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THE INFLUENCE OF READ, ANSWER, DISCUSS, EXPLAIN, AND CREATE (RADEC) LEARNING ON COGNITIVE ABILITIES AND COMMUNICATION SKILLS

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Abstract

This research was motivated by the low cognitive abilities and communication skills of students. This research aims to determine the effect of RADEC learning on students' cognitive abilities and communication skills. The approach taken in this research was quantitative with a quasi-experimental method and a non-equivalent control group design. The population in this study was 34 State Elementary Schools in North Sumedang District. Sampling used a purposive sampling technique, so that the research sample was selected, namely SDN Tegalkalong. The instruments in this research consisted of test and non-test instruments. Test questions are used to measure students' cognitive abilities which have been tested for validity and reliability. The non-test instrument is an observation sheet to observe students' communication skills during RADEC learning. The research results show that RADEC learning has a positive influence on students' cognitive abilities and communication skills. It is proven from the test results that the average difference in questions measuring cognitive abilities and the posttest results are higher than the pretest results. After implementing RADEC learning, students' communication skills become more active, especially when expressing opinions and using language that is easy to understand. Therefore, RADEC learning can be used to improve students' cognitive abilities and communication skills.

Keywords: RADEC Learning, Cognitive Abilities, Communication Skills, Students Elementary School

Abstrak

Penelitian ini dilatar belakangi karena rendahnya kemampuan kognitif dan keterampilan komunikasi siswa. Penelitian ini bertujuan untuk mengetahui pengaruh pembelajaran RADEC terhadap kemampuan kognitif dan keterampilan komunikasi siswa. Pendekatan yang dilakukan pada penelitian ini adalah kuantitatif dengan metode kuasi eksperimen dan desain *non equivalent control group.* Populasi pada penelitian ini yaitu 34 Sekolah Dasar Negeri di Kecamatan Sumedang Utara. Pengambilan sampel menggunakan teknik *purposive sampling,* sehingga terpilihlah sampel penelitian yaitu SDN Tegalkalong. Instrumen pada penelitian ini terdiri dari instrumen tes dan nontes. Soal tes digunakan untuk mengukur kemampuan kognitif siswa yang telah diuji validitas dan reliabilitas. Instrumen non tes berupa lembar observasi untuk mengamati keterampilan komunikasi siswa selama pembelajaran RADEC dilaksanakan. Hasil penelitian menunjukkan pembelajaran RADEC memberikan pengaruh positif terhadap kemampuan kognitif dan keterampilan komunikasi siswa. Terbukti dari hasil uji beda rata-rata pada soal yang mengukur kemampuan kognitif dan hasil *posttest* lebih tinggi dari hasil *pretest.* Setelah menerapkan pembelajaran RADEC, keterampilan komunikasi siswa menjadi lebih aktif terutama saat menyampaikan pendapat dan menggunakan bahasa yang mudah dipahami. Oleh karena itu pembelajaran RADEC dapat digunakan untuk meningkatkan kemampuan kognitif dan keterampilan komunikasi siswa.

Kata Kunci: *Pembelajaran RADEC, Kemampuan Kognitif, Keterampilan Komunikasi, Siswa Sekolah Dasar*

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INTRODUCTION

Education is one aspect that directly impacts the development of this era. Education is an effort to develop individuals to achieve the goals that have been determined in learning. Education is also a process of developing people who need education itself which is carried out by adults to guide people who need it. Education cannot be separated from "educators" and those who are "educated". Education is also carried out consciously by both parties mentioned previously to provide development for the party being "educated". In the Republic of Indonesia Constitution no. 20 of 2003 concerning the definition of education as a conscious, planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self, personality, intelligence, noble morals and skills needed by themselves, society, nation and state. (Malikah & Wafroturrohmah, 2022). From the definition of education in UUD no. 20 can be interpreted that education is a process of developing individual potential in various aspects which is carried out consciously and the benefits will be felt by many parties.

Government Regulation Number 19 of 2005 concerning National Education Standards article 6 paragraph (1) states that Natural Sciences (IPA) subjects at the basic education level are intended to recognize, respond to, and appreciate science and technology, as well as instill scientific habits of thinking and behavior. who is critical, creative and independent (Mertania, 2023). In natural science in elementary school, there are various kinds of material, one of which is living ecosystems which discusses the inseparable reciprocal relationships between living things and other living things. In this living ecosystem there is material regarding the food chain that occurs. In learning science, students can understand living things, life processes and the surrounding environment. Science is a process that involves the discovery, development and testing of scientific information obtained. Apart from that, science is also defined as an attitude that includes the process of discovery, observation, measurement, and application of scientific principles, which involves thought processes and attitudes that originate from scientific thinking (Muslimin, 2021). Science learning in elementary schools must continue to follow current developments because effective education is education that continues to be developed according to the times. This aims to ensure that students can gain knowledge and skills that are relevant to today's demands, preparing them to face the challenges of this modern era (Jannah & Atmojo, 2022).

