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RADEC AND READING COMPREHENSION: A QUASI-EXPERIMENTAL STUDY IN ELEMENTARY SCHOOL EDUCATION

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Abstract

This study seeks to explore the impact of the RADEC education model on the reading comprehension abilities of fourth-grade students. This study adopts a quasi-experimental design involving pre-test and post-test measurements on unequal control groups. The research population consists of all fourth-grade students at SDN Sokowoten Baru and the sample was selected purposive sampling with a total of 50 students, 25 participants from the experimental and control groups. The data collection process involved the use of tests and data analysis using descriptive statistics and assumption tests. The normality test results showed that all groups had a significance value ≥ 0.05, indicating that the data distribution was normal. Furthermore, Levene's test for homogeneity showed a significance value of 0.876 > 0.05, meaning that the data was homogeneous. Analysis of the post-test results showed a Sig. of 0.000, so H_a is accepted. This indicates that the increase in post-test results in the RADEC group is significantly higher than in the Direct Instruction. Thus, the RADEC learning model contributes positively to students' reading comprehension skills. Theoretically, these findings support the constructivist learning approach and the development of reading strategies based on higher-order thinking skills. Practically, the RADEC model helps teachers create more interactive, structured, and meaningful reading learning experiences at the primary school level.

Keywords: RADEC, Model Learning, Reading Comprehension.

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INTRODUCTION

Enhancing the quality of education in Indonesia is crucial, especially considering the numerous challenges the nation faces in adapting to the Industrial Revolution 4.0. (Mandalika, Srihastuti, and Syahrizal 2024). The ability to read is a fundamental skill acquired during primary education that significantly influences students' academic performance over time (Dolean and Prodan 2023). The primary purpose of learning to read is to grasp the meaning of a text, yet this process tends to be gradual and demanding, as reading comprehension involves multiple dimensions and is shaped by various influencing elements (Catts 2018). Over the past few decades, reading habits have undergone a remarkable shift; people now engage with not only printed materials but also digital texts presented on devices like digital devices such as laptops and touchscreen pads (Liao et al. 2024). Furthermore, there has been a growing trend in Utilization of tech-based resources by early-age children and within educational settings (Furenes, Kucirkova, and Bus 2021; Rideout 2021). As a result of this shift, researchers have increasingly focused on examining the effectiveness of reading comprehension in digital-based innovation environments (Van Der Weel and Mangen 2022; Salmerón et al. 2024; Peras et al. 2023; Delgado et al. 2018; Coiro 2021; Clinton 2019).

Reading is an essential lifelong skill that supports students' learning both inside and outside the classroom, extending throughout their lives. In addition, strong reading abilities can lead to academic success and open doors to career opportunities (Habók, Oo, and Magyar 2024). Although reading is vital, many students find it challenging to apply effective strategies that enable them to fully comprehend a text. Therefore, reading strategies equip students with necessary comprehension skills and play a key role in their language learning journey (Banditvilai 2020; Habók and Oo 2021; Oo and Habók 2022; Oo, Magyar, and Habók 2021). Understanding written texts is a complicated skill that presents difficulties for numerous students during the final stages of elementary schooling (Stevens et al. 2024). Comprehending a text involves activating extra areas of the brain responsible for advanced cognitive abilities, including holding information and ensuring coherence of meaning (Aboud et al. 2016). Effective grasping the meaning involves the ongoing revision regarding internal representations as concurrently linking information gained from the text (meaning cognitive working memory). Students displaying lack of attention, excessive activity/impulsiveness, or a combination of these symptoms can occur; however, it is primarily the lack of attention that has been clearly linked to lower reading achievement, whereas excessive activity or impulsiveness alone has not been connected to poorer reading outcomes (Pham 2016). As reading comprehension receives more emphasis in upper elementary grades, students who struggle with inattention may face challenges in Gaining understanding. Additionally, research indicates that while these students often possess comparable word decoding skills compared to their peers who develop typically classmates, They generally perform more poorly in fluency or comprehension assessments (Lohvansuu et

al. 2021). Consequently, certain students experiencing inattention might not get extra assistance until comprehension difficulties become evident in the upper grades.

