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FROM READING TO CREATING: INTEGRATING RADEC FOR DEEPER LEARNING IN PRIMARY SCHOOLS

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ABSTRACT

Deep learning has become an important orientation in primary education because it emphasizes conceptual understanding, critical thinking, collaboration, communication, and the ability to transfer knowledge. However, primary school learning practices still tend to be procedural and do not fully support deep learning. The RADEC learning model (Read–Answer–Discuss–Explain–Create) has the potential to address this challenge through systematic learning stages centered on students' active engagement. This study aims to analyze the implementation of the RADEC model to support deep learning in primary education through a Systematic Literature Review (SLR). This review was conducted in accordance with PRISMA principles by examining scientific articles published during the 2019–2025 period and sourced from Google Scholar, DOAJ, and Garuda. A total of 25 articles that met the inclusion criteria were thematically analyzed to map the implementation patterns of each RADEC stage and their relationship with the dimensions of deep learning. The synthesis results indicate that the Read and Answer stages contribute to conceptual understanding and critical thinking; the Discuss and Explain stages support collaboration and academic communication; and the Create stage encourages knowledge transfer and creativity. Nevertheless, the Create stage still needs strengthening in task design and product-based assessment. These findings affirm that RADEC is a relevant learning model for operationalizing deep learning in primary education.

Keywords: RADEC, deep learning, primary education, systematic literature review

INTRODUCTION

Deep learning is increasingly positioned as a primary focus in primary education because 21st-century demands no longer stop at the mastery of factual knowledge; they emphasize meaningful conceptual understanding, critical thinking, collaboration, communication, and the ability to transfer knowledge to new situations. At the primary school level, the development of these competencies becomes an important foundation for students' learning continuity at subsequent levels of education (Rashchikulina et al., 2016). Nevertheless, classroom learning in primary schools still often shows procedural tendencies, is oriented toward completing content coverage, and is dominated by short-answer assessments that do not fully support deep learning.

This condition indicates a gap between curriculum goals and instructional practices in the field. On the one hand, curriculum documents and pedagogical discourse encourage the development of higher-order thinking skills, authentic problem solving, and students' creativity. On the other hand, time constraints, teachers' administrative workloads, and entrenched teaching habits often lead learning to focus on listening, imitation, and memorization. As a result, learning activities do not consistently provide students with opportunities to construct meaning, engage in in-depth discussion of ideas, and produce outputs that reflect knowledge transfer.

Within this context, there is a need for a learning model that is not only theoretically sound but also operational and realistic to implement in primary school classrooms. The RADEC model (Read–Answer–Discuss–Explain–Create) provides a systematic learning

sequence that begins with independent learning preparation and culminates in the creation of meaningful products (Novianti et al., 2025). Each stage of RADEC is designed to gradually promote students' cognitive and social engagement, thereby helping bridge the gap between deep learning objectives and everyday classroom practices.

Conceptually, RADEC aligns with the principles of deep learning. The Read and Answer stages can strengthen students' cognitive readiness and foster individual responsibility for learning. The Discuss and Explain stages create space for dialogue, argumentation, and conceptual clarification through directed social interaction. Meanwhile, the Create stage enables students to apply knowledge in new contexts through product-based tasks, which serve as important indicators of successful knowledge transfer and creativity. Nevertheless, this theoretical alignment still requires reinforcement through a comprehensive synthesis of empirical evidence.

Various previous studies have reported the implementation of RADEC in primary education, with generally positive findings, including improvements in learning outcomes and critical thinking skills (Purwanto & Yanuarto, 2025; Satria & Sopandi, 2019; Jannah et al., 2025; Lasari et al., 2023). However, these findings are dispersed across different subject areas, grade levels, and research designs, and often remain focused on short-term outcomes. In addition, many studies have not explicitly mapped learning outcomes to the dimensions of deep learning, such as transfer ability, collaboration quality, or the authenticity of learning products. This condition leaves the existing evidence insufficiently integrated to support evidence-based pedagogical decision-making.

Based on this discussion, there is a clear need for a comprehensive review that assesses RADEC's overall effectiveness and situates it within the deep learning framework. A systematic literature review is a relevant approach for consolidating dispersed research findings, identifying patterns in RADEC implementation in primary schools, and evaluating the extent to which each stage contributes to the dimensions of deep learning. This approach also enables the identification of methodological gaps that future research needs to address.

