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The Effect of the CIRC Model on Reading, Writing, and Numeracy Skills in Second-Grade Elementary School Students

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Abstract

This research was motivated by the low ability to read, write, and count in second-grade elementary school students. This study, therefore, aims to determine the mean difference and improvement in implementing the smartboard-assisted CIRC model to the reading, writing, and numeracy skills of second-grade elementary school students. This study used quantitative research methods with a pre-experimental one-group-pretest-posttest research design. The sample involved was 17 students, with a total sampling technique or census. Data collection techniques were in the form of tests, interviews, observation, and documentation. The results showcased the difference in the mean pretest-posttest scores on the paired sample t-test calculation, indicating that the sig. (2-tailed) = 0.000 < 0.05, with criteria sig. $p < 0.05$, so H_0 was rejected, and H_a was accepted. It can be concluded that there was a difference in the mean pretest-posttest scores of students. Meanwhile, the application of the smartboard-assisted CIRC model in the N-gain test calculation was known to have increased by 0.61, with moderate criteria. From the study results, it can be concluded that there was an increase in students' reading, writing, and numeracy skills through the CIRC model assisted by smartboard media. These results indicate that the smart board-assisted CIRC model can be used as an alternative pair of innovative learning model and media to address learning problems of elementary school students.

Keywords: CIRC, Smartboard, Reading, Writing, Numeracy

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Abstrak

Penelitian ini dilatarbelakangi oleh rendahnya kemampuan membaca, menulis, dan berhitung pada siswa kelas II sekolah dasar. Oleh karena itu, penelitian ini bertujuan untuk mengetahui perbedaan rata-rata dan peningkatan penerapan model CIRC berbantuan papan pintar terhadap keterampilan membaca, menulis, dan berhitung siswa kelas dua sekolah dasar. Penelitian ini menggunakan metode penelitian kuantitatif dengan desain penelitian pre-experimental one-group-pretest-posttest design. Sampel yang terlibat sebanyak 17 siswa, dengan teknik total sampling atau sensus. Teknik pengumpulan data berupa tes, wawancara, observasi, dan dokumentasi. Hasilnya menunjukkan perbedaan rata-rata skor pretes-postes pada perhitungan uji-t sampel berpasangan, yang menunjukkan bahwa sig. (2-tailed) = 0,000 < 0,05, dengan kriteria sig. $p < 0,05$, maka H_0 ditolak dan H_a diterima. Dapat disimpulkan bahwa terdapat perbedaan rata-rata nilai pretes-posttes siswa. Sedangkan penerapan model CIRC berbantuan papan pintar pada perhitungan uji N-gain diketahui mengalami peningkatan sebesar 0,61 dengan kriteria sedang. Dari hasil penelitian dapat disimpulkan bahwa terdapat peningkatan kemampuan membaca, menulis, dan berhitung siswa melalui model CIRC berbantuan media papan pintar. Hasil ini menandakan model CIRC berbantuan papan pintar dapat digunakan sebagai alternatif pasangan model dan media pembelajaran yang inovatif mengatasi permasalahan belajar siswa sekolah dasar.

Kata Kunci: CIRC, Papan Pintar, Membaca, Menulis, Berhitung

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INTRODUCTION

Learning in elementary schools is carried out in an integrated thematic manner using the 2013 curriculum. Integrated learning means combining material from several subjects or studies in one theme (Ardianti & Wanabuliandari, 2019). On the other hand, soft and hard skills are one of the 2013 curriculum characteristics with knowledge, attitudes, and skills aspects. According to the 2013 curriculum characteristics, elementary schools teach students reading, writing, and numeracy skills. Reading, writing, and numeracy skills are also things that must be applied and emphasized to students, especially lower-grade students. It is because the 2013 curriculum characteristics are integrative thematic learning, scientific approaches, and authentic assessments (Pohan & Dafit, 2021). Thus, students must play an active role during the learning process. If elementary school students are not fluent in reading, writing, and numeracy, it will hinder the learning process. Therefore, the reading, writing, and numeracy skills must be applied and emphasized to students, so they have the abilities, starting from the lower grades.

