The RADEC Learning Model in Primary Schools: A Systematic Literature Review

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Abstract. The rapid development of science and technology has consequences on the challenges that students will face. Students need to develop 21st-century skills that include thinking critically, creatively, communicatively, and collaboratively. These skills can be obtained through the learning process, but the fact is that in the field, there are still many teachers who adopt conventional learning models and tend to be teacher-centered. This kind of learning has a negative impact on students' creativity, activeness, and critical thinking. This can be overcome by using the RADEC learning model. This study aims to determine the learning process that uses the RADEC model to increase student participation and student activeness in learning to grow 21st-century skills. This study uses the systematic literature review method with the PRISMA 2020 model. The 2020 prism model was used to assess the systematic review. The data collection process uses Google Scholar from 2019 to 2023. The data search was carried out with the keyword Use of the RADEC Model in Elementary Schools. The study results show that 21st-century skills are crucial things that students must possess to face the progress of modernization today. From the use of the RADEC model, the 21st century skills have improved, among others, critical thinking, creativity, communication, and cooperation. In addition, the main challenge of learning the RADEC model is if there are students who need to improve at reading because the initial syntax of this model is reading. Students must be good at reading as an initial capital in seeking information. Another challenge is that teachers must be able to analyze well related to the goals and factors that affect learning success. It is hoped that this research can provide new knowledge for educators and be a reference in using the RADEC learning model in schools.

Keywords: RADEC Learning Model; Primary School; Systematic Literature Review.

1. Introduction

To face the 21st century, students need skills known as the 4Cs: critical thinking, collaboration, creativity, and communication. Changing teaching strategies is an essential step in improving student learning in the current 21st-century (Widodo & Wardani, 2020). Strategies in an educational context lead to specific things in learning (Anggraeni, 2019). These particular things are in the form of learning models, one of which can be through the RADEC learning model. The concept of this learning model is the result of the creativity of the nation's children to adjust the character of students in Indonesia today, and this can be seen from the effectiveness of the implementation and the results of the learning model. The RADEC learning model focuses on student activities based on 21st-century skills (Angga et al., 2022).

In line with Ismail et al., (2022) the RADEC model is a student-oriented learning approach, involving them in activities that aim to understand concepts, collaborate, solve problems, and create ideas or works. The implementation of the RADEC model in learning consists of five steps, as the name implies, namely RADEC: (1) Read, (2) Answer, (3) Discuss, (4) Explain, (5) Create.

The RADEC model has several advantages, namely: it can increase students' interest in reading, reading comprehension, students' communication skills both verbally and in writing, train the ability to work in groups and learner-centered learning (Sopandi & et al, 2021). In line with this (Fauziah & Sukmawati, 2023) said that the advantages of the RADEC model are as follows: (1) the model design is effortless to implement, so that it has implications for interesting learning, (2) the steps of the RADEC model are elementary for teachers to understand, (3) it can improve critical thinking skills, (4) it can improve students' analytical and reading skills, (5) and increase cooperation activities between students.

This article uses the Systematic Literature Review (SLR) related to the RADEC model in terms of the process, results, and challenges faced in learning. Based on the analysis of the articles carried out in depth, it describes how the application of the RADEC model and the 21st century skills resulting from the application of the model.

1.1. Problem Statement

Education has a crucial role as an important foundation for the progress of a nation. Nowadays, technological and scientific advances have a great influence on various areas of life (Hakim et al., 2020; Ma'rufah & Rahmat, 2020; Pratiwi et al., 2019). This has implications for the Indonesian nation, where the Indonesian people must be able to adapt to the development of the current times. With a good education system, a nation can achieve a high level of progress and civilization. This statement is in line with the concept that education plays a key role in the progress of a society, because through the learning process, humans can be developed as valuable resources for the development of the nation (Muna, 2017). However, the fact is that education in Indonesia is still far from quality education. Quality education is education that is able to produce human resources that are adapted to the current development of the 21st century and are able to adapt to 21st century skills (Elitasari, 2022). In the learning process, quality education is able to improve critical thinking, creativity, and problem-solving skills, and train students' emotional skills. This is still very far to be achieved because there are still many problems and inequalities in education in Indonesia, especially in the learning process. It can be seen from the findings of a study conducted by (Saido et al., 2015) that most educators are still more inclined to teach students with memorization methods. Meanwhile, innovative learning approaches such as project-based, problem-based, collaborative, and inquiry-based learning are still not adequately implemented. This is in line with the results of the PISA (Programme for International Student Assessment) study. PISA is a research study that tests students' higher-level thinking abilities such as skills in the 21st century, namely creative and critical thinking (Lestari & Ilhami, 2022). Indonesia is ranked 74th out of 81 countries in 2022 for literacy in reading, mathematics, and science (OECD, 2023). This reality is concrete evidence that education in Indonesia still needs to be improved. If not addressed, the nation's next generation will most likely not have the ability to become individuals who can adapt in today's evolving era and become competent global citizens.