Therefore, this study aims to conduct a systematic literature review on the implementation of the RADEC model in primary education and its relationship with deep learning. Specifically, this study is directed to address the following research questions: (RQ1) what patterns of integration between the stages of RADEC and the dimensions of deep learning are reported in primary education research; (RQ2) which learning outcomes are most consistently associated with the implementation of RADEC, particularly in terms of critical thinking, conceptual understanding, collaboration, communication, and creative products; (RQ3) what supporting and inhibiting factors influence the implementation of RADEC in supporting deep learning in primary school classrooms; and (RQ4) what methodological and conceptual gaps remain in the literature, particularly about transfer assessment and product-based evaluation.

LITERATURE REVIEW

The concept of deep learning developed in response to the limitations of learning oriented toward memorization and information reproduction. Deep learning emphasizes higher-order cognitive processes that enable students to construct conceptual understanding, connect knowledge with prior experiences, and transfer that knowledge to new situations (Budhiarti et al., 2025). In primary education, deep learning is crucial because this stage is formative, shaping thinking patterns, learning habits, and attitudes toward knowledge that will influence long-term learning success.

Deep learning is generally understood to encompass several key dimensions, including conceptual understanding, critical thinking, collaboration, communication, and creativity. These dimensions do not stand independently, but are interrelated within a meaningful learning process. Conceptual understanding allows students to perceive relationships among ideas;

critical thinking helps them evaluate and reconstruct knowledge; and collaboration and communication facilitate the social negotiation of meaning (Wells, 2002). Creativity and the production of work serve as indicators that knowledge is not only understood but also applied and further developed.

One of the main challenges in implementing deep learning in primary schools is the availability of learning models that can operationalize these dimensions systematically. Many learning approaches still stop at discussion activities or simple problem solving without providing sufficient space for initial cognitive preparation and the creation of learning products. As a result, learning often yields only surface-level participation and fails to fully promote knowledge transfer.

The RADEC learning model (Read–Answer–Discuss–Explain–Create) was developed to address the need for a learning structure that gradually encourages students' active engagement. RADEC integrates individual and collaborative learning activities into a logical and coherent sequence (Novianti et al., 2025). The Read stage emphasizes students' initial interaction with learning resources, which functions to build schemata and cognitive readiness prior to classroom learning. This stage is important for reducing students' dependence on teacher explanations and for fostering independent learning from an early stage.

The Answer stage in RADEC serves as a mechanism for individual accountability, requiring students to articulate their initial understanding in written responses. This activity helps teachers identify early misconceptions while simultaneously encouraging students to think actively before engaging in group discussions. Subsequently, the Discuss stage facilitates the exchange of ideas and conceptual clarification through social interaction, a key element of meaningful learning in social constructivism.

The Explain stage strengthens concept consolidation through presentations, re-explanations, and teacher feedback. At this stage, students' academic language, argumentation, and reasoning are systematically developed. The role of the teacher is no longer that of the sole source of knowledge, but rather that of a facilitator who helps validate, correct, and deepen students' understanding. This process aligns with the principles of deep learning that emphasize reflection and conceptual elaboration.

The Create stage represents the main distinguishing feature of RADEC compared to other learning models. At this stage, students are required to produce products, artifacts, or solutions that represent the application of knowledge in new contexts. These products may take the form of written, visual, or performative artifacts, depending on the learning objectives and students' characteristics. The Create stage embodies the dimensions of knowledge transfer and creativity, key indicators of deep learning.

Several empirical studies indicate that implementing RADEC in primary education can improve students' cognitive learning outcomes and critical thinking skills (Yanuar et al., 2022). However, most studies still focus on test-based learning outcomes and have not consistently evaluated the quality of collaboration, the depth of conceptual understanding, or the authenticity of learning products. In addition, variations in task design at the Create stage lead to differences in the level of transfer students achieve, indicating the need for a more systematic mapping of best practices for RADEC implementation.

Based on this theoretical review, it can be concluded that RADEC aligns closely with the principles of deep learning, particularly in cognitive readiness, social interaction, and the creation of meaningful products. However, the relationship between the stages of RADEC and the dimensions of deep learning still requires a structured synthesis of empirical evidence in order to provide clear, implementable guidance for primary school teachers. Therefore, a systematic literature review is a relevant approach to integrating theoretical foundations and previous research findings into a coherent analytical framework.

Based on this theoretical foundation, RADEC can be positioned as a learning model that is structurally aligned with the principles of deep learning. Each stage of RADEC does not

stand alone; rather, it forms a learning trajectory that integrates cognitive readiness, social interaction, conceptual elaboration, and knowledge transfer through product creation. This framework serves as the analytical basis for the systematic literature review, assessing the extent to which the implementation of RADEC in primary education operationalizes deep learning.