Over the past ten years, Share within fourth-grade students achieving proficient reading levels in certain countries has stayed persistently low and has declined further following COVID-19 pandemic consequences (Bailey et al. 2021). Therefore, providing effective reading instruction aimed at enhancing comprehension in experimental classroom settings is crucial for fostering students' reading development. Specifically, assistance with informational texts is vital due to the growing emphasis on content-specific materials in later years of primary school and early secondary school grades. Impact reading instruction involves these strategies to aid comprehension prior to, throughout, and following reading: (a) activating prior awareness, (b) expanding vocabulary, (c) engaging in questioning and responding, and (d) summarizing main ideas (Vaughn et al. 2022). Enhancing lexicon possessed by students skills enables them to gain a clearer understanding of the texts they read (Filderman et al. 2022). In contrast, as students improve their understanding of reading materials, they acquire more content knowledge and vocabulary that aid in comprehending different written materials (Vaughn et al. 2022).

Studies indicate that learners gain advantages by means of strategies used at the time of reading, including posing and responding to questions and summarizing main ideas, which aid in tracking meaning and combining essential information throughout the text (Vaughn et al. 2022; Stevens et al. 2024; Filderman et al. 2022). Regrettably, numerous educators fail to integrate effective reading comprehension strategies within content area teaching (Stevens, Park, and Vaughn 2019). For instance, while teachers often provide vocabulary lessons before students read content-specific texts, they seldom offer adequate chances for students to practice using the recently learned terms (Capin et al. 2021). During the process of activating prior insight and participating in content-focused dialogues, instructors infrequently offer students detailed feedback to validate or adjust their answers (Stevens et al. 2023). Instructors instruct students to find the core concept and create summaries of passages, yet seldom assist them by using strategies that help accomplish these tasks (Ng et al. 2022). Such effective teaching methods advantage every student, even those who struggle with inattention (Stewart et al. 2023).

The skill of reading comprehension is a core competency that elementary students, particularly those in the fourth grade, need to achieve (Pania et al. 2021). This skill contributes not only to academic success but also serves as the basis for cultivating critical thinking, analytical abilities, and problem-solving skills. Nevertheless, multiple studies and surveys indicate that Indonesian students' reading comprehension remains at an unsatisfactory level (Sumira, Deasyanti, and Herawati 2018). An important reason for this low proficiency is the insufficient application of effective and innovative teaching models within schools (Aulia et al. 2024). This study's theoretical foundation combines theories of reading comprehension with constructivist learning principles. Reading comprehension is considered a multifaceted cognitive

activity that entails the interaction between the text and the reader's existing knowledge (Anderson et al. 1985; Duffy and Jonassen 2009). This study also utilizes the interactive reading model, which involves the simultaneous application of low-level to high-level processing decoding and from overall understanding to details comprehension plans of action (Rumelhart 1977). Moreover, the RADEC instructional model is rooted in Vygotsky's constructivist theory, highlighting active student participation, critical thinking, and meaningful learning through discussion and creation. This framework supports the notion that well-organized learning phases facilitate deeper and more reflective comprehension of reading materials by students.

The RADEC learning model has developed as an option aimed at enhancing both the quality of education and student involvement during the learning process. Every phase aims to promote critical thinking, teamwork, and the practical application of acquired knowledge among students. Deploying the RADEC learning model is able to greatly boost learners engagement in reading comprehension. Through the different phases of this model, learners get increasingly participative or involved within the educational process (Hasibuan, Pebriana, and Fauziddin 2024; Kurniawati et al. 2024; Amaliyah and Wati 2024). However, research on the application of the RADEC model still faces limitations, particularly concerning reading comprehension instruction in fourth-grade elementary classrooms. Most available studies tend to concentrate on other subjects or different educational levels. Existing research on reading comprehension predominantly targets secondary and higher education and often explores subjects like science, social studies, or general literacy. While these studies offer valuable perspectives on teaching methods and reading processes, they come with several drawbacks. A major shortfall is the scarcity of research focusing explicitly on the RADEC model's use in elementary reading comprehension, especially within primary school language education. Additionally, some investigations implement the RADEC model only in short-term classroom settings, which restricts the extent to which their findings can be generalized.

