-19 pandemic, treatment could not be administered to pupils face-to-face and simultaneously. To prevent the spread of the coronavirus, the instruction was divided into two sessions. The implementation of the research was separated into two sessions on the same day, with some students attending the class in the morning so that students attending the class in the afternoon could study information delivered to the WhatsApp group from home. The segmentation of study sessions was intended to facilitate the efficient collection of research data. In addition to the students' orderliness, the partition of the session increased the efficiency of documentation because the class environment was more favorable with fewer people.

This study involved 24 fifth-grade students from a private elementary school in West Bandung Regency. Data on the students' reading comprehension on data processing were collected using an essay test, interview guidelines, and daily journals as supplementary data. This test conducted in this study consisted of both open-ended and closed-ended essay questions, which were constructed based on the specified literacy indicators, question diversity, and question context. The exam was meant to collect information regarding student learning outcomes. The test was administered both before (pre-test) and after learning (post-test). In this study, interviews were semi-structured, that is, they were less rigid than structured interviews because they fell within the category of in-depth interviews.

The objective of semi-structured interviews was to discover problems more freely by asking informants about the implementation of an assisted approach to teaching a subject in elementary schools. Students' learning processes were examined through the usage of daily logs. According to (Lestari & Yudhanegara, 2015),

a daily log is a non-test instrument comprised of a few open-ended questions. Daily logs were also utilized to indicate student reactions to present learning activities and expectations for the upcoming meeting.

The research procedure included preparatory activities in which researchers conducted field investigations, identified problems, constructed research tools, and obtained the school's license procedure. This phase was followed by two days of learning approach application. Each meeting lasted for 2 x 45 minutes. On the first day of the study, participants completed a pretest, interviews, and daily logs; on the second day, they completed a posttest, interviews, and daily logs. The study concluded with data analysis and conclusion-drawing, which involved statistically analyzing pre-and post-test data and explaining the findings in relation to the research variables. The data were evaluated using descriptive and inferential quantitative analytic techniques, namely the t-test, to see if there was a significant difference between the average scores of students before and after receiving treatment. At this point, the treatment's effectiveness was determined. The developing conclusions phase attempted to address the problem formulation, offer suggestions, and produce the final study report.

3. FINDINGS AND DISCUSSION

This study collected students' pre-and post-test scores as its data. Prior to and following the application of the comic-assisted CPA approach, pre-and post-tests were administered to evaluate data on students' processing literacy skills. The data were then analyzed descriptively. The recapitulation of the pre-test and post-test scores of the research subjects can be seen in Table 1 and Table 2.

Table 1 and Table 2 shows that the students' post-test mean score (67.52) was higher than their pretest mean score (44.48). The increase observed in the students' reading comprehension score was 23.04. Meanwhile, the mean score achieved by students on each indicator of the test is described in Table 3.

Table 1. Recapitulation of students' pre-test

	Name	Score	Grade
the highest score	NSH	32	80
the lowest score	SA	8	20
Mean	44.48		

Table 2. Recapitulation of *students' post-test*

	Name	Score	Grade
the highest score	AAK	40	100
the lowest score	GPA	19	48
Mean	67.52		

Table 3. Students' pre- and post-test scores on each test indicator

Indicator	Pre-test	Post-test
Understand the nature of data and the terms used in data processing	55.20%	68.22%
Collect data based on a method	47.91%	64.73%
Identify and classify data	43.75%	67.70%
Present data based on the instructions given	38.02%	69.27%
Provide responses when asked to compare data	42.18%	75.52%
Mean	45.41%	69.08%

Table 3 demonstrates that overall, students' scores on each reading comprehension indicator of data processing increased by 23.67%. In addition, students' scores on each reading comprehension indicator climbed dramatically. Table 4 depicts the results of the normality test on the data.

The normality test results in Table 4 indicates Sig. 0.200, where P-*value* > α (significance level) suggests accepting H_0 and Jika P-*value* < α (significance level) at 5% (0.05) suggests rejecting H_0. Since Sig. on the Kolmogorov Smirnov[a] and Shapiro Wilk were 0.200 and 0.456, then H_0 was accepted and the data were distributed normally.

While a homogeneity test with Levene's statistics was performed to examine the homogeneity of the research variance, as presented in Table 5. Table 5 shows a significance value of 0.992, which is greater than α. Therefore, this figure suggests accepting H_0 and that the data had homogeneous variances. The normality and homogeneity tests were followed by a 2-tailed t-test to test the hypothesis.

Table 4. The normality test results

Group	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pretest	.100	24	.200*	.961	24	.456
Post-test	.160	24	.114	.928	24	.089
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Table 5. The homogeneity test result

	Levene Statistic	df1	df2	Sig.
Based on Mean	.000	1	46	.992
Based on Median	.022	1	46	.882
Based on Median with adjusted df	.022	1	45.737	.882
Based on trimmed mean	.000	1	46	.997

Table 6. The 2-Tailed t-test paired samples result

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test - Post-test	-24.000	14.222	2.903	-30.005	-17.995	-8.267	23	.000

Regarding the normality and homogeneity tests which were followed by a 2-tailed t-test to test the hypothesis as data seen in Table 5, if P-*value* $\geq \alpha$ (significance level), H_0 was accepted; otherwise, if P-*value* $< \alpha$ (significance level), H_0 was rejected. The t-test result can be seen in Table 6. Table 6 shows a Sig. value of 0.00, which is smaller than α. This indicates that H_0 was rejected and H_1 was accepted. The statistics indicates that the students' reading comprehension score after the implementation of the comics-assisted Concrete Pictorial Abstract (CPA) was higher than that before the implementation of the approach.

