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Analysis of the needs for RADEC-based social studies teaching materials

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ABSTRACT

This study aimed to analyze the need for developing RADEC-based Social Studies teaching materials to enhance environmental literacy among elementary school students in the Sarimukti Landfill area, West Bandung Regency. A descriptive qualitative approach was employed involving teachers and fifth-grade students from elementary schools located near the Sarimukti Landfill. Data were collected through questionnaires, observations, and interviews and analyzed using the interactive model of Miles and Huberman, consisting of data reduction, data display, and conclusion drawing. The findings revealed a strong need for contextual teaching materials that support reading activities, analytical questioning, collaborative discussions, concept explanation, and project creation. Students demonstrated positive responses to the RADEC learning stages and showed high interest in environmental learning, although their understanding of environmental issues remained limited. RADEC-based Social Studies teaching materials are needed to provide meaningful learning experiences and strengthen students' environmental literacy through contextual environmental issues surrounding the Sarimukti Landfill.



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Introduction

Environmental education has become an important issue in elementary education because schools play a strategic role in developing students' environmental awareness, attitudes, and behaviors from an early age (Arodani, 2025; Aisyah et al., 2024). Environmental literacy encompasses not only knowledge of the environment but also the ability to understand environmental problems, make responsible decisions, and demonstrate environmentally responsible behavior (Mawarni, 2024). Therefore, environmental literacy requires critical understanding and practical action rather than merely theoretical knowledge (Wulandari, 2025). In elementary schools, Social Studies provides an appropriate context for integrating environmental literacy because it is closely related to students' social and environmental experiences (Nurjanah, Puspitasari, Febriyanto, & Rosidah, 2026).

Despite its importance, previous studies indicate that elementary school students' environmental literacy remains relatively low, particularly in understanding environmental issues, making responsible decisions, and applying environmentally friendly behaviors in daily life. Similar findings emerged from preliminary observations conducted among students living around the Sarimukti Landfill area. Although students

demonstrated basic awareness of environmental issues, their understanding of waste impacts and sustainable waste management remained limited. These conditions highlight the need for contextual learning approaches and teaching materials that connect environmental concepts with real problems in students' surroundings (Suhelmi, Barokah, & Kamal, 2025).

The Sarimukti Final Disposal Site (FDS) in West Bandung Regency presents various environmental and social challenges that can serve as authentic learning resources. Waste disposal activities contribute to air, water, and soil pollution while also creating health and aesthetic problems for surrounding communities (Sari et al., 2023). Furthermore, the existence of the landfill influences local social conditions, including lifestyles, economic activities, and community interactions (Ariyanti, 2025). For students living near the landfill, these issues form part of their daily experiences and provide valuable opportunities for contextual learning.

However, these local environmental conditions have not been optimally integrated into Social Studies learning. Preliminary observations revealed that classroom instruction remains largely dependent on textbooks and worksheets, with teachers serving as the primary source of information. Learning activities tend to emphasize conceptual understanding rather than connecting content with local environmental problems. Consequently, students have limited opportunities to develop deeper environmental understanding, critical thinking skills, and responsible environmental behavior. Integrating local issues such as those found around the Sarimukti landfill has the potential to strengthen students' engagement and environmental responsibility (Damayanti et al., 2025).

Another challenge concerns the teaching materials currently used in schools, which are predominantly general in nature and insufficiently reflect students' local environmental contexts (Rohaeni, 2025). As a result, Social Studies learning has not fully utilized environmental issues surrounding the Sarimukti landfill as meaningful learning resources. This condition indicates the need for innovative and contextual teaching materials that encourage students' active participation through observation, discussion, and problem-solving activities related to environmental issues in their immediate surroundings (Djayadin, 2025).

One learning model that can support the development of such teaching materials is the RADEC (Read, Answer, Discuss, Explain, and Create) model (Pratiwi, Helsa, & Padang, 2025). RADEC emphasizes a systematic learning sequence that encourages reading, answering questions, discussion, explanation, and the creation of learning products (Shofwatul Abidah, 2025). This model has been shown to enhance critical thinking, collaboration, communication, and creativity skills (Rahmawati, Murniviyanti, & Riyanti, 2024). Previous studies also demonstrate its effectiveness in promoting active learning and higher-order thinking skills (Nurfadillah, 2024). Nevertheless, studies examining the need for RADEC-based Social Studies teaching materials to improve environmental literacy among students living around landfill areas remain limited (Desca, 2025). Therefore, this study aims to analyze the need for RADEC-based Social Studies teaching materials to enhance the environmental literacy of elementary school students in the Sarimukti landfill area, West Bandung Regency.