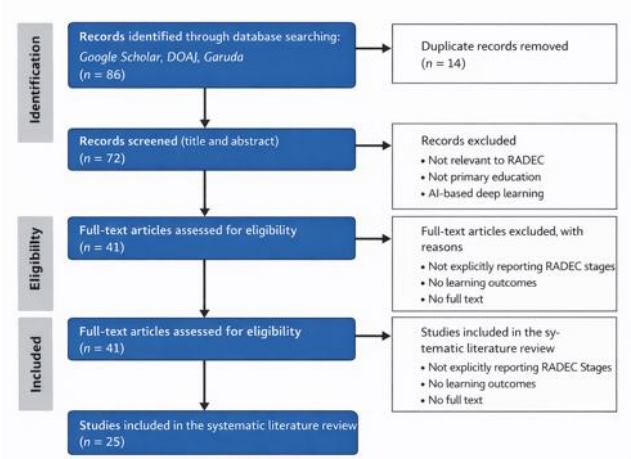
METHODOLOGY

This study employed a Systematic Literature Review (SLR) to map the implementation of the RADEC learning model (Read–Answer–Discuss–Explain–Create) to support deep learning, with a primary focus on the primary education context. The SLR procedure was developed in accordance with PRISMA guidelines to ensure that the processes of article identification, screening, eligibility assessment, and inclusion were conducted transparently and to minimize potential selection bias (Pati & Lorusso, 2018). The initial stage of the study began with the formulation of research questions focusing on: (1) the forms of implementation of each RADEC stage in learning at the primary school level, (2) the alignment of RADEC stages with the dimensions of deep learning, (3) the impact of RADEC implementation on students' learning outcomes and skills, and (4) the methodological and conceptual gaps that remain in research related to the implementation of RADEC in supporting deep learning. The analysis also considered findings from other educational levels and the context of teacher professional development as points of comparison to enrich the interpretation of the review results.

The literature search was conducted across several databases and academic portals relevant to education, namely Google Scholar, the Directory of Open Access Journals (DOAJ), and Garuda. The search strategy employed combinations of keywords and Boolean operators, such as ("RADEC" OR "Read Answer Discuss Explain Create") AND ("deeper learning" OR "pembelajaran mendalam") AND ("primary school" OR "elementary" OR "pendidikan dasar" OR SD OR MI). The publication year range was set from 2014 to 2025 to capture recent research developments, and publication languages were limited to Indonesian and English. The articles considered included peer-reviewed journal articles and indexed conference proceedings that discussed the implementation of RADEC in primary education, as well as several studies at the junior secondary school level and in the context of teacher training or professional development that were relevant to enriching understanding of RADEC implementation across contexts. Articles that did not provide full-text access or that used the term deep learning in the context of artificial intelligence were excluded from the review.

The article selection process was conducted in stages: duplicates were removed, followed by title and abstract screening, and then eligibility assessment through full-text review using predefined inclusion and exclusion criteria. Article eligibility was assessed by considering the clarity of the research design, the relevance of the primary education context, and the completeness of reporting on the implementation of RADEC stages and the learning outcomes or skills reported. Articles that passed the selection process were then extracted using a structured coding table that included study characteristics, educational level, and research context, the implementation of each RADEC stage, and students' learning outcomes or skills. Data analysis was conducted through qualitative synthesis using thematic analysis to identify patterns of implementation and trends in findings, and subsequently to map the contribution of each RADEC stage to the dimensions of deep learning, with a primary emphasis on primary education, supported by findings from other educational levels and relevant educator contexts.

Figure 1. Article Selection Flow Diagram



RESULT AND DISCUSSION

This study presents the results of a Systematic Literature Review (SLR) synthesis of 25 articles, focusing on the implementation of the RADEC learning model (Read–Answer–Discuss–Explain–Create) in primary education. The analysis was conducted systematically in accordance with PRISMA guidelines, ensuring that the results presented were relevant, well-selected, and methodologically sound. This section not only describes the characteristics of the studies and patterns of RADEC implementation, but also interprets trends in the findings within the framework of deep learning in order to provide a more meaningful understanding of the model's contribution.