Regarding its benefits, earlier studies indicate that the RADEC model successfully enhances student participation, critical thinking, and a deeper level of understanding through its organized phases. These results imply that the model could be adapted across different subjects and education levels. Nevertheless, a significant limitation is that numerous studies fail to evaluate long-term comprehension effects, and some do not concentrate on reading-specific abilities, complicating the assessment of the RADEC model's real influence on reading comprehension. Moreover, differences in how the model is implemented across studies may produce varied outcomes. These shortcomings highlight the necessity for additional focused research on the RADEC model, especially within the scope of elementary school reading comprehension, to derive more precise and evidence-supported findings. Consequently, this research seeks to address this gap by thoroughly examining the consequences of RADEC approach on reading comprehension capabilities students in fourth grade at SDN Sokowoten Baru.

This study is driven by the urgent necessity to enhance the quality of reading instruction in primary schools. By examining the effectiveness of the RADEC model within this setting, it aims to play an important role to the creation better and pertinent learning approaches and to support the advancement of students' literacy skills from an early stage. The primary goal of this research is to examine the effectiveness of the RADEC on the reading comprehension abilities of students in fourth grade. The results are anticipated to serve as a valuable resource for mentors and Authorities in developing or implementing instructional models that can elevate the standard of student literacy in Indonesia.

METHODS

This investigation follows a quasi-experimental framework. The design chosen for this research was the non-equivalent control group with pre-test and post-test measures. Quasi-experimental is research that compares an entire group of students who are given directions with a group that does not get directions or research that tests two or more groups given different treatments (Taguchi 2018). Quasi experimental aims to show the relationship between treatment and outcomes, while the A control group design without random assignment type has two categories, one group gets treatment while the other group does not get treatment (Krishnan 2019). This experimental research was conducted in class IV at SDN Sokowoten Baru, Bantul, Prov. D.I. Yogyakarta, precisely the second semester of the 2024/2025 academic year. The research process took place in three stages. The first stage was to conduct a pretest to get initial data reading comprehension on 06 January 2025. The second stage of this research activity is to conduct treatment. this research took place for 1 month for 6 meetings. The third stage was to conduct a posttest to get the final data on reading comprehension on 31 January 2025. Treatment was applied to the experimental class using Instruction in the experimental class followed the RADEC model, while the control class was taught through direct instruction. The reason for using the teacher-centered instruction model in the control class is because teachers at that grade level usually use the model in reading comprehension learning. so it can be said that the direct instruction learning model is a conventional model at that grade level.

RADEC instructional approach model Includes five syntaxes, namely Read, Answer, Discuss, Explain, and Create. During the Read phase, the teacher offers pre-learning questions and directs students to read the material before the activity begins. Furthermore, at the Answer step, students reply to the questions given prior to the lesson independently depending on the reading results. The discussion phase is done by dividing students into groups to discuss the material and answers. Students who already understand the material help their friends, and the teacher identifies groups that need further assistance. At the Explain segment, learners present the results of the discussion, while the teacher functions as a facilitator, encourages active participation, and provides additional explanations with the help of learning media. Finally, the

Create stage encourages students to create creative ideas or products, such as conclusions, solutions, or new questions based on the material learnt.

The Direct Instruction learning model consists of five syntaxes. The first stage is planning and orientation, where the teacher develops a lesson plan, prepares learning equipment, and checks students' attendance. The second stage is presentation, where the teacher presents information and demonstrates skills or materials through relevant reading materials. Next, at the structured practice stage, the teacher guides students in doing exercises to strengthen understanding. The fourth stage is guided practice, where the teacher checks students' understanding, provides feedback, reinforces correct answers, and corrects mistakes. The teacher also monitors and provides guidance if needed. The last stage is independent practice, which gives students the opportunity to work on tasks independently if they have mastered the material with a minimum success rate of 85-90% in the previous stage.