Educators must focus on cognitive abilities in learning activities because these abilities are complex processing mechanisms in humans that enable them to acquire, retain, process, and transmit information. Cognition is also developed slowly from the beginning of birth until the child's age and in accordance with environmental conditions. Cognitive identifies 4 keys to learning, namely attention, active learning, reciprocity and consolidation. With this, it can be said that increasing cognitive abilities should be more of a concern for educators to develop children's cognitive development abilities in elementary schools. The process of cognitive

development enables children to remember, imagine solutions to problems, develop creative strategies, and connect sentences into meaningful conversations (Yunaini & Winingsih, 2022). Cognitive development is a process in which individuals can improve their ability to use their knowledge. In the context of children's cognitive development, it is important to stimulate and provide appropriate stimulation so that their development can increase (Khaironi, 2020).

The communication skills of students must also be a concern for teachers. Communication itself is the key to learning, which should occur in two-way conversations, but most students appear passive during learning activities. Communication skills are among the skills that students in the 21st century must have, which include the ability to think critically, be innovative, collaborate, communicate, and have a deep understanding of global issues. The teaching and learning process largely occurs due to the communication process, both intrapersonal and interpersonal (Pratiwi et al., 2022). The role of teachers in improving students' communication skills is very important, teachers can use various learning methods or models which include discussion activities between students.

According to Joyce and Weil (Octavia, 2020) a learning model is a description of the learning situation which also includes the teacher's behavior in applying it to learning. From this statement it can be said that the learning model is a plan for the learning that will be implemented in which the role of the teacher has been determined, especially to ignite students' abilities in learning activities. Broadly speaking, according to Joyce and Weil (Hendracipta, 2021) a learning model is an explanation of the learning environment which explains the curriculum plan, learning design, learning equipment, as well as programs or teaching materials either from books or assistance from computers. There are various kinds of learning models that can improve students' cognitive abilities and communication skills, one of which is RADEC. This learning model was first coined by Wahyu Sopandi, M.A., in 2017. According to Suryana (Ummaya et al., 2024), the RADEC learning model is able to improve students' cognitive abilities because students must master the material in the RADEC model learning stage. The RADEC learning model has a syntax that is easy to remember and effective when applied in learning activities, including in elementary schools. RADEC learning is effective for enhancing students' cognitive abilities and communication skills. At the outset, students are encouraged to acquaint themselves with one another through reading pre-learning materials. This process leads to discussions where they generate creative ideas based on their knowledge. Additionally, the RADEC model enhances communication skills through the explanation stage, where students present the outcomes of group discussions to the entire class, receiving feedback from both classmates and the teacher. According to Sopandi (Pratama et al., 2019) the name of this learning model is adjusted to its syntax which will be easy for teachers in primary and secondary schools to remember. Pratama (Tulljanah & Amini, 2021), the RADEC learning model is a model developed by adapting the characteristics of students and the nation in Indonesia. The RADEC model is a model that emphasizes student centered (student centered) which is a learning model that is student centered learning (student centered) by carrying out a series of activities to understand concepts, work together, solve problems, and produce ideas or work. (Ramdoni et al., 2022). This model is presented as a solution to support the learning process, providing opportunities for students to develop skills independently and collaborate with their friends in exchanging information and solving problems. Sopandi (Y. Yulianti et al., 2022) stated that the RADEC learning model has a number of characteristics that not only help in understanding concepts, but also develop 21st century skills, including students' critical

thinking abilities. The advantages of the RADEC learning model are (Kusumaningpuri & Fauziati, 2021):

1. Teachers have the ability to design learning models so that the learning process becomes interesting.
2. Can improve students' critical thinking performance.
3. Improve students' ability to analyze and read to understand.
4. Improve collaboration skills with groups.
5. The RADEC model is also easy for an educator to understand because of its syntax.

According to Handayani (Yulisdiva et al., 2023) One weakness of RADEC learning is its dependency on meticulous planning by teachers. The success of this approach heavily relies on teachers' competencies in designing teaching and learning programs, assessing ongoing progress, and mastering the teaching materials thoroughly.

Based on the problems described, the aim of this research is to see the influence of reading, answer, discuss, explain, and create (RADEC) learning on cognitive abilities and communication skills.