The above shows the reality in the field that many teachers still use the lecture method to implement learning. The lack of two-way interaction between educators and students is seen in the dominance of teacher explanations, with some simple questions that do not encourage students to think critically (Anggraeni et al., 2018). The impact is the low critical thinking ability in students. Not only that, but the skills that students must have include collaboration, communication, metacognition thinking, digital literacy, and creativity.

In addition, the non-optimal ability is influenced by the learning goal factor that only focuses on one ability, namely the cognitive aspect or comprehension. This is in line with what was conveyed (Siswono, 2016) imbalances in the learning process often arise because they generally only prioritize understanding concepts. Learning should allow students to dare to speak, express opinions, and explain their ideas. The RADEC learning model is an example of a learning model that requires human resources to have high skills such as problem-solving, critical thinking, communication, creativity, and collaboration, as well as obtaining a solid understanding of the learning concepts learned (Sopandi in Suleman & Kiaymodjo, 2023).

By conducting a literature review study related to the RADEC Model, knowledge can be obtained about how the learning process uses the learning model in elementary schools. In addition, the results, impacts, and challenges of the use of the RADEC model can also be known.

1.2. Related Research

The RADEC learning model has begun to be applied in the world of education, and the benefits have been felt. There have been several researches that have examined and produced various information, such as (1) The application of the RADEC method contributes to improving higher-level thinking skills in students (Damayanti et al., 2023); (2) In addition, the research findings conducted by Pratama stated that the application of the RADEC learning model effectively improves students' higher-level thinking skills at the elementary school level. This can be seen by comparing the average post-test score of the RADEC class of 70.08 with the average pre-test score of 40.44. This increase reached 29.54, which means that the application of the RADEC model has a positive effect on students' higher-level thinking (Pratama et al., 2020); (3) The use of the STEAM-oriented RADEC learning model has a significant impact on students' science literacy (Putri & Zulfadewina, 2023); (4) the use of the RADEC model can improve students' analytical thinking skills in science learning (Tulljanah and Amini, 2021).

Some research leads to one skill and focuses on only one subject in primary school. However, research that thoroughly discusses 21st-century skills that have emerged or improved due to the RADEC learning model has yet to be widely researched. This study also comprehensively analyses using the RADEC learning model integrated with various subjects. This is what distinguishes previous research from current research.

1.3. Research Objectives

This study aims to collect information about using the RADEC model and identify various skills that emerge after learning. The description of this study includes:

1. An overview of the learning process using the RADEC model in various subjects in elementary school.
2. Results or impacts of the learning process using the RADEC model in various subjects in elementary schools
3. Challenges faced in the use of the RADEC model in elementary schools.

2. Theoretical Framework

2.1. RADEC Model

The RADEC learning model is a learning concept that comes from the creativity of the nation's children. The model is made by adjusting the character of students in Indonesia, which makes this learning model can be applied well. According to Ismail et al., (2022) the RADEC model, it is a student-oriented learning approach involving them in activities that aim to understand concepts, collaborate, solve problems, and create ideas or works. P2.1 The implementation of the RADEC model in learning consists of five steps, as the name implies: RADEC (read, answer, discuss, explain, create). It is also in line with the research presented by (Kaharuddin et al., 2020) RADEC, namely: (1) Read, (2) Answer, (3) Discuss, (4) Explain, (5) Create. For more details, the following is the learning table of the RADEC model according to Sopandi et al., (2021).

Table 1. Learning Stages of the RADEC Model

Learning Stage	Activities	
	Teacher	Student
Read (this activity is done before learning)	The teacher's task involves monitoring and encouraging students to read the material	Students have the responsibility to find as much information as possible

	to be discussed. This activity is carried out in the home environment.	regarding the subject matter to be discussed. Material information sources can be obtained through various media such as books, eBooks, the internet, and other media.
Answer or answer (this activity is done before learning)	Teachers have the obligation to compile questions or questions related to the subject matter that will be discussed in the next meeting.	Students are in charge of answering pre-learning questions.
Discuss	Teachers have the responsibility of providing encouragement to students who can complete assignments, in the hope that they can help other students who are still struggling. Teachers are in charge of motivating students who do not understand so that they dare to ask their friends. Ensure active and communicative discussions. Help direct groups that are experiencing difficulties.	Students are tasked with discussing in groups about the answers to the questions that have been answered.
Explain	The teacher is in charge of ensuring that what is explained by the group representative/speaker is correct and can be understood by all students. Motivate other students to respond to what has been conveyed. It can be in the form of questions, rebuttals, or adding other information. Provide important additional material that has not been mastered by students.	Each group is asked to send a representative to explain the concept that has been discussed in front of the whole class.
Create	Teachers are tasked with motivating students to spark creative ideas. Teachers are tasked with guiding students in realizing their creative ideas and assisting them in making reports.	Students are tasked with discussing their creative thoughts with the group independently. Students make a work along with a report.