Method

This study employed a descriptive qualitative approach to analyze the needs of teachers and students regarding the development of RADEC-based Social Studies teaching materials aimed at improving environmental literacy in primary schools located near the Sarimukti Final Disposal Site (TPA). A qualitative approach was selected to obtain an in-depth understanding of participants' perceptions, experiences, and expectations related to environmental learning. Data were collected through questionnaires, classroom observations, and in-depth interviews, following the framework proposed by Wiwin Yuliani (2018). The questionnaire examined three main aspects, namely environmental literacy needs, Social Studies learning needs, and the characteristics of the RADEC learning model. Prior to implementation, the instrument was reviewed by experts and subjected to a readability test involving elementary school students to ensure its relevance, clarity, and suitability for the participants' developmental level.

To ensure data credibility, methodological triangulation (questionnaires, observations, and interviews) and source triangulation (teachers and students) were applied. Classroom observations focused on learning activities, teacher–student interactions, the use of teaching materials, and students' engagement in environmental learning, while interviews explored teachers' needs, challenges, and expectations regarding the development of RADEC-based teaching materials. Data analysis followed the interactive model of Miles and Huberman (2014), consisting of data reduction, data display, and conclusion drawing. During the analysis process, data were coded and organized into thematic categories related to environmental literacy, contextual learning needs, environmental content, learning activity preferences, and RADEC characteristics. The findings were

subsequently synthesized to formulate recommendations for developing contextual and relevant Social Studies teaching materials.

Results and Discussions

The findings of the observation indicate that social studies teaching in primary schools around the Sarimukti TPA is still dominated by the teacher's role. In the learning process, teachers tend to be the primary source of information delivery, whilst pupils largely act as recipients of information (Ety Nur Inah 2015). Furthermore, the teaching materials remain conventional: textbooks and worksheets. The use of such teaching materials has not yet been fully effective in linking the subject matter to the real-life conditions surrounding the pupils.

The teaching materials also do not yet make many connections with the pupils' immediate environment, particularly the environmental issues arising from the activities of the Sarimukti landfill. Yet these conditions could serve as a learning resource closely linked to the pupils' daily lives. Teachers also tend to deliver the material theoretically without providing contextual learning experiences (Ristan Rakim, Yahya Herman Liud, Julio Eleazer Nendissa 2025). Consequently, social studies lessons have not yet been fully able to provide relevant meaning for learners and have not been optimal in developing their understanding of the surrounding environment (Ahmad Susanto 2014).

Based on the interview results, the majority of pupils were already aware of the Sarimukti landfill, which is located near their homes. This indicates that the pupils have some prior experience and knowledge of this facility in their daily lives. However, their understanding of the landfill's environmental impact and of waste management efforts remains limited. Most pupils were unable to explain in any depth how the landfill's operations might affect the surrounding environment. Furthermore, pupils are also unable to link social studies concepts to environmental issues occurring in their immediate surroundings. Yet, the connection between the curriculum and environmental realities is crucial in helping pupils understand the subject matter in a more meaningful way (Iswati, Sukarman 2025).

This situation indicates that students' environmental literacy still needs improvement through more contextual and relevant learning (Gunawan, S. et al., 2025). Thus, the learning process can help students not only understand theory but also become sensitive to environmental issues in their surroundings.

Sub The Need for RADEC-Based Social Studies Teaching Materials

The teacher stated that the teaching materials currently in use are not yet capable of encouraging students' active engagement in learning. Teachers require teaching materials that not only contain subject content but also include learning activities that can enhance students' critical thinking skills and their concern for the environment. Based on the results of a questionnaire on pupils' needs regarding RADEC-based social studies teaching materials, which was distributed to 105 primary school pupils in the vicinity of the Sarimukti Waste-to-Energy Plant, the findings indicate that the majority of pupils have a strong need for social studies teaching materials that are contextual and relevant to their local environment, as shown in the following Figure 1.