METHOD

The method used in this research is quantitative. Quantitative is research that analyzes data in the form of numbers and explains the meaning of the data obtained. The approach used in this research is experimental. Quasi-experiment is the research design that will be implemented. More specifically, the research design used was a pretest and posttest type with non-equivalent control group design. The researcher will only give special treatment to one of the selected groups, while the second group will only be treated as usual using the direct instruction method. Before this special treatment, both groups were given pretest and posttest questions after implementing the learning activities. The non-test instrument is an observation that will observe students' communication skills while implementing RADEC learning. The data obtained will be analyzed quantitatively and presented qualitatively descriptively.

O_1	X	O_2
.....		
O_3		O_4

Figure 1. Non-equivalent control group research design

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RESULTS AND DISCUSSION

Results

1. **Cognitive Abilities**

Data on students' cognitive abilities before and after treatment was obtained from the pretest and posttest. Data on the pretest and posttest in the experimental class will first be tested for normality and homogeneity. To find out the effect of RADEC learning, the average difference will be tested. The recapitulation of the experimental class pretest and posttest results is as follows:

Table 1. Recapitulation of Pretest Scores and Cognitive Posttest Scores in Experimental Class

Score	N	Lowest	Highest	Average	Standard Deviation
Pretest	28	35	78	52,50	12,65
Posttest	28	55	98	77,32	11,22

From the table above, it is known that there was an increase in the pretest and posttest scores. The pretest is useful for measuring students' initial cognitive abilities, getting an average score of 52.50. Meanwhile, the posttest which measured students' cognitive abilities after being given treatment received an average score of 77.32. It can be seen that there is a point difference of 24.82. To see a significant effect, an average difference test will be carried out. The requirements for carrying out a mean difference test are normality and homogeneity tests. This test will be carried out using the SPSS 26 application. The normality test results can be seen in the table below:

Table 2. Test Normality of Pretest and Posttest Scores

	Shapiro-Wilk Statistic	N	Average	Sig.	Information
Pretest	0,947	28	52,50	0,162	Normal
Posttest	0,979	28	77,32	0,824	Normal

Because the research sample was less than 50, the Shapiro-Wilk statistical test was used. Based on the test results above, the normality of the pretest score data is 0.162, which means sig > 0.05 = 0.162 > 0.05, so the student pretest score data is declared to be normally distributed. The student posttest score data is 0.824, which means sig > 0.05 = 0.824 > 0.05, so the student posttest score data is declared to be normally distributed.

Table 3. Test Homogeneity of the Experimental Class

Homogeneity Test	Sig.	Information
Experimental Class	0,423	Homogeneous

From the homogeneity test in the table above, sig = 0.423. then 0.423 > 0.05 means that the pretest and posttest cognitive ability scores in the experimental class are declared to be homogeneous.

Table 4. Test Difference Between the Average Pretest and Posttest Scores

	N	Sig. (2 Tailed)	Information
Experimental Pretest Values	28	0,000	There are differences in cognitive abilities between students' pretest and posttest
Experimental Posttest Values	28		

Because the data is normally distributed and homogeneous, the mean difference test used is the T test, namely the paired sample test. Based on the results of the average difference test above, a sig of 0.000 is obtained, which means that RADEC learning has an effect in the form of an increase in cognitive abilities because 0.000 < 0.05.

2. **Communication Skills**

The data on the observation sheet was obtained when RADEC learning was in progress. The observer observes students' communication skills in the verbal category. This observation sheet only observes the verbal category which is divided into oral and written in communication skills.

Table 5. Percentage of Student Communication Skills

No	Category	Indicator	Percentage
1	Oral	Convey ideas/thoughts	76,19%
		The grammar used is easy to understand	79,76%
		The sound is loud and can be heard clearly	72,62%
2	Written	Ability to rewrite understanding or material	66,67%
		Neatness in writing	88,10%
Average			76,67%

As shown in the table above, after applying the RADEC model, students' communication skills were found to be in the good category. Meanwhile, students' communication skills are declared complete because they have exceeded the specified minimum class completion. Because the average percentage obtained is 76.67% while the minimum completeness is 67.86.

Discussion

1. **Cognitive Abilities**

In this research, the RADEC learning model is an independent variable which has an influence on the dependent variable, namely cognitive ability. Pretest and posttest questions are used to measure students' cognitive abilities both before being given treatment and after being given treatment. The questions created have been adapted to cognitive domains C1 – C5 according to Bloom's taxonomy. The questions used in this research were first tested on a similar sample and the test results of these questions were declared valid both in terms of material, grammar and appropriate for measuring cognitive abilities. The RADEC model learning was carried out for two days to see a significant effect.