In addition, the 2019 Ministry of Education and Culture data revealed that Indonesia has participated in PISA since 2000 for literacy, mathematics, and science. In 2018, reading and mathematics scores decreased quite drastically (Rahayuningtyas & Yuliani, 2020). In 2018, Indonesia scored 371 for reading literacy, 379 for mathematics, and 389 for science. Previously, in 2015, Indonesia got a score of 397 for reading literacy, 386 for math scores, and 403 for science scores (Hewi & Saleh, 2020).

Further, students with low reading skills tend to have difficulty understanding the subject matter being studied (Pujabakti et al., 2021). The problem of reading, writing, and numeracy is also a phenomenon. Many parents are concerned since their children are not taught to read, write, and count at preschool age. Parents with preschool-age children are also increasingly talking about reading, writing, and numeracy skills because they are worried that their children will not be able to follow the lessons at school to the next level if they are not equipped with reading, writing, and numeracy skills from the start. Research conducted by Mardani & Nasaulhak (2019) at the State Elementary School of 9 Hu'u demonstrated that the reading, writing, and numeracy skills in the first grade in learning had not been entirely run optimally. It can be seen from the students, who have become second graders at this school, were still weak in their reading, writing, and numeracy skills. It might be caused by the way teachers taught in delivering the material, the lack of using learning media, and the lack of teachers in teaching reading, writing, and numeracy in the classroom.

From the results of interviews with second-grade teachers at State Elementary School of 1 Mejobo on Friday, October 22, 2021, and observations of students' reading, writing, and numeracy skills in learning on Wednesday, October 27, 2021, it was found that there was a lack of habituation and use of learning models and media. In addition, learning was still conventional, and face-to-face learning was limited, which did not require students to be active during the learning process. In addition, students lacked in honing their cognitive abilities and had difficulties in student's reading, writing, and numeracy skills. Students' difficulty calculating divisions during observations in the second grade of this school was known from the results of daily tests and questions and answers with the teacher during the learning process in class. Moreover, 7 out of 17 students still could not calculate divisions, and 5 out of 17 second-grade students at State Elementary School of 1 Mejobo were still not fully fluent in reading and writing. Some students had to be guided and accompanied by their teacher in reading and writing.

Student's difficulties in reading, writing, and numeracy skills were also known from the results of the daily test results for second-grade students at State Elementary School 1 Mejobo, showing that on the material for playing in the environment, out of 17 students who took the daily test, only ten students, equivalent to 58.82%, were declared complete with minimum mastery criteria of 66. Meanwhile, 41.18% could not complete it. It could be seen from the students' incomplete answers, incorrectly writing letters, lacking writing letters, unable to read questions, unable to

solve story problems, and unable to calculate divisions. As a result, students were less able to solve the questions given by the teacher correctly and precisely. Moreover, ideally, good reading learning is student-centered and not teacher-centered (Pujabakti et al., 2021).

From this description, students' reading, writing, and numeracy skills in learning were still not optimally developed. Therefore, teachers need to use innovative learning models and media, make students active during the learning process, and attract students' attention (Misi, 2021). In the 2013 curriculum, teachers must present integrative thematic-based learning, use a scientific approach, and employ a learning model per the 2013 curriculum (Pohan & Dafit, 2021). In addition, students' reading, writing, and numeracy learning can be related to integrating reading and writing in groups, real life, and learning experiences. Under Jean Piaget's theory of cognitive development, elementary school-age children (6-12 years) are in the concrete operational stage. At the stage of cognitive development, children still really need concrete objects to help develop their intellectual abilities (Mauliya, 2019). One model that can be used for reading, writing, and numeracy skills is Cooperative Integrated Reading and Composition (CIRC). The CIRC model is a cooperative learning model integrating reading as a whole and then composing it into important parts (Murtiningrum et al., 2019). CIRC learning was first developed by Stevans, Madden, Slavin, and Farnish (Kurniawan et al., 2021).