The research population consisted of all students in the fourth grade at SDN Sokowoten Baru. Purposive sampling was employed, which involves selecting samples deliberately based on specific criteria aligned with the research goals. The sample comprised two classes, each containing 25 students, totaling 50 participants. These two classes were chosen because both had been taught reading comprehension material, showed balanced academic abilities, and were at the same grade level, making them suitable representatives to explore the research questions. The sample included each group, experimental and control, included 25 students. The independent variable in this study is the RADEC learning model, while the dependent variable is reading comprehension.

This study employed tests as the data collection method. The descriptive test indicators used to assess reading ability included answering questions about the reading content, identifying the main idea, drawing conclusions, and summarizing the reading material. Validity testing was conducted through both content and construct validity. The descriptive test had previously been validated by two experts in reading comprehension for content validity. Pearson correlation analysis was used for validity testing with IBM SPSS 25 for Windows. Statistical validation of the instrument was performed using the Pearson correlation test. The validity test involved a sample of 30 students from SDN Ambarukmo, meeting representative criteria to facilitate the research. According to the validity decision criteria, the r table value was derived using the formula df = n-2, where df = 30-2 equals 28, resulting in an r table value of 0.361 for this investigation. Drawing from the outcomes of validity testing on the Pretest Reading Comprehension instrument above, all r values are above 0.361 and the Sig. value is below 0.05. So one may conclude that the pretest reading comprehension instrument is valid.

Based on the results of validity testing on the post test Reading Comprehension instrument above, all r values are above 0.361 and the Sig. value is below 0.05. So one may conclude that the post test reading comprehension instrument is valid. After all items are valid,

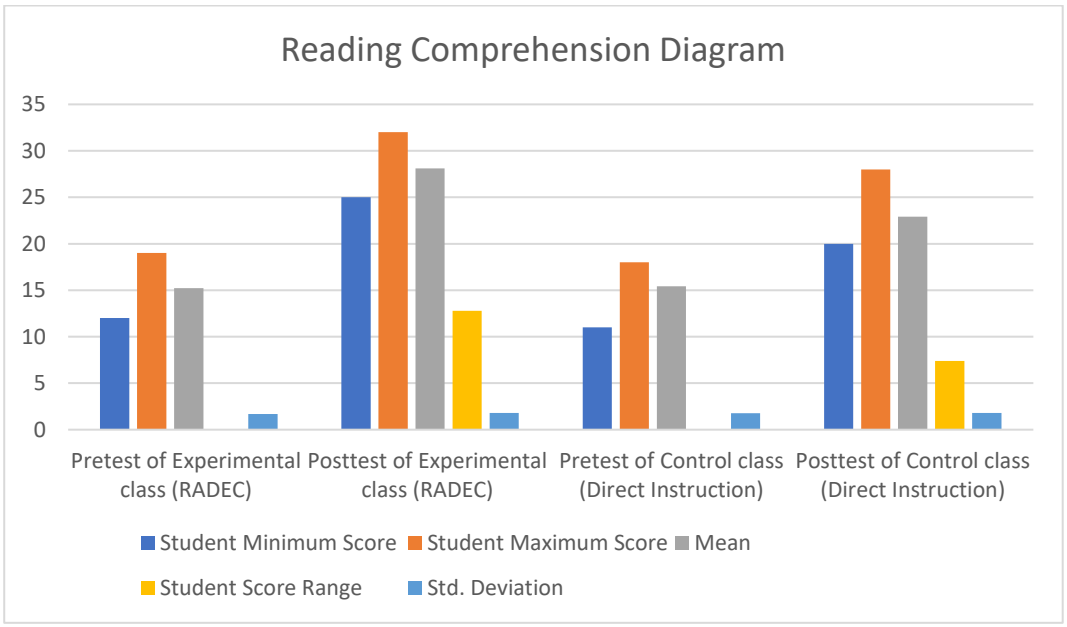
then proceed to the reliability stage. The Cronbach Alpha (α) value for a variable or construct is over 0.07, it indicates reliability. In light of the result from reliability testing, it is acknowledged that the pretest reading comprehension instrument has a value of Cronbach's Alpha equal to 0.802 and the Post test Reading Comprehension instrument has a value of Cronbach's Alpha equal to 0.911. So it can be concluded that both instruments used in this study meet the reliability requirements.