Based on Figure 1, the questionnaire results indicate that most elementary school students around the Sarimukti Landfill require Social Studies learning that is contextual and closely related to their surrounding environment. At SDN Sarimukti, 71.4% of students considered the textbook easy to understand, while 61.9% expressed interest in learning materials that discuss environmental conditions around their homes and schools. A similar percentage stated that they preferred learning resources connected to their daily lives. However, more than half of the students (52.4%) reported that the current teaching materials did not adequately address local environmental issues.

A similar pattern was found at SDN Cicadas and SDN Jati. At SDN Cicadas, 75% of students expressed a desire to study Social Studies through local environmental contexts, and 60.7% believed that existing teaching materials lacked discussion of their surrounding environment. Likewise, at SDN Jati, 74.3% of students wished to learn through materials related to their local environment, while 54.3% felt that the current curriculum provided limited coverage of local environmental issues. These findings indicate a consistent need for more relevant and contextual learning resources across schools.

The strongest demand was identified at SDN 1 Rajamandala Kulon. Although only 28.6% of students considered the current Social Studies textbooks easy to understand, 76.2% expressed interest in learning materials related to their living environment. Moreover, 95.2% of students stated that the teaching materials currently used did not adequately discuss local environmental conditions. These results demonstrate a substantial need for contextualized Social Studies teaching materials that are more closely aligned with students' experiences and environmental realities.