The research by Niliawati, Hermawan & Riyadi (2018) on the CIRC model application to improve students' reading comprehension skills showed an increase in the mean test results of students, reaching the minimum mastery criteria in each cycle. In the first cycle, a mean of 70.21 was obtained, and the mean value of the second cycle was 81.88. It can be concluded that the CIRC model application could improve students' reading comprehension skills. In addition, a study by Apriani & Arief (2019) on the effect of the CIRC model on the skills of writing fable tests in seventh-grade students suggested that the CIRC model significantly affected the ability to write fable texts, with t-count > t-table (7.63 > 1.70). Furthermore, another study by Dewi, Elhefni & Testiana (2017) revealed that the use of the CIRC model was better than conventional learning to solve math story problems, with the results of the final data processing obtaining the mean score of the control group of 72.64 and the experimental group of 88.

From reading, writing, and numeracy problems in the second grade of State Elementary School of 1 Mejobo, the CIRC definition from previous research conducted by the expert is one of the models that can be used for students' reading, writing, and numeracy skills. In addition, the CIRC model is a learning model that involves active students, which can improve students' abilities in reading, writing, and numeracy. The CIRC learning method can also help students in an integrative manner, i.e., students can understand reading and improve writing skills in their learning implementation (Niliawati et al., 2018). Besides, the CIRC learning model requires students to be active and innovative. In this case, the teacher gives the story text and allows students to read, read to each other, understand, find the ideas in the reading text, and then write them down.

Under CIRC, learning will be meaningful if students can work together to read to each other, find the essence of the text, provide feedback, and write down the answers that have been found (Padila et al, 2012). One of them is by using learning media. Learning media in teaching and learning are defined as graphic, photographic, or electronic tools to concurrently process and rearrange visual or verbal information (Arsyad in Wirandari & Kristiantari, 2020). Learning to use learning media will attract more attention to students, especially in students' reading, writing, and numeracy learning. In reading, writing, and calculating division, smartboards can be used as tools or media to help during the student learning process. Smartboard is a thematic learning media in the form of pocket board visual media developed to make learning more fun and teach and facilitate students in learning to read and count so that students do not get bored quickly (Sudiarni & Sumantri, 2019).

Smartboard media also has two sides: Indonesian language content (reading and writing) and mathematics content (numeracy). Meanwhile, the steps of the smartboard media-

assisted CIRC model for reading and writing include 1) taking the Indonesian story text in one of the pockets on the smartboard, which has been cut per sentence and disordered with playing material in the surrounding environment; 2) each student in the group takes turns reading the sentences they get and sorting them into a coherent sequence; 3) students find ideas or content in the reading text; 4) students write the reading contents found; 5) students paste the story texts obtained and compiled on the smartboard; 6) students present their answers in front of the class. Furthermore, the steps of the CIRC model assisted by smartboard media on the numeracy skills are that 1) each group takes the story questions on the smartboard; 2) find conclusions from each story problem obtained; 3) calculate the division story problems using ice cream sticks on the smartboard media; 4) write and paste the answers on the smartboard media.

The CIRC model with smartboard media would be combined and modified to attract students' interest during the learning process of reading, writing, and numeracy. Previously, the development of smartboard media obtained a percentage of 86.3% with very good criteria from the first meeting of 61.5% (Fais et al., 2019).

Based on that description, the CIRC model application, assisted by smartboard media, can be used as an alternative to learning to read, write, and count in second-grade elementary school students. It is because the CIRC model assisted by a smartboard positively affects the reading, writing, and numeracy skills of lower-grade students. Students carry out learning activities, starting from reading, finding content in the text, writing, and calculating divisions so that learning is expected to be meaningful for students. Following the description, the problem formulation in this study consisted of (1) Is there a significant difference between the mean pre-test and the mean post-test scores in the CIRC model learning assisted by smartboard media on the reading, writing, and numeracy skills of second-grade elementary school students? (2) Is there a mean increase in the learning of the CIRC model assisted by smartboard media on the reading, writing, and numeracy skills of second-grade elementary school students? Thus, this study aims to (1) describe the significant difference between the mean pre-test and the mean post-test scores in the CIRC model learning assisted by smartboard media on the reading, writing, and numeracy skills of second-grade elementary school students and (2) to elucidate the mean increase in the learning of the CIRC model assisted by smartboard media on the reading, writing, and numeracy skills of second-grade elementary school students.