Implementing the RADEC model has several supporting and inhibiting factors, which are as follows. A supporting factor in the implementation of the RADEC learning model is that the current curriculum supports the learning process that aims to develop students' spiritual and

social attitude skills, knowledge, and skills. The second factor is the availability of many information sources and requirements from the latest curriculum, which demands that students have spiritual, social, literacy, and skill abilities. In contrast, the inhibiting factors are as follows. There may be teachers who are used to the lecture method, so switching to other methods makes them feel that they still need to thoroughly teach all the subject matter. Second, using the lecture method alone can make it easier for students to understand, especially if they are allowed to study independently. Finally, there is the assumption that learning is only a transfer of knowledge from teachers to students.

2.2. 21st-Century Skills for Elementary School Students

21st-century skills are some of the skills that students must master to support their success in the modern era. Skills that must be possessed include critical thinking skills, collaborative, creative, and able to communicate well. This is in line with the words of Anagun (2018) & Van Roey et al., (2020). In the era of the 4.0 revolution, universities in Indonesia must prepare graduates with 21st-century skills, namely collaboration, communication, creativity, and being able to think critically. 21st-century learning is also called learning using technology because, in this era, technology and science are developing very quickly. This is in line with Sudarisman's words that in the 21st century, learning has undergone very rapid changes, especially in the field of information technology (Rosnaeni, 2021).

In the 21st era, it brings various complex challenges in multiple aspects of human life, one of which is in the field of Education. In this era, elementary schools and teachers have a crucial role in preparing the nation's generation to survive in this increasingly advanced and rapidly growing era. According to (Thana & Hanipah, 2023) elementary schools as formal education institutions have a critical role as a forum for implementing educational innovations and creating a conducive learning environment. Meanwhile, as the frontline in implementing the curriculum and learning, teachers must present a more exciting and interactive learning experience, help students have 21st-century skills, and be more skilled in digital literacy.

This skill is very much needed by elementary school students where, in this era, there is a lot of information flowing therefore, to fortify students from the negative impact of the development of the times, they must be equipped with the ability to think creatively, communicatively, creatively, and be able to cooperate with others. This has implications for the learning process in schools where teachers must standardize the learning process so that students are trained in the skills needed in the 21st-century era. According to Zubaidah (2017) learning must be designed in accordance with the 4C skills, namely, critical thinking skills, creative and innovative thinking skills, communication skills and cooperation skills.