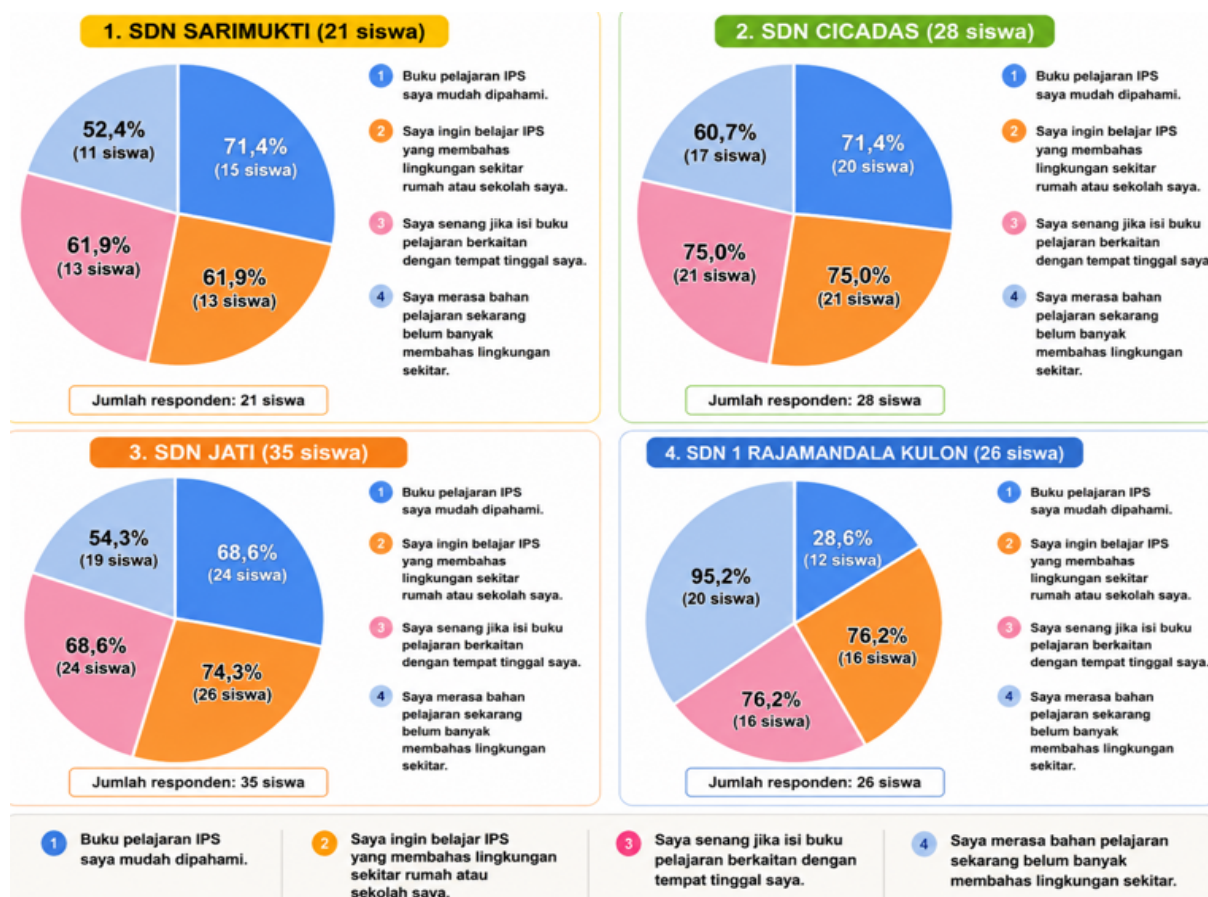


Figure 1. Diagram of Social Studies Teaching Materials Requirements

The need for RADEC-based Social Studies teaching materials was closely linked to students' environmental literacy challenges. Although students were familiar with environmental issues surrounding the Sarimukti Landfill, many experienced difficulties in understanding environmental impacts, analyzing problems, and identifying potential solutions. Variations in the level of need among schools were influenced by differences in environmental exposure, learning resources, and instructional practices. Overall, the findings indicate a strong need for contextual Social Studies teaching materials that integrate local environmental issues and apply the RADEC model to support the development of environmental literacy among elementary school students.

RADEC Model Requirements

Based on the results of the questionnaire on the RADEC learning model administered to primary school pupils in the vicinity of the Sarimukti TPA, the data indicate that the majority of pupils responded positively to the learning stages within the RADEC model, namely Read, Answer, Discuss, Explain, and Create. The results of the RADEC model need assessment can be seen in the following Figure 2.

The results presented in Figure 2 indicate that elementary school students around the Sarimukti Landfill generally responded positively to learning activities represented in the RADEC model. At SDN Sarimukti, students showed the greatest interest in creating projects (76.2%), while interest in reading, answering questions, discussing, and explaining ranged from 38.1% to 52.4%. Similar findings were observed at SDN Cicadas, where project-based activities (71.4%) and answering questions after reading (67.9%) received the highest responses. These results suggest that students are particularly attracted to active and creative learning experiences.

At SDN Jati and SDN 1 Rajamandala Kulon, students also demonstrated positive responses to the stages of the RADEC model. At SDN Jati, discussion activities (74.3%) and answering questions (71.4%) were the most preferred learning activities, followed by project creation (68.6%). Likewise, students at SDN 1 Rajamandala Kulon showed strong interest in discussions (76.9%), answering questions (65.4%), and reading activities (57.7%). These findings indicate that students value opportunities to interact, exchange ideas, and actively participate in the learning process.