METHODS

Research Design

The research method used in this study was quantitative. The type of research employed was pre-experimental, with a one-group-pre-test-post-test design to determine the effect of the CIRC model assisted by smartboard media on students' reading, writing, and numeracy skills. Meanwhile, the pre-experimental research design utilized is as following table.

Table 1. One-Group-Pre-test-Post-test Design

Group	Pre-test	Treatment	Post-test
Experiment	O_1	X	O_2

The population in this study was all second-grade students of State Elementary School of 1 Mejobo. The sample in this study was taken from the total population, as many as 17 second-grade students of State Elementary School 1 Mejobo, with details of 11 male and six female students. The sampling technique used was non-probability sampling, with the type of total sampling or census.

This research was conducted in the second grade of State Elementary School of 1 Mejobo, Mejobo Sub-district, Kudus Regency, Central Java Province. This research was carried out from March 24 to April 7, 2022, in the even semester of the 2021/2022 academic year. This research was done for six meetings. The researchers held a pre-test at the first meeting on Thursday, March 24. On March 25-March 26, 31, and April 6, the researchers applied the CIRC learning model assisted by smartboard media. On April 7, the researchers gave a post-test (final test) after the CIRC

model implementation assisted by smartboard media.

In this study, there are independent variables and dependent variables. The independent variable affects or causes change. The independent variable in this study was the CIRC model assisted by smartboard media. Meanwhile, the dependent variable is influenced or becomes the result of changes. The dependent variable was the result of second-grade students' reading, writing, and numeracy skills at State Elementary School of 1 Mejobo.

This study employed data collection techniques, including a test, interview, and documentation. The test instrument was used to obtain data about students' reading, writing, and numeracy skills. The presentation of the CIRC model, assisted by smartboard media in the research process, was to achieve indicators of reading, writing, and numeracy skills. The test and interview instruments had several indicators for reading, writing, and numeracy. Indicators of reading included 1) reading by paying attention to punctuation marks, 2) making conclusions about the reading text, 3) answering questions according to the contents of the reading text, and 4) retelling the text contents in their language. Then, writing aspects comprised 1) the ability to determine essay ideas, 2) the ability to organize the essay contents, 3) the ability to use vocabulary choices, 4) the ability to use language, and 5) the ability to use spelling and writing. Meanwhile, the numeracy aspects consisted of 1) being able to solve division story problems, 2) being able to change the arithmetic division operation into multiplication, and 3) being able to determine the final result.

In this study, data were obtained by conducting a pre-test before the implementation of the CIRC model assisted by smartboard media and a post-test given after the implementation of the CIRC model assisted by smartboard media through a written test. The test was intended to determine the effect before and after implementing the CIRC model assisted by smartboard media. The test instrument consisted of description questions, totaling ten questions, with details of five Indonesian language questions and five math questions, according to predetermined indicators. The test questions had also been tested using validity and reliability tests, utilizing the product moment formula by Pearson as presented below (Irza, 2021).

$$rxy = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{\{N\Sigma X^2 - (\Sigma X^2)\}\{N\Sigma Y^2 - (\Sigma Y^2)\}}}$$

Description:
r_{xy} = Correlation coefficient between variable X and variable Y
X = The score of certain test items
Y = Total score
N = Total students

The validity results of the pre-test and post-test instruments for reading, writing, and numeracy skills for Indonesian content had six valid and four invalid questions, with R-count > R-table. Meanwhile, the mathematics content had seven valid questions and three invalid questions. In addition, the measurement of the reliability test used Cronbach's Alpha formula. The Cronbach Alpha formula was utilized to find the instrument's reliability, not 1 and 0, but in the form of a description or questionnaire. Here is the reliability formula (Arikunto in Irza, 2021).