3. Method
3.1. Research Design

The researcher uses the systematic literature review method to answer research questions systematically, mainly referring to the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) model. (Page et al., 2021). The literature examination contained in this study details the application of the RADEC model in improving 21st-century skills by reviewing various previous types of research. This study uses the SLR method to identify, review, and interpret multiple existing studies on the RADEC model. The stages include formulating research questions, determining data criteria that can be processed (inclusion or exclusion), looking for relevant literature, assessing the reading quality, collating and analyzing data, and summarizing and presenting the results.
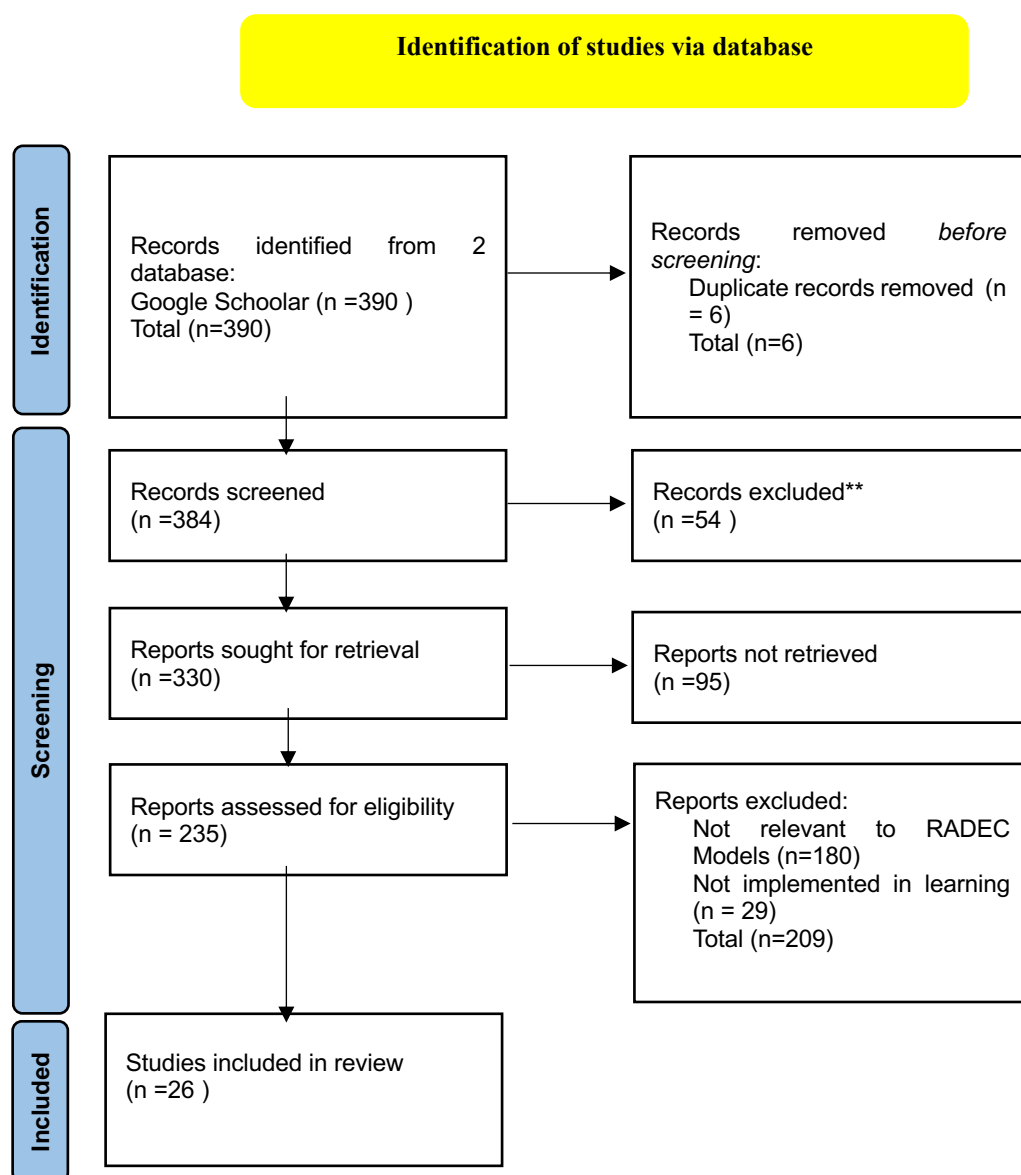
3.2. Data Collection

On September 3, 2023, researchers conducted a literature search using Google Scholar with online database sources. The selection of research is based on the following Table 2 criteria:

Table 2. Article Selection Criteria

Inclusion Criteria	Exclusion criteria

Publications in 2019-2023	Publications before 2019
Peer review journal	Not a peer review journal
Journal at least indexed Sinta 5	Journal index lower than Sinta 5
Speaking Indonesian or English	Not Indonesian or English
Related to learning using the RADEC model	Not related to RADEC
in elementary schools	Not learning implementation

The search used the keyword "use of the RADEC model in elementary schools". From the search, 390 articles were obtained. The next article is selected through the title, abstract, and full text by referring to the criteria of Table 2. In the selection, the researcher still uses the manual method. Furthermore, the process of coding, extraction, and analysis is carried out by pouring the information the researcher needs into a spreadsheet. In the end, out of 390 articles obtained, only 26 articles entered the criteria. The following is the complete process related to article selection:

Identification of studies via database

Identification

Records identified from 2 database:
Google Schoolar (n =390)
Total (n=390)

Records removed *before screening*:
Duplicate records removed (n = 6)
Total (n=6)

Screening

Records screened
(n =384)

Records excluded**
(n =54)

Reports sought for retrieval
(n =330)

Reports not retrieved
(n =95)

Reports assessed for eligibility
(n = 235)

Reports excluded:
Not relevant to RADEC Models (n=180)
Not implemented in learning (n = 29)
Total (n=209)

Included

Studies included in review
(n =26)

Figure 1. Article selection flow

Adapted from Page et al. (2021).