Based on the literature search and selection process, 25 articles were identified that met the inclusion criteria for further analysis. These articles were published between 2019 and 2025, with a noticeable increase in publications over the past three years. This pattern indicates growing research attention to the RADEC model as a learning approach that is relevant to the demands of developing 21st-century competencies. The majority of studies were conducted at the primary school level (SD/MI), although several at the junior secondary school level were also included as points of comparison to deepen understanding of RADEC implementation across educational levels (Asmara, 2022; Fatikhin et al., 2024). The research designs employed included experimental and quasi-experimental studies, research and development (R&D), classroom action research, and systematic literature reviews, demonstrating a diversity of methodological approaches in examining the effectiveness of RADEC.

The general characteristics of the 25 analyzed articles are summarized in Table 1. The table shows that the implementation of the RADEC model was most frequently reported in science and Indonesian language subjects, followed by thematic learning and social studies. Research outcomes focused on the development of critical thinking skills, higher-order thinking skills (HOTS), conceptual understanding, and reading and writing literacy skills (Pratama et al., 2019; Widodo et al., 2024; Hasibuan et al., 2024). This dominance of higher-level cognitive aspects indicates that RADEC is more often positioned as a learning model to strengthen thinking processes and conceptual understanding. In contrast, exploration of affective and metacognitive aspects remains relatively limited.

Table 1. Characteristics of the Analyzed Studies (n = 25)

No	Author (Year)	Educational Level	Research Design	Subject/Context	Outcome Focus
1	Abidin et al. (2021)	Primary School	Experimental	Thematic	21st century skills
2	Andriyani & Ekawati (2024)	Primary School	SLR	General	Critical thinking
3	Anggraeni et al. (2024).	Primary School	Experimental	Science	6Cs
4	Asmara (2022)	Junior Secondary School	R&D	General	Learning activities
5	Burhanudin et al. (2024).	Primary School	SLR	General	RADEC implementation
6	Fatimah et al. (2024).	Primary School	Experimental	Indonesian Language	Reading comprehension
7	Hasibuan et al. (2024).	Primary School	Experimental	Indonesian Language	Reading literacy
8	Hendra & Makkasau (2025)	Primary School	Experimental	Indonesian Language	Reading comprehension
9	Imran & Amal (2024)	Primary School	Quasi-experimental	Science	HOTS
10	Kiska et al. (2024).	Primary School	Experimental	Science	Collaboration
11	Maulana et al. (2022)	Primary School	R&D	Science	4C skills
12	Maulida et al. (2023).	Primary School	Experimental	Science	Conceptual understanding
13	Novianti et al. (2025).	Primary School	Experimental	Indonesian Language	Writing
14	Pratama et al. (2019).	Primary School	Experimental	General	Critical thinking
15	Savitriana et al. (2023).	Primary School	SLR	Science	HOTS
16	Sopandi (2019)	Primary School Teachers	Implementation study	General	RADEC implementation
17	Sukmawati et al. (2024)	Primary School	Experimental	Social Studies	4C skills
18	Suryani et al. (2025).	Primary School	Experimental	Indonesian Language	Explanatory writing
19	Tulljanah & Amini (2021)	Primary School	SLR	Science	HOTS
20	Ulfa et al. (2024).	Primary School	Experimental	Indonesian Language	Literacy
21	Ulum & Alfani (2025)	Primary School	SLR	General	Learning outcomes

No	Author (Year)	Educational Level	Research Design	Subject/Context	Outcome Focus
22	Widodo et al. (2024)	Primary School	Quasi-experimental	Science	HOTS & communication
23	Karya terkait lainnya	Primary School	Experimental	Thematic	Critical thinking
24	Karya terkait lainnya	Primary School	Experimental	Thematic	Learning activities
25	Karya terkait lainnya	Primary School	Review	General	RADEC implementation

The synthesis results indicate a relatively consistent pattern of RADEC implementation across the Read and Answer stages in various primary education contexts. In the Read stage, most studies used structured reading materials, such as short texts, student worksheets (LKPD), and digital resources, to build students' cognitive readiness prior to instruction (Abidin et al., 2021; Maulida et al., 2023). These findings suggest that reading activities within RADEC do not merely serve as an introduction to the material; rather, they function as an initial strategy to activate students' schemata and reduce their dependence on direct teacher explanations. The subsequent Answer stage is commonly implemented through guiding questions or tasks that require higher-order thinking skills (HOTS) to be completed individually, thereby encouraging students to independently and reflectively formulate their initial understanding (Imran & Amal, 2024; Ulfa et al., 2024).