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \Sigma \frac{\sigma_b^2}{\sigma_t^2}\right)$$

Description:
r_{11} = Test reliability
k = Number of questions
$\Sigma\sigma_b^2$ = Number of item variances
σ_b^2 = Total variance

Meanwhile, the reliability test criteria, according to Darren & Mallery (in Mamonto et al., 2021), can be seen in Table 2 as the following table.

Table 2. Reliability Test Criteria

Coefficient Interval	Relationship Level
≥0.900	Excellent
0.800 – 0.899	Good
0.700 – 0.799	Acceptable
0.600 – 0.699	Questionable
Less than 0.500	Unacceptable

The following are the results of the reliability test calculation.

Table 3. Reliability Test Calculation Results

Variable	r_{xy}	R-table	Description
Reading and writing skills	0.878	0.497	Reliable
Numeracy skills	0.890	0.497	Reliable

Application of Smartboard Media

This study used the CIRC model with the help of smartboard media. Smartboard media is a thematic learning media in the form of a pocket board so that learning is more fun, educates, and makes it easier for students to learn to read, write, and count. The smartboard media measures 50 cm × 70 cm with two sides. One side was for Indonesian content, and the other was for mathematics content. Here is the image of the smartboard media.

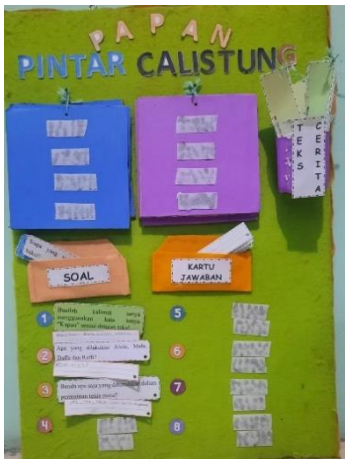

Figure 1. Indonesian Content Smartboard Media

Figure 2. Mathematical Content Smartboard Media

In the application of smartboard media for reading, writing, and numeracy skills, several steps for smartboard media for reading and writing skills are as following steps.

1. Taking the reading text, questions, and answer cards to answer the questions, which have been disordered in the pocket on the smartboard

Figure 3. Taking Reading Texts, Questions, and Answer Cards

2. Reading the text obtained to each other and arranging it into a coherent text on a small smartboard

Figure 4. Reading Texts to Each Other and Composing Texts

3. Reading a coherent and correct reading text

Figure 5. Reading Coherent and Correct Text

4. Determining the story content and answering the questions obtained from the smartboard media

Figure 6. Determining Content and Answering Questions

5. Presenting and pasting questions and answers on smartboard media

Figure 7. Presenting and Pasting Questions and Answers

In addition to reading and writing, there are also smartboard media steps for numeracy skills, including:

1. Taking division story questions and answer cards to answer division questions

Figure 8. Taking Questions and Answer Cards

2. Finding conclusions, solving problems, and calculating story problems using smartboard media

Figure 9. Solving Problems and Counting Story Problems on Smartboard Media

3. Writing answers on answer cards and student worksheets

Figure 10. Writing Answers

RESULTS AND DISCUSSION

Result

The data from this research carried out in the second grade of State Elementary School of 1 Mejobo were about students' reading ability obtained from the students' pre-test and post-test results. The recapitulation of the pre-test and post-test results data on students' reading, writing, and numeracy skills are presented in Table 4.

Table 4. Recapitulation of Second-Grade Pre-test and Post-test Results

No	Data Size	Pre-test	Post-test
1.	Number of data	17	17
2.	Mean	55.176	81.411
3.	Standard deviation	10.841	14.642
4.	Lowest score	38	52
5.	Highest score	82	98

Based on the table, it can be seen that the mean value of the post-test, 81.411, was higher than the mean value of the pre-test, 55.176. The highest score obtained in the post-test was 98, while in the pre-test, it only reached 82.