3.3. Data Analysis

The researcher analyzed by creating a spreadsheet containing the following description: year of publication, author's name, school level, research objectives, research methods, research results, and supporting information. After everything is done, the researcher synthesizes all the summaries that the researcher has made into a whole unit to answer the research question. This is in line with Lame's statement that a systematic literature review is a way of synthesizing scientific evidence to answer a particular research question in a transparent and reproducible way while attempting to include all published evidence on the topic and assess the quality of this evidence (Lame, 2019). The use of the SLR (Systematic Literature Review) method in this study aims to obtain a large amount of information and be able to answer questions that arise related to learning with the Radek model. Thus, the information obtained by the researcher becomes more complete and allows the presentation of a large amount of data.

4. Findings

From the results of the selection process, 26 articles are analyzed in depth. Below is Table 3, which contains a summary of the results of the analysis of the article on the Implementation of the RADEC Learning Model in Elementary Schools.

Table 3. Application of the RADEC Learning Model in Elementary Schools

Author and Year of Publication	Student Level	Learning Process	Learning Challenges	Learning Outcomes
(Nurliana & Sukmawati, 2023)	SD (V)	In the reading stage, students read information from various sources. In the answering stage, students were given three questions about the benefits of water for living things, human activities that affect the water cycle, and related to the stages of the water cycle. Then students answer the question with their knowledge when reading. In the reading stage, students read information from various sources. In the answering stage, students were given three questions about the benefits of water for living things, human activities that	-	The application of the RADEC model to water cycle materials has been proven to be able to increase students' creativity with a fairly good category.

		affect the water cycle, and related to the stages of the water cycle. Then students answer the question with their knowledge when reading. In the discussion stage, after obtaining enough material, students discuss in small groups about water cycle material, then the results are written on student worksheets. Then the group representative explained the material that had been discussed in his group to other groups. In the final stage, which is creating, students are assigned to draw the water cycle.		
(Setiawan et al., 2019)	SD	Students read the essential (important) material through the pre-learning assignments given by the teacher and discuss their understanding with other students. Then solidify the understanding obtained through interaction with the social environment.	-	From the evaluation of learning using the RADEC model, there was a significant improvement in the skills of writing explanatory texts and the understanding of the concept of explanatory texts by students.
(Pratama et al., 2020)	SD (V)	In the reading stage, students read the teaching materials that the teacher has compiled and the teacher gives several questions	-	The application of the RADEC model has a positive effect on students' higher-level thinking skills, when compared to the application of

		related to ecosystem materials. At the answering stage, students answer questions given by the teacher. In the discussion stage, participants discussed in one group about ecosystem materials. At the explaining stage, students as group representatives explained the results of their discussion in front of the class. The creation stage, at this stage students develop their ideas in making a product.		conventional learning models.
(Suryana et al., 2021)	SD (V)	The RADEC model is used in teaching science lessons by starting with students instructed to read the material from home before the learning activity begins (the material learned about air). Then HOTS questions about air were given. Then students have a small group discussion, at this stage the teacher ensures the communication of the students in answering the questions correctly. Then the representatives of each group made a presentation of the material that had been discussed in a small	The class became very noisy and several times difficult to control.	The RADEC learning model can improve students' creative thinking skills in the medium category to high. This ability is obtained because learning activities require students to express opinions, deny, ask questions, find solutions and make something new.

		group, in this phase other groups could refute and give comments. Then at the end of the activity, students are instructed to make a work, namely a song whose verses contain subject matter.		
(Putri & Amini, 2023)	SD (V)	Pay attention to language aspects that are in accordance with the level of student development (Focus more on the E-LKPD aspect only).	-	E-LKPD with the RADEC-based Nearpod application has high effectiveness and students become very actively involved in learning.
(Fitri et al, 2023)	SD (V)	In the reading stage, students learn independently from various reading sources. At the answering stage, students answer the questions given by the teacher, from this step the teacher can know the part of the material that the student has not understood. In the discussion stage, at this stage students in the group discuss the answers to the questions given by the teacher. At the explaining stage, in front of the class, the student representatives explained the basic knowledge they had learned. In the creation stage, students realize their ideas in a work.	-	The creation of teaching materials oriented to the RADEC model, with the aim of improving students' Higher Order Thinking Skills, has been approved for use as teaching materials in the learning process.