In the Discuss and Explain stages, RADEC implementation consistently emphasizes social interaction and academic communication as means of deepening conceptual understanding. Small-group discussions and class presentations emerge as dominant strategies for clarifying concepts and building shared understanding through the exchange of ideas and arguments (Kiska et al., 2024; Sukmawati et al., 2024). Several studies report that these stages contribute to improvements in students' communication and collaboration skills. However, their effectiveness is strongly influenced by the quality of teacher facilitation, particularly in designing discussion questions that require reasoning and in managing group interaction dynamics (Anggraeni et al., 2024; Widodo et al., 2024). This finding indicates that the teacher's role as a facilitator is a key factor in ensuring that discussions do not remain at the level of surface opinion exchange, but instead genuinely promote conceptual elaboration.

The Create stage shows the greatest variation in implementation among the RADEC stages. Student-generated products include written reports, posters, visual works, simple projects, and explanatory texts (Suryani et al., 2025; Novianti et al., 2025). This variation demonstrates RADEC's flexibility in encouraging the application of knowledge across diverse learning products. However, not all studies evaluated these products using standardized assessment rubrics, resulting in knowledge transfer and students' creativity not always being optimally measured (Maulana et al., 2022; Savitriana et al., 2023). These findings emphasize that the Create stage is both a strength and a major challenge in RADEC implementation, as its success depends heavily on the quality of task design and the assessment strategies employed.

Table 2. Mapping of RADEC Stages to Deep Learning Dimensions

RADEC Stage	Dominant Forms of Implementation	Reported Deep Learning Dimensions	Supporting Studies
Read	Reading texts, worksheets (LKPD), digital resources	Conceptual understanding, early literacy	Abidin et al. (2021); Maulida et al. (2023); Fatimah et al. (2024)

RADEC Stage	Dominant Forms of Implementation	Reported Deep Learning Dimensions	Supporting Studies
Answer	Individual HOTS-based questions, guiding prompts	Critical thinking, initial reflection	Pratama et al. (2019); Imran & Amal (2024); Ulfa et al. (2024)
Discuss	Small-group discussions	Collaboration, argumentation	Kiska et al. (2024); Sukmawati et al. (2024)
Explain	Presentations, question and answer sessions, and teacher clarification	Academic communication, conceptual elaboration	Widodo et al. (2024); Anggraeni et al. (2024)
Create	Projects, written/visual products	Knowledge transfer, creativity	Maulana et al. (2022); Suryani et al. (2025); Novianti et al. (2025)

Based on the mapping in Table 2, each stage of the RADEC model contributes differently to the dimensions of deep learning. The Read and Answer stages play a dominant role in building initial conceptual understanding and encouraging individual students' cognitive engagement. At these stages, students do not merely receive information; they must also actively process and respond to it through reading activities and HOTS-based questions, which serve as a foundation for deep learning (Pratama et al., 2019; Imran & Amal, 2024).

The Discuss and Explain stages demonstrate a strong contribution to the development of socio-cognitive skills, particularly collaboration and academic communication. Group discussions enable students to test their initial understanding, compare perspectives, and collectively construct meaning. The subsequent Explain stage further strengthens this process by enabling the teacher to orally articulate ideas and clarify concepts, thereby minimizing misconceptions and deepening conceptual understanding (Kiska et al., 2024; Widodo et al., 2024).

These findings indicate that RADEC's primary strength lies in integrating individual learning activities with structured social interaction. This pattern aligns with the principles of deep learning, which emphasize balancing personal knowledge construction with the negotiation of meaning through social interaction. Thus, RADEC functions not only as an active learning model but also as a pedagogical framework that systematically supports the development of 21st-century competencies (Anggraeni et al., 2024; Sukmawati et al., 2024).

However, the synthesis results also reveal that the Create stage has not yet been fully utilized across all analyzed studies. Although various products have been reported, such as simple projects, posters, and explanatory texts, the evaluation of product quality and students' ability to transfer knowledge remains limited. Many studies have not employed explicit assessment rubrics to evaluate creativity and transfer, resulting in deep learning outcomes at this stage not always being comprehensively documented (Maulana et al., 2022; Savitriana et al., 2023).

From the perspective of the findings' strengths, most studies report positive effects of RADEC implementation on critical thinking, higher-order thinking skills (HOTS), and conceptual understanding among primary school students. The consistency of these findings across subjects and school contexts strengthens RADEC's position as an effective deep learning model. In addition, several studies also indicate improvements in literacy and communication skills, which are essential components of 21st-century competencies (Fatimah et al., 2024; Hasibuan et al., 2024).