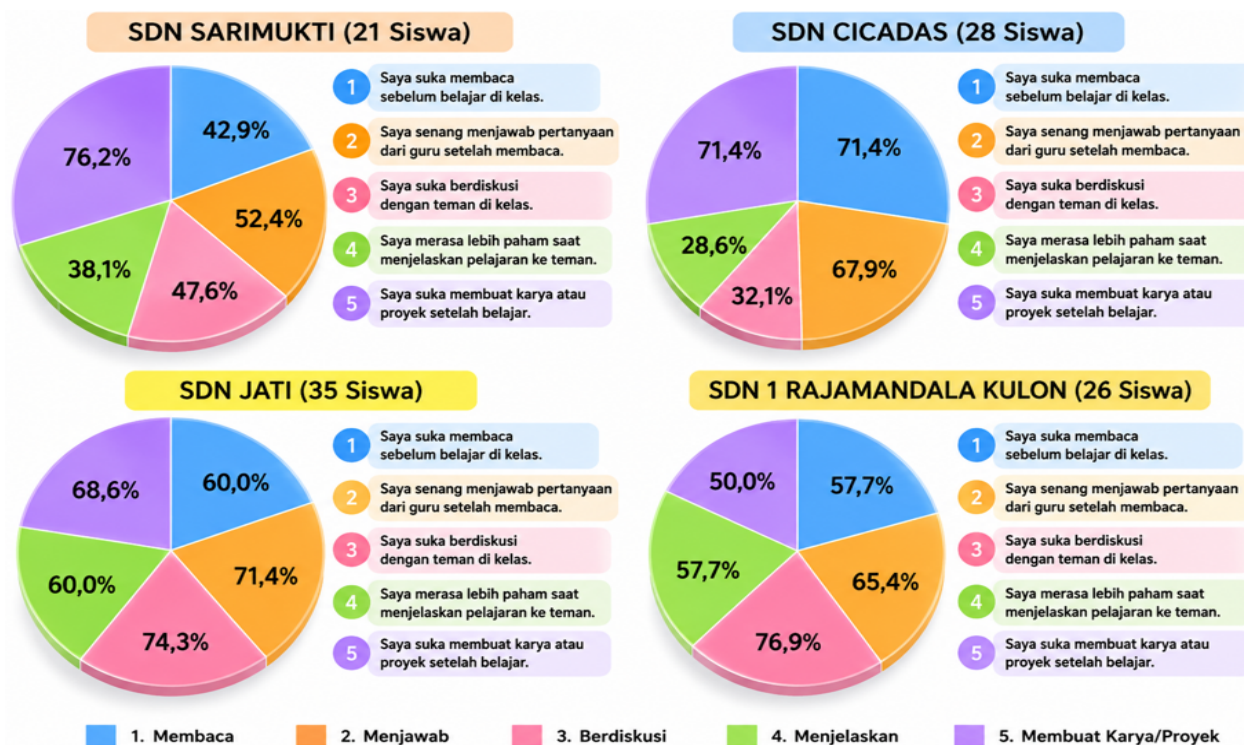


Figure 2. RADEC Model Requirements Diagram

The positive responses toward RADEC activities reflect more than simple learning preferences. Further analysis revealed that students need learning experiences that are contextual, interactive, and oriented toward real-world problem solving. Students expressed the need to understand environmental issues surrounding the Sarimukti Landfill, discuss possible solutions collaboratively, communicate their ideas, and engage in meaningful projects. Therefore, the preference for RADEC-related activities demonstrates a broader need for learning approaches that support active engagement and environmental literacy development.

The findings also provide important guidance for designing RADEC-based Social Studies teaching materials. Contextual reading materials can support the Read stage, while analytical questions can strengthen the Answer stage. Collaborative discussions and presentation activities can facilitate the Discuss and Explain stages, whereas project-based tasks can support the Create stage by encouraging students to develop practical solutions to local environmental problems. Overall, the results indicate that the RADEC model has considerable potential to enhance active participation, contextual learning, and environmental literacy among elementary school students.

Students' Environmental Literacy

Based on a survey of the environmental literacy of primary school pupils in the vicinity of the Sarimukti landfill site, the data indicate that the majority of pupils already possess basic awareness and knowledge of the environment, although the level of understanding varies across schools. The results regarding the environmental literacy of pupils in the vicinity of the Sarimukti landfill site are shown in the following Figure 3.

Figure 3 indicates that students around the Sarimukti Landfill generally possess a basic awareness of environmental issues. At SDN Sarimukti, most students had heard about landfills (71.4%), understood the impact of waste on environmental and public health (90.5%), and expressed a strong desire to learn more about environmental issues (100%). In addition, 81% of students stated their willingness to participate in maintaining environmental cleanliness. These findings suggest a high level of interest in environmental learning among students.

Similar trends were observed at SDN Cicadas and SDN Jati. At SDN Cicadas, 78.6% of students were familiar with landfills, 67.9% understood the environmental impacts of waste, and 85.7% expressed interest in learning more about environmental issues. Likewise, at SDN Jati, 80% of students had heard of landfills and wished to deepen their environmental knowledge, while 60% demonstrated awareness of the environmental and health impacts of waste. These results indicate that students generally show positive attitudes toward environmental learning and environmental protection.