(Putri & Zulfadewina 2023)	MI (IV)	In the reading stage, the teacher instructs students to read theme 8 learning. In the answering stage, the teacher gave learning questions that were developed related to the concepts of the theme to be discussed. In the discussion stage, students discuss the answers to pre-learning questions. Stages explained, students explained the answers from their group discussions in front of the class, in this activity the teacher played a role so that students from other groups could actively ask questions, refute, and add material from the presenting group. In the creation stage, students approve, realize, and report a work. .	-	Applying the STEAM-based RADEC learning model has a significant influence on students' science literacy levels.
(Yulianti et al., 2022)	SD (V)	-	-	There was a significant improvement in students' critical thinking skills before and after applying the RADEC learning model.
(Vitriasari et al., 2023)	SD (III)	In the reading stage, students read and study the material to be studied. In the answering stage, students answer questions on the worksheet given by the teacher. In the discussion stage, at this stage the	-	The application of the RADEC learning model is able to improve students' critical thinking skills.

		teacher gives students the opportunity to discuss the answers to the questions given by the teacher. In the explanation stage, students explain the material from the results of the discussion. In the creation stage, students make experiments related to material about style.		
(Nurmitasari et al., 2023)	SD (IV)	In the reading stage, students look for information and read it from various sources, both from books, the internet and so on. In the answering stage, students are obliged to answer the pre-learning questions given by the teacher. In the discussion stage, then in small groups students discuss the answers. Stages explained, student representatives explained the results of the discussion to large groups. In the creation stage, students in small groups make a work.	Efforts are needed to strengthen students by teachers through various learning strategies. This aims to strengthen and maintain the classroom atmosphere so that it remains conducive, improves competence, and enriches the experience and knowledge possessed by students	There was a significant difference in learning outcomes between students who applied the RADEC learning model and those who used the conventional learning model.
(Nurnaningsih et al., 2023)	SD	-	This research has several limitations, such as a relatively short time limit, the selection of research	The application of the RADEC model has proven to be successful in shaping and improving students' critical and creative thinking skills. This ability is seen in the form

			subjects focused on one class with certain variations, and a research orientation that only refers to two skills.	of ideas, efforts to answer questions, and analysis.
(Setiawan et al., 2020)	SD (V)	At the first meeting, students were given reading materials and instructed to read, then answered questions given by the teacher that had to be done at home. At the next meeting, which was to have a discussion, students had a group discussion that discussed answers related to the material to be studied. Then student representatives from the group explained the material discussed. At the third meeting, students were instructed to make a work related to muscle style material.	This research still has several weaknesses, namely students have not fully mastered spelling and writing skills.	There was a striking difference in students' ability to write explanatory texts between classes that applied the critical multiliteracy model and the RADEC model. The drawable conclusion is that the critical multiliteracy model has been shown to be more effective in improving the ability to write explanatory texts when compared to the RADEC model.
(Meisarah et al., 2023)	SD (IV)	In the reading stage, students are instructed to read the subject matter at home. In the answering stage, students were given pre-learning questions about sound material in science subjects. In the discussion stage, students discuss and agree on answers and	-	Applying the RADEC learning model significantly improves students' mastery of concepts and encourages the emergence of various aspects of creativity, including the suitability of materials, creation and innovation, student readiness, and how to create works.

		opinions in one group. Stages explained, students made presentations in front of the class. The creation stage, the activity at this stage is for students to develop creative ideas regarding science subject matter.		
(Damayanti et al., 2023)	SD (V)	The first activity that teachers do to students is the reading and answering stage. The teacher instructs students to read the H-1 subject matter the day before the class meeting. The teacher gives 9 questions and the students answer the questions. The next activity in the teacher's classroom divides students into 4 heterogeneous groups. Each group discusses the answers to the questions given by the teacher. Representatives of each group explained their group answers. In the creation stage, students make poems about water.	-	The RADEC learning model is able to improve students' higher-level thinking skills.
(Harun & Yuza, 2022)	SD (V)	Initial activities. The first meeting of the teacher instructed students to read books or reading sources presented on theme 8 subtheme 1 pages	Challenges in distance learning still occur, where some students do not comply with the teacher's	The application of the RADEC learning model in online learning has the potential to improve student learning by making them more engaged, strengthening conceptual

		1-22 entitled Cultural Diversity of the Nation in Indonesian Region and in the second meeting read books on pages 43-44 entitled Learning Tolerance from Children's Traditional Games. At the answering stage, students answered in writing the questions given by the teacher. The core activity, in the student discussion activity was divided into 5 groups, before the students discussed, the teacher discussed a little related to diversity in the Indonesian region. The next stage is the presentation, there are two groups that present classically and the other group is tasked with asking questions, giving responses, and adding. In the creation stage, students are instructed to make a mind map of the existing problem.	instructions to read and actively participate during the learning process.	understanding, and developing higher-order thinking skills (HOTS).
(Rifatunnisa et al., 2023)	SD (V)	In the reading stage, students are given worksheets containing pre-learning questions related to the water cycle, students read water cycle materials from various sources. In the answering stage, students	-	The RADEC Learning Model is able to improve students' critical skills.