On the other hand, the limitations of the findings are primarily due to variations in implementation quality and assessment methods across studies. Differences in task design, intervention duration, and assessment instruments have resulted in inconsistent levels of reported deep learning outcomes. This condition indicates the need to develop more

standardized guidelines for RADEC implementation and assessment, particularly at the Create stage, to maximize the model's potential to operationalize deep learning in primary education.

These findings from the synthesis have significant pedagogical implications for classroom practice in primary schools. The consistent contributions of the Read and Answer stages to conceptual understanding and critical thinking highlight the importance of designing structured pre-learning activities, including selecting reading materials appropriate to students' cognitive levels and formulating HOTS-based guiding questions. Meanwhile, the strength of the Discuss and Explain stages in developing communication and collaboration underscores the need for teachers to assume an active role as discussion facilitators, with questioning and presentation scenarios that encourage evidence-based argumentation. At the Create stage, the review identified variation in practices and assessment, indicating the need to strengthen product-based task design and to employ explicit assessment rubrics to measure students' knowledge transfer and creativity more accurately. Thus, effective RADEC implementation requires alignment among activity planning, interaction facilitation, and assessment strategies that are consistent with deep learning objectives.

From a research perspective, the findings of this review open several relevant directions for future studies. First, empirical research is needed to evaluate product quality at the Create stage, using standardized assessment instruments to measure knowledge transfer and creativity more comprehensively. Second, longitudinal studies with longer intervention durations should be conducted to assess the sustainability of RADEC's impact on deep learning, particularly in the metacognitive and self-regulated learning dimensions. Third, comparative studies of RADEC implementation across different subject areas and diverse school contexts can enrich understanding of the conditions that support successful implementation and the challenges encountered. These research directions are expected to strengthen the empirical evidence and refine the implementation framework of RADEC as a learning model that supports deep learning in primary education.

CONCLUSION

The RADEC learning model (Read–Answer–Discuss–Explain–Create) makes a significant contribution to supporting deep learning in primary education. The synthesis of findings indicates that each RADEC stage plays a complementary role: strengthening conceptual understanding and critical thinking through the Read and Answer activities; developing communication and collaboration through the Discuss and Explain stages; and facilitating knowledge transfer and creativity through the Create stage. Nevertheless, the effectiveness of RADEC is highly dependent on the quality of activity design and the assessment strategies employed, particularly when creating learning products. Overall, RADEC can be regarded as a relevant and promising learning model for operationalizing deep learning in primary education, provided that its implementation and assessment are further strengthened and more standardized.

REFERENCES

Abidin, N. R., Purnomo, E. A., & Mawarsari, V. D. (2021, December). Radec Learning Design Model to Train 21st-Century Skills in Elementary School. In *Prosiding Seminar Nasional & Internasional*. https://jurnal.unimus.ac.id/index.php/psn12012010/article/view/9013/6046

Andriyani, F., & Ekawati, R. (2024). Systematic Literature Review: Model Pembelajaran RADEC terhadap Keterampilan Berpikir Siswa: Systematic Literature Review. *ELSE (Elementary School Education Journal): Jurnal Pendidikan dan Pembelajaran Sekolah Dasar*, *8*(3). http://dx.doi.org/10.30 651/else.v8i3.24425

Anggraeni, P. O. P. P. Y., Sunendar, D. A. D. A. N. G., Maftuh, B. U. N. Y. A. M. I. N., & Sopandi, W. A. H. Y. U. (2024). Changes in environmental conditions: 6Cs-oriented

RADEC learning model for elementary schools. *Journal of Engineering Science and Technology*, *19*(6), 33–40. https://jestec.taylors.edu.my/Special%20Issue%20ISCoE%202024_1/ISCoE2024_1_05.pdf

Asmara, A. (2022). Validity And Effectiveness Of The Radec Learning Model: A Research And Development To Improve Learning Activity Of Junior High School Students. *Journal of Positive School Psychology*, *6*(8). https://journalppw.com/index.php/jpsp/article/view/10222

Budhiarti, Y., Mytra, P., & Slow, L. (2025). The Role of Deep Learning in Elementary Education: Pedagogical Insights from a Literature Study. *Jurnal Pedagogi Dan Inovasi Pendidikan*, *1*(2). http://jurnal-pip.com/index.php/jpip/article/view/14

Burhanudin, B., Maftuh, B., Sujana, A., Sopandi, W., Sapriya, S., & Nanola, N. (2024). The RADEC Learning Model in Primary Schools: A Systematic Literature Review. *Mimbar Sekolah Dasar*, *11*(2), 487-511. https://doi.org/10.53400/mimbar-sd.v11i2.65596