Then, a simple linear regression test was done to see the correlation between the independent and dependent variables. Table 7 summarizes the regression test results. Table 7 shows a correlation value (R) of 0.631 and an (R) square of 0.398. These numbers indicate that the comics-assisted assisted Concrete Pictorial Abstract (CPA) had a 39.8% effect on students' literacy skills in data processing.

Following the regression analysis, an N-Gain test was done to investigate the effectiveness of the treatment on students' reading ability (Lestari & Yudhanegara, 2015). The N-Gain test results are summarized in Table 8. Table 8 indicates an N-Gain score of 0.44 (44.70%), suggesting that the comics-based CPA approach had a medium effectiveness in terms of improving students' reading comprehension on data processing.

Prior to the implementation of the comics-based CPA approach, students' reading comprehension was assessed with a pre-test. The post-test scores revealed students' reading comprehension after the implementation of the comics-based CPA approach. The results of the analysis showed that the reading comprehension of the study participants improved significantly after being given the treatment.

Table 7. The results of the linear regression test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631ᵃ	.398	.370	12.490
a. Predictors: (Constant), Pre-test				

Table 8. The n-gain test results

No	Name	Pretest Score	Post-test Score	N-Gain Score	N-Gain Percentage	Category
1	RF	23	55	0.42	41.56%	Medium
2.	MN	63	75	0.32	32.43%	Medium
3.	RAM	58	75	0.40	40.48%	Medium
4.	SKA	80	90	0.50	50.00%	Medium
5.	N	73	80	0.26	25.93%	Low
6.	W	43	50	0.12	12.28%	Low
7.	NN	58	78	0.48	47.62%	Medium
8.	P	43	55	0.21	21.05%	Low
9.	T	55	68	0.29	28.89%	Low
10	GA	20	48	0.35	35.00%	Medium
11	ASA	38	55	0.27	27.42%	Low
12	BR	48	100	1.00	100%	High
13	K	73	83	0.37	37.04%	Medium
14	KNA	53	98	0.96	95.74%	High
15	EZ	25	60	0.47	46.67%	Medium
16	CF	48	83	0.67	67.31%	Medium
17	SF	20	50	0.38	37.50%	Medium
18	IL	48	78	0.58	57.69%	Medium
19	R	63	80	0.46	45.95%	Medium
20	G	43	60	0.30	29.82%	Medium
21	W	35	58	0.35	35.38%	Medium
22	F	43	75	0.56	56.14%	Medium
23	RY	35	50	0.23	23.08%	Low
24	ON	23	83	0.78	77.92%	High
Mean				0.44	44.70%	Medium

The increase in reading comprehension scores was strengthened by the results of the N-Gain test for each research subject. The analysis revealed that three students obtained high N-Gain scores, six students achieved low N-Gain scores, and the remaining 15 students obtained moderate N-Gain scores. The average N-gain score for all participants is 0.44, which is considered to be in the middle range.

The results of the significance test with a simple linear regression test showed that the comics-assisted Concrete Pictorial Abstract (CPA) approach had an effect of 39.8% on fifth grade reading comprehension on data processing. Descriptive data acquired through interviews and a collection of daily journals revealed that each child learned new words and understood the contents of the reading material within two days of reading comics. The new words that children discover can be directly

translated and understood. Students reported in an interview that the use of comics media in conjunction with the CPA approach was very beneficial in enhancing their reading comprehension skills. Students can continue to interpret each new word discovered by reading and discovering new words.

This finding is reinforced by the opinion of experts who state that the Concrete Pictorial Abstract (CPA) approach is suitable for students' conditions. The approach starts with the concrete stage (done directly to a specific thing), then moves on to the stage of presenting images, and concludes with the abstract stage through the presentation of abstract symbols (Jeffrerson, 2009). The use of comics in the classroom has a significant impact on the learning process of children in primary school since comics feature appealing images and pages. The employment of pictures in comics can influence student responses to learn positively (Subroto et al., 2020). In conclusion, the stages of learning in the comics-assisted CPA (Concrete Pictorial Abstract) have a significant effect on improving students' reading comprehension on data processing.

4. CONCLUSION

The findings of the study and the discussion in the preceding section indicate that the comic-assisted CPA approach can improve fifth-grade elementary school students' reading comprehension skills on data processing. Aside from the utilization of engaging media, the tools supplied were also in line with the signs of reading comprehension performance, particularly in data processing. As a result, the comic-assisted CPA approach can be said to help enhance the reading comprehension skills of fifth graders in elementary school. The statistical analysis and discussion presented in the previous sections have demonstrated that the comics-assisted Concrete Pictorial Abstract (CPA) approach had a significant effect on the fifth graders' reading comprehension of data processing; and that After the implementation of the comics-assisted Concrete Pictorial Abstract (CPA) approach, students' reading comprehension of data processing improved significantly.

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