Thus, it can be said that the results of the post-test scores were better than the results of the pre-test scores.

Before carrying out the hypothesis test, a prerequisite test was conducted to determine whether the data were normally distributed using the normality test. The data normality test results in the pre-test and post-test data analysis utilizing SPSS 26 for windows, with the Kolmogorov-Smirnov formula, are shown in the following table.

Table 5. Pre-test and Post-test Data Normality Test Results

	Statistic	df	Sig.
Pre-test	0.154	17	0.200*
Post-test	0.179	17	0.148

Based on the analysis of the normality test of the pre-test and post-test data, the pre-test data obtained a significant result of 0.200 > 0.05 at a significance level of 0.05 and N = 17, so H_0 was accepted. Thus, the data derived from the pre-test scores obtained the results of the initial data on the students' reading, writing, and numeracy skills with a normal distribution. Meanwhile, post-test data obtained a significant result of 0.148 > 0.05 at a significance level of 0.05 and N = 17. Therefore, H_0 was accepted, and H_a was rejected. Hence, the data derived from the post-test scores obtained the results of the initial data on the students' reading, writing, and numeracy skills with a normal distribution. Since all data were normally distributed, the statistical test used was parametric. The following are the analysis results of parametric statistical test data.

Paired Sample T-Test

A paired sample t-test was conducted to determine whether the application of the CIRC model assisted by smartboard media on reading, writing, and numeracy skills could provide a significant difference between the mean pre-test and post-test scores. The following are the calculation results of the paired sample t-test utilizing SPSS 26 for Windows.

Table 6. Paired Sample t-test Output

	Paired Differences			t	Sig. (2-tailed)
	Mean	Std. Dev	Std. Error Mean		
Pre-test – Post-test	-26.235	11.443	2.775	**-9.453**	**.000**

In the output table, the analysis results of the paired sample t-test on the pre-test and post-test showed the value of sig. (2-tailed) = 0.000 < 0.05. From the criteria used in the paired sample t-test, the value of sig. p < 0.05, so H0 was rejected, and H_a was accepted. Based on these results, it can be concluded that there was a significant difference between the students' mean pre-test and post-test scores. Hence, it can be concluded that using the CIRC model assisted by the smartboard media affected the second-grade students' reading, writing, and numeracy skills at State Elementary School of 1 Mejobo.

Gain Score Normality Test

The gain score normality test was carried out to determine the increase in the mean score of students after implementing the CIRC learning model assisted by smartboard media. The N-gain test was used to compare the pre-test and post-test scores with a predetermined maximum ideal score. The results of the N-gain test calculations on the reading, writing, and numeracy skills are described in more detail in Table 7.

Table 7. Output Results of Normality Gain Score on Reading, Writing, and Numeracy Skills

N	Pre-test	Post-test	N-gain	Criteria
17	55.176	81.411	0.61	Moderate

Table 7 shows that the mean values of the pre-test (before) and post-test (after) receiving treatment using the CIRC model assisted by smartboard media had different final results. The mean pre-test before treatment was 55.176, while the mean post-test after treatment got a score of 81.411. The increase in the N-gain test calculation was 0.61, with moderate criteria. Hence, it can be concluded that there was an increase in students' reading, writing, and numeracy skills through the CIRC model assisted by smartboard media.

Discussion

The data analysis results from this study can be seen from interviews and hypothesis testing. From interviews with students before the implementation of the CIRC model assisted by smartboard media, it was found that students still could not fully recognize letters, read by spelling, still could not distinguish almost the exact words, especially if they read too fast, and students lacked confidence and had not fully aware of punctuation. In addition, in writing skills, students still had difficulty writing a few letters, more than five letters, lacking in writing a word and sentence, and were wrong and could not count, especially subtraction, multiplication, and division.