Fatikhin, A. C., Budiyanto, M., & Qosyim, A. (2024). Enhancing Critical Thinking Skills in Junior High School Students through the RADEC Learning Model on Vibration Material. *Jurnal Pijar Mipa*, *19*(4), 586–593. DOI:10.29303/jpm.v19i4.6908

Fatimah, F., Darmansyah, D., Marlina, M., & Zaini, M. (2024). Enhancing Students' Reading Comprehension Skills through the RADEC Model: A Focus on Elementary Education. *AL-ISHLAH: Jurnal Pendidikan*, *16*(2), 2427–2439. https://doi.org/10.35445/alishlah.v16i2.5224

Hasibuan, A., Pebriana, P. H., & Fauziddin, M. (2024). Penerapan Model Pembelajaran RADEC untuk Meningkatkan Keterampilan Membaca Pemahaman pada Siswa Sekolah Dasar. *Journal of Education Research*, *5*(3), 2458-2466. https://doi.org/10.37985/jer.v5i3.741

Hendra, Z., & Makkasau, A. (2025). Pengaruh Model Pembelajaran RADEC (Read, Answer, Describe, Explain, and Create) terhadap Kemampuan Membaca Pemahaman Siswa. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *10*(04), 318–324. https://doi.org/10.23969/jp.v10i04.34295

Imran, M. E., & Amal, A. (2024). Pengaruh Model Radec (Read, Answer, Discussion, Explain, And Create) Terhadap Kemampuan Berpikir Tingkat Tinggi. *Jurnal Riset Guru Indonesia*, *3*(3), 139–148. https://doi.org/10.62388/jrgi.v3i3.454

Jannah, R., Amini, R., Muhammadi, M., & Desyandri, D. (2025). The Influence of Initial Ability and Critical Thinking on Science Learning Outcomes through RADEC-Based Comic Media. *Jurnal Penelitian Pendidikan IPA*, *11*(8), 935–940. DOI: 10.29303/jppipa.v11i8.11941

Kiska, N. D., Haryanto, E., & Indryani, I. (2024). Improving Students' Collaboration Skills Using the RADEC Learning Model in Elementary School Science Learning. *Jurnal Pijar Mipa*, *19*(2), 240–247. DOI: 10.29303/jpm.v19i2.6606

Lasari, R. N., Fadly, W., Nuranisak, P. F., & Karenina, A. (2023, May). The effectiveness of radec learning on critical and creative thinking in the era of super-smart society 5.0. In *Proceedings of the 4th International Conference on Progressive Education 2022 (ICOPE 2022)* (Vol. 746, p. 127). Springer Nature. DOI10.2991/978-2-38476-060-2_13

Maulana, Y., Sopandi, W., Sujana, A., Robandi, B., Agustina, N. S., Rosmiati, I., ... & Fasha, L. H. (2022). Development and validation of student worksheets on the ARE theme, based on the RADEC model and 4C skills. *Jurnal Penelitian Pendidikan IPA*, *8*(3), 1605–1611. DOI: 10.29303/jppipa.v8i3.1772

Maulida, N. A., Pratama, D. F., & Kelana, J. B. (2023). Use of the Read, Answer, Discuss, Explain, and Create Learning Model in Science Learning Knowledge Nature to Improve Elementary School Students' Ability to Understand Concepts. *Journal of Education and Teacher Training Innovation*, *1*(2), 78–87. https://doi.org/10.61227/jetti.v1i2.67

NOVIA, R. (2024). Pengaruh Model Pembelajaran Radec (Read, Answer, Discuss, Explain, Create) Terhadap Kemampuan Berpikir Kritis Siswa Pada Mata Pelajaran Bahasa Indonesia Kelas V Sd It Salsabila Palembang (Doctoral dissertation, Universitas PGRI Palembang).

Novianti, R., Latifah, N., & Kashefian-Naeeini, S. (2025). Digital Learning Innovation Through Application-Assisted RADEC Model: Let's Read About Elementary School Students' Writing Skills. *Profesi Pendidikan Dasar*, 48–65. https://doi.org/10.23917/ppd.v12i1.9830

Pati, D., & Lorusso, L. N. (2018). How to write a systematic review of the literature. *HERD: Health Environments Research & Design Journal*, *11*(1), 15–30. doi: 10.1177/1937586717747384.