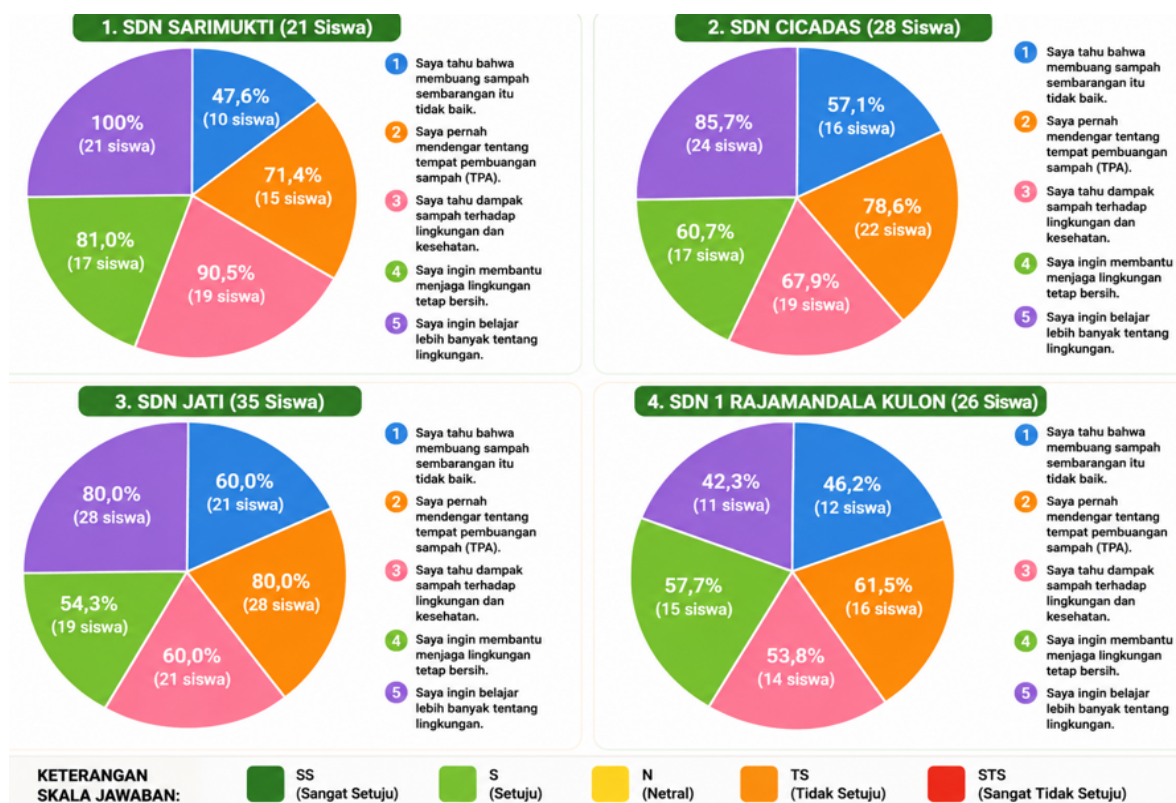


Figure 3. Diagram of Students' Environmental Literacy

In contrast, students at SDN 1 Rajamandala Kulon demonstrated relatively lower levels of environmental understanding and interest. Although 61.5% had heard of landfills and 57.7% expressed a willingness to maintain environmental cleanliness, only 53.8% understood the impacts of waste, and 42.3% indicated a desire to learn more about environmental issues. These findings suggest the need for more contextual and engaging learning experiences to strengthen students' environmental awareness and motivation.

Further analysis revealed that students' environmental literacy needs encompass three main dimensions. First, in terms of environmental knowledge, students were generally familiar with environmental issues surrounding the Sarimukti Landfill but had limited understanding of their broader causes and consequences. Second, regarding environmental attitudes, students demonstrated positive concern for environmental issues and a willingness to learn about environmental protection. Third, in relation to environmental behavior, students showed limited involvement in activities requiring problem-solving, decision-making, and direct environmental action.

The findings also indicate that students' strong interest in environmental learning represents a valuable opportunity for developing RADEC-based Social Studies teaching materials. This interest can be utilized through contextual reading materials, discussion activities, environmental case analyses, and project-based learning tasks that actively engage students in environmental inquiry and problem-solving. Overall, although students already possess basic environmental awareness, there remains a need to strengthen their understanding, participation, and responsible environmental actions through contextual Social Studies learning integrated with the RADEC model.

The findings indicate that Social Studies learning in elementary schools around the Sarimukti Landfill is still predominantly teacher-centered, with teachers acting as the primary source of information and students playing relatively passive roles. The teaching materials currently used, mainly textbooks and worksheets, have not sufficiently integrated local environmental contexts, resulting in learning experiences that are less meaningful and less engaging for students (Yeni Haryonik, 2018). Consequently, students have limited opportunities to develop environmental literacy competencies because environmental topics are generally presented in a broad and decontextualized manner. This condition reduces students' ability to connect academic concepts with environmental issues encountered in their daily lives.