		answer pre-learning questions. During the discussion stage, students create small groups and discuss in the group. Stages explained, each group representative delivered material. In the creation stage, students make a product that is related to the material that has been learned.		
(Ratnasari & Sukmawati, 2023)	SD (V)	-	-	The application of the RADEC model creates a significant change in students' understanding of concepts.
(Ramadini et al., 2021)	SD (V)	It starts with the teacher as an intermediary for students and helps in overcoming difficulties in previous learning. The learning process starts from reading the material to be studied in class, then learning in groups in presenting the results of writing explanatory texts.	-	Applying the RADEC learning model has been proven to be successful in increasing the effectiveness of students' ability to write explanatory texts.
(Nengsih et al., 2023)	SD (VI)	In the reading stage, students read the benefits and water cycle materials. In the answering stage, students answer pre-learning questions on student worksheets. In the discussion stage, students actively discuss in small	-	The application of the RADEC learning model has a positive impact on students' understanding of concepts and skills in writing explanatory texts.

		groups. Stages explained, group representatives presented the results of their discussion in front of the class classically. In the creation stage, students make a simple chart about the water cycle.		
(Yulianti et al., 2023)	SD (V)	The implementation of the RADEC model is carried out through two cycles. The first cycle begins by preparing lesson plans, preparing materials, resources and learning media in the form of interactive videos and PPTs, making pre-learning questions, making observation worksheets. The implementation began with the teacher instructing students via WhatsApp to read information from various sources. The next step is for students to answer pre-learning questions sent through google forms. Then the teacher started learning with virtual face-to-face via zoom, students were divided into several groups to discuss the answers to the questions given by the teacher. After that, representatives of	-	The RADEC learning model has an impact on the achievement of science learning outcomes in grade V elementary school students.

		each group presented the results of their discussions.		
(Chairunnisa et al., 2022)	SD (IV)	Learning is carried out during three meetings of each class. In the initial stage, students are given a pretest to find out the student's reading comprehension ability. In the second stage, students are given treatment using the RADEC model. In the third stage, students are given a posttest.	-	The application of the RADEC Model has proven to be effective in improving the learning achievement of grade IV students in social studies subjects, and is one of the learning model options that can be adopted by teachers in elementary schools.
Salam, Pagarra, & Nurmalia 2021)	SD (IV)	Learning is carried out in two cycles. In cycle 1 there are three meetings, while for cycle 2 there are two meetings.	-	The application of the RADEC model is considered very good, in line with students' reading comprehension ability which is also assessed in the very good category.
(Suleman & Wahyu P Kiaymodjo, 2023)	SD	Learning with the RADEC model was carried out five meetings. At the stage of reading, answering, discussing, and explaining, four meetings were held, while for the creative stage, one meeting was held.	Difficulty in maintaining focus during learning, lack of involvement when students are discussing, and shyness to speak in front of the class.	The application of the RADEC learning model has been proven successful in increasing student learning achievement in science subjects class V.
(Sukmawati et al., 2021)	SD (V)	-	-	From the findings of this study, it was found that the characteristics that emerged included religious attitudes, nationalists, independence, integrity, and the spirit of mutual cooperation.
(Andini & Fitria, 2021)	SD (V)	-	-	The implementation of the RADEC learning model has succeeded in

				enriching the potential of students in accordance with the demands of this era, such as the ability to think critically, find solutions to problems, collaborate, form interpersonal relationships, and develop creativity.
(Halim, 2022)	MI	Integrate the RADEC learning model with integrated thematic learning through several subjects. Students exchange opinions and discuss their opinions, starting from reading, building critical thinking skills by recalling the lessons that have been read.	-	The application of the RADEC learning model has been proven to be able to improve student learning outcomes.

5. Discussion

Based on Table 3, the RADEC learning model can be used in science subjects and other subjects such as social studies, religion, and thematic lessons. The RADEC learning model can be applied at all levels of education, including elementary school (SD), junior high school (SMP), and high school (SMA). This RADEC model can also be used to cultivate 21st-century skills and improve student character. The RADEC model is a learning approach that increases the attractiveness of learning and activates student participation in the learning process. This is in line with the statement (Nurpratiwi et al., 2023) that through the use of the RADEC model, student learning activities can be improved. This learning model can also be combined with an innovative learning model. This follows Pratama's statement, which shows that the RADEC learning model is one of the creative alternatives in the Indonesian education system. In this model, students are expected to be able to understand various concepts of science within a specified period (Pratama et al., 2019).