Pratama, Y. A., Sopandi, W., & Hidayah, Y. (2019). RADEC Learning Model (Read-Answer-Discuss-Explain and Create): The Importance of Building Critical Thinking Skills in the Indonesian Context. *International Journal for Educational and Vocational Studies*, *1*(2), 109–115. https://doi.org/10.29103/ijevs.v1i2.1379

Purwanto, A., & Yanuarto, W. N. (2025). Effectiveness of RADEC Learning Model in Developing Critical Thinking Skills of Elementary School Students: A Systematic Literature Review. *Proceedings Series on Social Sciences & Humanities*, *25*, 197–205. https://conferenceproceedings.ump.ac.id/pssh/article/view/1690

Rashchikulina, E. N., Stepanova, N. A., Tuguleva, G. V., & Ilyina, G. V. (2016). Students' Training for the Realization of the Principle of Continuity in the Development of Children's Cognitive Abilities. *Indian Journal of Science and Technology*, *9*(37), 102–174. DOI:10.17485/ijst/2016/v9i37/102174

Satria, E., & Sopandi, W. (2019, October). Applying the RADEC model in science learning to promote students' critical thinking in elementary school. In *Journal of Physics: Conference Series* (Vol. 1321, No. 3, p. 032102). IOP Publishing. DOI:10.1088/1742-6596/1321/3/032102

Savitriana, H., Anjarwati, P., Kartika, R. A., & Nurhaliza, S. (2023). Model Pembelajaran RADEC Sebagai Alternatif Dalam Meningkatkan Higher Order Thinking Skills Pada Pembelajaran Ipa Di Sekolah Dasar: A Systematic Literature Review. *JIMU: Jurnal Ilmiah Multidisipliner*, *1*(01), 17–30. https://doi.org/10.31004/basicedu.v5i6.1680

Sopandi, W. (2019). Sosialisasi dan Workshop Implementasi Model Pembelajaran RADEC Bagi Guru-Guru Pendidikan Dasar dan Menengah. *Pedagogia: Jurnal Pendidikan*, *8*(1), 19–34. https://doi.org/10.21070/pedagogia.v8i1.1853

Sukmawati, I., Imron, A., & Soesanti, S. (2024). Implementation of the RADEC (Read, Answer, Discuss, Explain, Create) model, integrated with culturally responsive teaching, to improve students' 4C skills. *Jurnal Teori dan Praksis Pembelajaran IPS*, *9*(2), 114–130. https://doi.org/10.17977/um022v9i22024p114

Suryani, A., Sulyati, E., & Saepurokhman, A. (2025). The Read-Answer-Discuss-Explain-Create (RADEC) Model Assisted by Image Media to Improve Learning to Write Explanatory Texts for Fifth Grade Students. https://doi.org/10.34012/bip.v7i2.7552

Tulljanah, R., & Amini, R. (2021). Model pembelajaran RADEC sebagai alternatif dalam meningkatkan higher order thinking skill pada pembelajaran IPA di sekolah dasar: Systematic review. *Journal Basicedu*, *5*(6), 5508-5519. https://doi.org/10.31004/basicedu.v5i6.1680

Ulfa, M., Oktaviana, E., & Hasanah, N. (2024). Penerapan Model Radec dan Pembelajaran Berbasis Masalah dalam Meningkatkan Keterampilan Literasi. *PUSAKA: Journal of Educational Review*, *1*(2), 16–27. DOI:10.56773/pjer.v1i2.15

Ulum, A. M., & Alfani, M. F. (2025). The Effectiveness of the RADEC Learning Model in Improving Student Learning Achievement. *EDUCARE: Journal of Primary Education*, *6*(1), 31–48. https://doi.org/10.35719/educare.v6i1.313

Wells, G. (2002). Learning and teaching for understanding: The key role of collaborative knowledge building. *Advances in research on teaching*, *9*, 1–42. DOI:10.1016/S1479-3687(02)80004-9

Widodo, W., Suciati, S., & Hidayat, R. (2024). Implementasi model pembelajaran RADEC (read, answer, discuss, explain, create) serta dampaknya pada kemampuan berpikir tingkat tinggi dan kemampuan komunikasi. *Jurnal Studi Guru Dan Pembelajaran*, *7*(1), 270–285. https://doi.org/10.30605/jsgp.7.1.2024.3706

Yanuar, Y., Sopandi, W., Saud, U. S., & Riyana, C. (2022). An Empirical Approach to Online Radec Learning Model: Does it Affect Elementary Students' Creative Thinking Skills?. *European Online Journal of Natural and Social Sciences*, *11*(4), pp. 1279. http://european-science.com/eojnss/article/view/6556