Descriptive statistical techniques were applied to analyse the data and tests for prerequisite assumptions. Descriptive statistics served to summarize the data, specifically the pre-assessment and post-assessment reading comprehension marks received from both intervention and non-intervention groups employing the RADEC and direct instruction methods. For the prerequisite assumption tests, normality, homogeneity, and hypothesis tests were performed. Data are regarded as normally distributed when the significance level derived asymptotically from the Kolmogorov-Smirnov test exceeds the alpha level set at 0.05. Conversely, if the Asymptotic Sig amount is below 0.05, It is concluded that the data does not follow a normal distribution. Homogeneity is confirmed if the Sig value in the Levene's Test output is above the 0.05 alpha threshold. Hypothesis testing was conducted using Independent Samples T-Test. This analysis examines to determine if there is a statistically significant difference between the average scores of two groups or samples. T-Test helps researchers determine whether the observed difference is due to random variation or due to the presence of a specific influence.

RESULTS AND DISCUSSION

The data of this investigation includes a pretest component and posttest reading comprehension data. Referring to the descriptive analysis with the outcomes achieved, it may be concluded that in the treatment group that applied the RADEC model, the pretest scores were in the range of 12 to 19, having an average of 15.24 and with a spread (in scores) of 1.690. After the application of this model, the posttest results showed a significant increase, with scores ranging from 25 to 32, an overall average of 28.12, and showing a standard deviation value of 1.787. The range of student scores was 12.8. The control class which served as the control class had pretest results in the score range of 11 to 18, a score averaging 15.44 and with a spread (in scores) of 1.781. After the learning was intervened by the conventional model (direct instruction), the posttest scores increased but not as much as the two experimental groups. The posttest score range was between 20 to 28, an overall average of 22.92 and with a spread (in scores) of 1.801. For students, the score range was 7.4. From these results, it can be seen that the group receiving the intervention that applied the RADEC model experienced a higher score increase more than what was observed in the control class. This can be seen through the range of student scores, namely the group receiving the treatment has a score extent of 12.8 and the

control group shows a point range of 7.4. In addition to the table, the reading comprehension data can be presented in graph 1 as follows.



Graph 1. Diagram of Reading Comprehension Data

The indicators used to describe reading ability are Answering questions about the content of the reading, Determining the main idea, Making conclusions, and Retelling the content of the reading. In the intervention class using the RADEC instructional approach, it Is observable that the pretest score has a lower minimum score than the posttest score, while the maximum score has increased significantly after the application of the RADEC model. The mean showed a considerable increase, reflecting the improvement in students' reading comprehension after learning with this model. The standard deviation remained low, indicating that the distribution of students' scores was quite consistent. For the range of students' scores, the performance of the experimental class was greater than that of the control class.

Meanwhile, the control class also experienced an enhancement in scores following the pretest and posttest. However, the growth was not as large as the two experimental classes that used a particular learning model. The maximum and mean scores increased, but on a smaller scale than the RADEC class. The standard deviation in this group also remained low, indicating that the score differences between students were relatively stable. For the range of student scores, the group without intervention was under the performance of the experimental class.