After the implementation of the CIRC model assisted by smartboard media, students with difficulty and problems in reading, writing, and numeracy skills could then fully recognize letters, read faster than before, know the meaning of punctuation dots and commas, write words and sentences with only 2-3 letters missing in one sentence, and calculate division using smartboard media or multilevel subtraction.

In addition, the differences in the mean students' reading, writing, and numeracy skills could be identified by giving pre-test questions at the beginning and post-test at the end. The difference in the mean scores of the pre-test and post-test was then analyzed using the paired sample t-test with SPSS 26 for the windows application. The test of the mean pre-test and post-test scores with the paired sample t-test showed that the pre-test results obtained a mean score of 55.176, and the post-test results obtained a mean score of 81.411. The mean difference in the mean scores of the pre-test and post-test was -26,235. In addition, the difference in the mean scores of students' reading, writing, and numeracy skills before and after the implementation of the CIRC model assisted by smartboard media can be seen in Table 4.5. The results of the paired sample t-test obtained sig (2-tailed) < 0.05, i.e., 0.000 < 0.05, so H_0 was rejected, and H_a was accepted. Thus, it can be stated that there was a significant difference in the mean before and after implementing the CIRC model assisted by smartboard media.

It is consistent with the research conducted by Kartika, Partadjaya & Widiana (2013) entitled *"The Influence of the Jolly Phonics-Based CIRC Learning Model on the Reading and Writing Ability of Second-Grade Students of Elementary School Cluster II, Sukawati Sub-district,"* stating that the use of the CIRC model influenced the reading and writing abilities of second-grade students. The t-test results obtained t-count 34.79 > t-table 1.98, for dk of 64 and a significance level of 5%. Hence, Ho was rejected, and Ha was accepted, meaning there was a significant difference in reading and writing skills using the CIRC learning model. In addition, another study by Mudzanatun & Fauziyah (2013) entitled *"The Effectiveness of the CIRC Type Cooperative Learning Model (Cooperative Integrated Reading and Composition) on Mathematics Learning Outcomes of Fourth-Grade Students at State Elementary School of Kedunguter 02 Brebes"* also showed that the application of the CIRC model to learning outcomes mathematics was better, more effective, and could activate students in the teaching and learning process. The t-test calculation revealed that t-count > t-table, 2.0757 > 1.68, so H_0 was rejected, and H_a was accepted. Thus, it can be concluded that the CIRC cooperative learning model effectively affected students' mathematics learning outcomes.

A study by Akhir, Agus, & Sanytiara (2021) entitled *"The Effect of Using PAKAPIN (Smart Pocket Board) Media on Indonesian Language Learning Outcomes"* uncovered that the hypothesis testing results, t-count 16.17 > t-table 1.708 at a significance level of 0.05. Therefore, it can be concluded that the PAKAPIN media (smart pocket board) affected the learning outcomes of Indonesian second-grade students of State Elementary School of 1 Parangrea, Bajeng Sub-district, Goa Regency. From this description, applying the CIRC model assisted by smartboard media provided a significant difference in the students' mean pre-test scores. The mean score of the post-test of the students given after being given treatment with the media-assisted model was higher than the mean score of the pre-test of the students.

In this study, the increase in the mean students' reading, writing, and numeracy skills

was analyzed using the N-gain test with the SPSS 26 application for windows. This test was conducted to compare the results of the pre-test scores and post-test scores of the second graders of State Elementary School of 1 Mejobo. Based on the N-gain test results, it was found that there was an increase in the reading, writing, and numeracy skills of the second-grade students of State Elementary School of 1 Mejobo in the pre-test and post-test scores. It can be seen in Table 4.6 that the N-gain test on reading, writing, and numeracy skills showed an increase of 0.61 with moderate criteria. Thus, it can be concluded that there was an increase in students' reading, writing, and numeracy skills before and after implementing the CIRC learning model assisted by smartboard media. The increase in results could be seen from the pre-test results, 55,176, before the implementation of the CIRC learning model assisted by smartboard media, and the post-test result of 81.411 after the implementation of the CIRC learning model assisted by smartboard media.