After implementing RADEC learning, the average difference between the pretest and posttest scores indicated that RADEC learning had a positive impact on cognitive abilities. The pretest results showed an average score of 52.50, while the posttest results showed an average score of 77.32. Therefore, it can be concluded that in this study, RADEC learning positively influenced cognitive abilities, as evidenced by the improvement measured through pretest and posttest questions.

The results of this research are also in line with relevant previous research conducted by (Nurmitasari et al., 2023), where this research examined the effectiveness of the RADEC

learning model in improving student learning outcomes in science subjects. The research results revealed a noticeable difference between the posttest scores of the experimental and control classes. According to the N-gain test, the experimental class achieved a medium category score of 0.56, indicating significant improvement. In contrast, the control class scored 0.25 on the N-gain test, categorized as low, suggesting less improvement compared to the experimental group. In further research conducted by (Yulianti et al., 2023) whose research discussed the influence of the RADEC learning model on the science learning outcomes of fifth grade students. The findings of this research demonstrate that the implementation of the RADEC learning model significantly affects science learning outcomes. This conclusion is supported by the statistical analysis, specifically the t-test, which yielded a t-value of -12.064. This value is smaller than the critical t-value of 2.120 at a significance level (two-tailed) of $0.000 < 0.05$, indicating a highly significant impact of RADEC learning on improving science learning outcomes.

The development of cognitive abilities is an important factor in learning activities at school. Students with good cognitive abilities will understand the learning material, but students with low cognitive abilities will have difficulty understanding the learning material. Therefore, teachers are challenged to deal with differences in the characteristics of students' cognitive abilities so that learning is made more enjoyable and can be understood by all students (Turiyah, 2023). Therefore, teachers must use varied learning more often to improve students' cognitive abilities. Teachers can also use RADEC learning as in this research which has a positive influence in the form of increasing cognitive abilities.

Science is a mandatory subject at every level of education. The aim of science learning in elementary school is that science learning has educational value that can shape children's personalities so that students can develop knowledge and understanding of science concepts that can be utilized and applied in everyday life (Yeni et al., 2020). RADEC learning is in line with the aim of science, namely to understand initial concepts first before entering more complex science learning concepts. Meanwhile, in RADEC learning, students are required to first understand the learning material to be studied, then students are given pre-learning questions as a form of honing cognitive and thinking skills.

2. **Communication Skills**

Observation activities in observing students' communication skills are carried out during RADEC learning. To observe communication skills in the oral category, look at presentation activities and group discussion activities, while to observe student communication skills in the written category, look at evaluation questions, LKPD, and students' posttest answers. The average percentage of students' communication skills after implementing RADEC learning is in the good category and is declared complete from the determined KKM value. The average percentage obtained is in the table below:

Table 6. Recapitulation of the Average Percentage of Student Communication Skills

Number of Students	Average Percentage	Class Classical Completeness
28	76,67	67,86

From the table above, it is known that the average percentage of communication skills in the experimental class is 76.67. This average percentage was obtained from five indicators that

were calculated and have been adjusted to the oral and written categories. So it can be said that the average percentage of communication skills in the experimental class according to the assessment category is in the good category and is declared complete because the average percentage of communication skills is 76.67, exceeding the classical completeness of students' communication skills in the experimental class, namely 67.86.

The results of this research are in line with previous research conducted by (Suryadi et al., 2024) which discussed the analysis of communication skills of class V students in inquiry and Radec learning. The results of this research were that the class that applied learning received an average percentage of 80.34 which was in the good category. According to Milawati (Fitriah et al., 2020) through communication skills, students can provide responses, express ideas and opinions and also dare to ask questions when students experience difficulties in the lesson material. From this statement it can be said that if students do not have good communication skills then learning activities will not run optimally.

CONCLUSION

1. RADEC learning has a positive impact due to an increase in cognitive abilities as measured using pretest and posttest questions. This can be proven that students are faster in understanding the initial concepts of science learning, students are faster in analyzing problems in the form of questions and finding solutions to the problems found.

2. After implementing RADEC learning, it was found that students' communication skills were in the good category. This indicates that students who use RADEC learning are more active and enthusiastic in presentations and when expressing their opinions. They also use clear and understandable grammar and can effectively articulate their understanding in writing. The students' communication skills were declared complete because 19 of the 28 students had exceeded the specified KKM score.

From the conclusion above, it is known that RADEC learning has an influence on students' cognitive abilities and communication skills in learning science on eating and eating.

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