The RADEC learning model consists of five syntaxes: Read, answer, discuss, explain, and create in line with (Sopandi, 2017) who said that this model was introduced at an international conference in Kuala Lumpur, Malaysia. The name of this model is arranged according to the steps, namely Read, Answer, Discussion, Explain, and Create (RADEC). If it is elaborated in more detail, the following explanation will be obtained: (1) Read: students are directed to read the material at home. The source can be from the internet, books, or other media; this activity is carried out at home. (2) Answer: students answer pre-learning questions. This activity is carried out at home with the intention that students are more ready to receive learning. (3) Discuss, students create groups and discuss the answers they have filled in at home; (4) Explain, students explain the results of their group discussions; (5) Create, students generate ideas to solve a problem.

The RADEC learning model has been proven to improve the skills required by learners in the 21st-century era. Skills that have greatly improved learning include creative thinking, mastery

of learning concepts, the ability to write explanatory texts, high-level thinking, science literacy skills, critical thinking, improving student learning outcomes, reading comprehension, conceptual skills, and writing explanatory texts. This skill is very beneficial for the progress of learners. This aligns with the opinion (Brookhart & Susan M., 2010) that that teaching 21st-century skills to students has significant benefits, including the ability to develop practical communication skills in the face of differences. Students can establish good and mutually beneficial cooperation to achieve common goals. They will also have a stance, view, and creativity in solving problems at the individual and community levels. In addition, students can create new things by identifying opportunities, facing challenges, and optimizing their abilities with skilled expertise. We can see these emerging skills when students carry out a series of learning processes, where when students do reading activities, students can obtain initial knowledge or the foundation of knowledge; besides that, this activity also fosters students' creativity in finding sources of reading or learning. During the answering activity, students are asked to think critically and be able to solve problems. The skills seen in the discussion activities include collaboration, mutual respect, and communication. Explaining the students' abilities can consist of confidence, communication, and understanding of concepts. Then, in the Creating activity, the student's abilities include creativity, innovation, and cooperation.

The character that grows from the learning process includes nationalism, religion, independence, integrity, and mutual cooperation. This improvement proves that the RADEC learning model is very suitable for application in educational units because it can have a comprehensive positive impact. Not only that, there are other advantages of the RADEC learning model, including: (1) Teachers can easily design learning models and make the learning process more interesting, (2) The application of the RADEC learning model has the potential to improve students' critical thinking performance (3) Students' reading and analysis skills increase, (4) The RADEC learning model can increase cooperation in groups (Kaharuddin et al., 2020).

In addition to improving the skills and character of students, the learning process of the RADEC model also has challenges that must be faced, including teachers must pay attention to students' abilities, primarily if they are used in low grades where there are usually still students who are not good at reading. Another challenge is that not all RADEC model learning can improve explanatory text-writing skills. This is proven based on a study (Setiawan et al., 2020) that stated a significant difference in students' explanatory text writing skills. In contrast, teachers who used the critical multiliteracy model were more effective than those who used the RADEC model.

6. Conclusion

Based on the analysis, using the RADEC learning model greatly influences skills improvement in the 21st-century. The RADEC model's learning process includes reading, answering, discussing, explaining, and creating. Skills that improve after the learning process using the RADEC model include critical thinking skills, creativity, collaboration, communication, mastery of learning concepts, high-level thinking, science literacy skills, improving student learning outcomes, reading comprehension, religious attitudes, nationalists, independence, integrity, and cooperation. In addition, in using the RADEC learning model, teachers must pay attention to students' basic ability, namely the ability to read, because at the beginning of this model, syntax is reading. Students must possess this ability as a model to obtain initial information. Teachers must also pay attention to learning objectives and other supporting factors because not all learning objectives can be optimally improved using the RADEC model. It is also hoped that this research can provide new knowledge for educators and can also be used as a reference for readers in using the RADEC learning model.

Limitation

Undeniably, this study has some limitations that should concern readers, especially for researchers who will continue this study. The limitations that arise are related to the use of databases that are limited to Google Scholar only. In addition, article analysis is limited to the

last five years (2019-2023). Both limitations can affect the depth of analysis that can be carried out. Therefore, to achieve a better level of depth, it is recommended that database sources be added and the analyzed year range expanded.

Recommendation

Based on the findings of the study, we suggest the following: (1) This study can be the basis for further research on the RADEC learning model, mainly focusing on its implementation at the elementary school level; (2) teachers can use the results of this research as a guide in implementing the RADEC learning model at the higher grade level. (3) It can collect databases from various reference sources such as ResearchGate, Scopus, Publish or Perish, and so on.

Acknowledgments

I want to thank the lecturers who provided guidance and direction during the research process and my friends who also assisted.

Conflict of Interest

The researcher stated that there was no conflict of interest.

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