Moreover, the improvement in students' reading, writing, and numeracy skills in story text material and arithmetic division was due to the use of learning models and media that have never been implemented by classroom teachers, which are new things for students. Thus, the second-grade students of State Elementary School of 1 Mejobo were very enthusiastic, and high learning motivation arose among the students. It is reinforced by research by Marviana, Wahyudi & Indarini, (2018) entitled *"The Effectiveness of the CIRC and GGE Models on Elementary Mathematics Problem Solving Ability,"* asserting that the mean of experimental class I given the CIRC learning model increased by 0.56, meaning that the N-gain means of the experimental class I, given the CIRC learning model, included in the moderate category.

Furthermore, another study of Niliawati et al. (2018) with the title *"Application of the CIRC (Cooperative Integrated Reading and Composition) Method to Improve Fourth Grade Students' Reading Comprehension Ability"* stated increase in students' reading comprehension ability in cycle I, with a mean score of 70 .21, which increased to 80.81 in the second cycle. Students who completed the first cycle were 56.67% and increased in the second cycle to 90%.

In addition, a study conducted by Akhir et al., (2021) entitled *"The Effect of Using PAKAPIN (Smart Pocket Board) Media on Indonesian Language Learning Outcomes"* highlighted that the mean score before being given treatment (pre-test) was 51.53% and after being given treatment (post-test) was 81.92%. Thus, it can be concluded that the PAKAPIN (smart pocket board) media affected the learning outcomes of Indonesian second-grade students of State Elementary School of 1 Parangrea, Bajeng Sub-district, Goa Regency. Thus, it can be concluded that there was an increase in students' reading, writing, and numeracy skills before and after implementing the CIRC learning model assisted by smartboard media.

CONCLUSION

Based on the analysis results and discussion described, it can be concluded that the application of the Cooperative Integrated Reading and Composition (CIRC) model assisted by smartboard media affected the reading, writing, and numeracy skills of second-grade students of State Elementary School of 1 Mejobo in the 2021/2022 academic year.

There was a significant difference between the students' mean pre-test and post-test scores. The mean pre-test and post-test scores obtained with the paired sample t-test showed that the pre-test results had a mean score of 55.176, and the post-test results got a mean score of 81.411. The mean difference in the mean pre-test and post-test scores was -26,235. In addition, the difference in the mean scores of students' reading, writing, and numeracy skills before and after the implementation of the CIRC model assisted by smartboard media can be seen in Table 4.5. From the paired sample t-test, the results obtained sig (2-tailed) < 0.05, 0.000 <0.05, so H_0 was rejected, and H_a was accepted. Thus, it can be stated that there was a significant difference in the mean ability before and after the implementation of the CIRC model assisted by smartboard media.

There was a significant improvement in the second graders' reading, writing, and

numeracy skills using the CIRC model with the help of smartboard media. Based on the N-gain test results, it was found that there was an increase in the reading, writing, and numeracy skills of the second-grade students of State Elementary School of 1 Mejobo in the pre-test and post-test scores. It can be seen in Table 4.6. The N-gain test results on reading, writing, and numeracy skills showed an increase of 0.61, with moderate criteria. Thus, it can be concluded that there was an increase in students' reading, writing, and numeracy skills before and after implementing the CIRC learning model assisted by smartboard media. The increase in results could be seen from the pre-test results of 55.176 before the implementation of the CIRC learning model assisted by smartboard media and the post-test result of 81.411 after the implementation of the CIRC learning model assisted by smartboard media.

Based on the description of the research results obtained, several suggestions can be used as consideration. For educators, it is recommended to use various learning models and media, one of which is the Cooperative Integrated, Reading and Composition (CIRC) learning model, which educators can utilize during the learning process. Meanwhile, for future researchers, it is hoped that they will be more innovative and adapted to the times in choosing the learning model and learning media to be used.

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