To check normality, the Kolmogorov-Smirnov test was carried out method. A dataset is considered the distribution is normal if the p-value (Sig) is equal to or beyond 0.05. Conversely, when the significance level is under 0.05, the data is considered does not follow a normal distribution. Presented here are the results of the normality analysis testing that has been

done. The outcomes of the normality assessment indicated that each group had a significance value equal to or beyond 0.05. Therefore, it is evident that the reading comprehension statistics in all groups are normally distributed. Following the confirmation of data normality, a homogeneity test was subsequently conducted.

In accordance with the homogeneity test, it is evident that the significance amount in testing the group's Levine's statistic is more than 0.05. It can be concluded that the variants owned by the samples are homogeneous, so that hypothesis testing can be continued. Tests conducted in this study to prove the hypothesis assessed by means of a Paired Sample T-test regarding the effect of RADEC learning model on reading comprehension. In accordance with the summary of the t-test results, the value of significance score of the pretest reading comprehension of the experimental (RADEC) and control classes is 0.686 > 0.05, then H_a is rejected. It was concluded that the students' reading comprehension pretest data showed no difference among those in the experimental (RADEC) and non-experimental classes. Thus, in relation to reading comprehension in equivalent conditions to be compared using different actions.

Data analysis of reading comprehension post test in the intervention group (RADEC) and control group performance found Sig. (2-tailed) value shows 0.000 (Sig. <0.05), then H_0 is declined while H_a is supported. Thus, the conclusion can be drawn that students' reading comprehension post test data indicated a distinction between the experimental (RADEC) and non-experimental classes that used RADEC learning model and direct instruction model. The post test improvement of RADEC learning model in intervention class (RADEC) is more effective than direct instruction model. So it is known that the first hypothesis which states "RADEC learning model has an effect on reading comprehension of grade IV elementary school students" is accepted.

With the stages of reading in the RADEC model, it can improve students' reading comprehension literacy so that students' abilities can increase (Salam et al. 2023). When in the educational activities being conducted using the RADEC model, cognitive development will be formed where a person will learn gradually through starting with Read (R) and ending with Create (C) to gain awareness (Yulianti, Lestari, and Rahmawati 2022). Reading activities enable students to independently develop insight and comprehension, enabling them throughout the learning process, they come prepared with a foundation of understanding to further explore. Additionally, these activities foster habits in students to act in accordance with examples presented in the reading material, which helps nurture environmental conservation behaviour (Zubaidah 2016).

The discussion phase helps to cultivate and enhance students' abilities in both knowledge acquisition and critical thinking skills (Satria and Sopandi 2019). In the field, students share their answers with their peers and in small groups. The discussion significantly enhanced

students' comprehension of the text, as those with a better understanding were able to assist their peers by explaining the content more clearly. The researchers saw that this discussion also gave rise to new perspectives, some students found additional meanings that they had not previously realized when reading on their own. This is one of the strengths of RADEC, namely increasing understanding through social interaction.

CONCLUSION

This study examines the effect of RADEC learning model on reading comprehension of 4th grade students. The findings indicated that implementing of RADEC model significantly positively influenced learners reading comprehension ability. Through the stages of reading (Read) and answering (Answer), students are more focused in understanding the text. Discuss encourages active interaction that deepens understanding, while Explain trains students to convey ideas coherently. The creation stage stimulates creativity and analytical thinking abilities.

The positive impact of implementing the RADEC model is observable from The improvement in students' reading interest or text analysis skills. In addition, this model is effective in training communication and collaboration skills. Therefore, RADEC is recommended as an alternative reading comprehension learning strategy at primary school level to create a more interactive and meaningful learning process.

The data obtained from this research provide theoretical implications by strengthening the theory of constructivism, that active and meaningful learning can improve students' comprehension. The RADEC model also contributes to the development of reading strategies by integrating higher order thinking activities, such as analyzing, discussing and creating, in the process of understanding texts. Practically, RADEC provides a systematic learning framework that is easy for teachers to implement. The model encourages students' active involvement through RADEC, making the learning process more interactive and meaningful. In addition, RADEC can be flexibly applied to various levels and other subjects.

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