The Sarimukti Landfill area offers considerable potential as a contextual learning resource, particularly for studying issues related to waste management, pollution, and their social impacts (Mohammad Luthfi Saputra, 2020). However, the findings revealed that Social Studies instruction remains largely theoretical and has not

optimally utilized local environmental issues as learning resources. As a result, students often experience difficulties relating classroom concepts to real environmental conditions. The limited integration of local contexts may reduce students' opportunities to develop deeper understanding and meaningful learning experiences regarding environmental issues in their surrounding communities.

Interview results further revealed that although most students were familiar with the existence of the Sarimukti Landfill, their understanding of environmental impacts and waste management remained limited. Many students were unable to explain comprehensively the relationship between human activities and environmental degradation. These findings indicate that students' environmental literacy has not yet developed comprehensively, despite their relatively high environmental awareness and interest in environmental learning (Khasanah, N., Puspitasari, D., Mufidah, E., Kurniyadi, R., Afroni, A., & Aji, 2025). Both teachers and students expressed a need for contextual Social Studies materials that encourage active participation, critical thinking, and creativity. This finding is consistent with the view that environmental literacy encompasses not only environmental knowledge but also the ability to analyze issues, evaluate alternatives, and make responsible environmental decisions (Azdkia, H., Fauziah, N., & Purwandari, E., 2024).

From the perspective of environmental literacy theory, environmentally literate individuals are expected to possess knowledge, awareness, investigative skills, and the capacity to take responsible environmental action. The results suggest that students have begun to develop environmental awareness through their exposure to environmental conditions around the Sarimukti Landfill. However, opportunities to investigate environmental problems, engage in discussion, and participate in solution-oriented activities remain limited. Therefore, learning approaches that actively involve students in analyzing local environmental issues are necessary to support the progression of environmental literacy from basic awareness toward higher-order competencies (Khasanah, N., et al., 2025).

The findings also identified the RADEC (Read, Answer, Discuss, Explain, and Create) model as a suitable approach for addressing these needs. RADEC emphasizes reading, responding to questions, discussing ideas, explaining concepts, and creating products or projects as part of the learning process (Marissa, 2024). Questionnaire results demonstrated positive student responses toward the RADEC stages, particularly the Create stage, indicating strong interest in project-based and active learning activities. Previous studies have also shown that the RADEC model can enhance literacy, critical thinking, communication, collaboration, and creativity skills (Pohan & Gajah, 2026). Therefore, the development of RADEC-based Social Studies teaching materials is considered highly relevant to the needs of students living around the Sarimukti Landfill.

From an environmental literacy perspective, the RADEC model aligns closely with the core dimensions of environmental literacy described by Abidah, S. (2025). The Read stage facilitates the acquisition of environmental knowledge, while the Answer and Discuss stages support analytical thinking and critical evaluation of environmental problems. The Explain stage strengthens communication skills and reflective thinking, which are essential for informed environmental decision-making. Furthermore, the Create stage provides opportunities for students to transform their understanding into practical actions and solutions, thereby fostering environmentally responsible behavior. These characteristics indicate that RADEC-based Social Studies teaching materials have considerable potential to address the environmental literacy needs identified among elementary school students in the Sarimukti Landfill area.

Conclusions

This study concludes that Social Studies learning in elementary schools around the Sarimukti Landfill remains dominated by teacher-centered instruction and teaching materials that are insufficiently connected to local environmental contexts. Both teachers and students expressed a strong need for contextual teaching materials that promote active learning, critical thinking, creativity, and environmental awareness. Students also demonstrated positive responses to the RADEC (Read, Answer, Discuss, Explain, and Create) model, indicating its potential to support environmental literacy development. Therefore, the development of RADEC-based Social Studies teaching materials that utilize environmental issues surrounding the Sarimukti Landfill is recommended. The novelty of this study lies in identifying the need for contextual RADEC-based teaching materials that integrate authentic local environmental issues to strengthen environmental literacy in elementary Social Studies education.

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