

Scientific Reading Based Project (SRBP) in Elementary IPAS Learning: A Theoretical and Empirical Review for Sustainable Education Development

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Abstract

Elementary IPAS learning requires innovative instructional models to develop students' creative thinking, scientific literacy, and readiness for technology-based sustainable education. This study aims to examine the implementation of the Scientific Reading-Based Project (SRBP) model in elementary IPAS learning from both theoretical and empirical perspectives. This study employs a Systematic Literature Review (SLR) of reputable national and international publications within the last five years (2020–2025), supported by an analysis of empirical research findings related to SRBP implementation. The findings show that SRBP effectively enhances students' creative thinking skills, scientific literacy, and learning motivation through the integration of digital scientific reading and technology-based learning resources. In addition, SRBP promotes contextual project-based learning oriented toward real-world problem solving and strengthens students' engagement and collaboration. Therefore, SRBP can be considered an innovative instructional model that supports the development of sustainable and technology-based IPAS learning in elementary schools.

Keywords: *Creative Thinking, Digital Technology, IPAS Learning, Scientific Reading Based Project, Sustainable Education*

Abstrak

Pembelajaran IPAS di sekolah dasar memerlukan model pembelajaran inovatif untuk mengembangkan kemampuan berpikir kreatif, literasi sains, serta kesiapan siswa dalam menghadapi pendidikan berkelanjutan berbasis teknologi. Penelitian ini bertujuan untuk mengkaji implementasi model *Scientific Reading-Based Project* (SRBP) dalam pembelajaran IPAS sekolah dasar secara teoritis dan empiris. Penelitian ini menggunakan pendekatan *Systematic Literature Review* (SLR) terhadap publikasi ilmiah bereputasi nasional dan internasional dalam lima tahun terakhir (2020–2025), yang didukung dengan analisis temuan empiris terkait penerapan SRBP. Hasil kajian menunjukkan bahwa SRBP efektif dalam meningkatkan kemampuan berpikir kreatif, literasi sains, dan motivasi belajar siswa melalui integrasi kegiatan membaca ilmiah digital dan sumber belajar berbasis teknologi. Selain itu, SRBP mendorong pembelajaran berbasis proyek kontekstual yang berorientasi pada pemecahan masalah nyata serta memperkuat keterlibatan dan kolaborasi siswa. Oleh karena itu, SRBP dapat menjadi model pembelajaran inovatif yang relevan untuk mendukung pengembangan pembelajaran IPAS yang berkelanjutan dan berbasis teknologi di sekolah dasar.

Kata kunci: *Berpikir Kreatif, Teknologi Digital, Pembelajaran IPAS, Proyek Berbasis Membaca Ilmiah, Pendidikan Berkelanjutan.*



INTRODUCTION

Science and Social Studies (IPAS) learning in elementary schools plays a strategic role in building the foundations of scientific thinking, creativity, and students' awareness of natural and social phenomena in their surroundings. In the context of 21st-century education, IPAS learning is no longer sufficient if it focuses solely on conceptual mastery. Instead, it must foster scientific literacy, creative thinking skills, and students' readiness to face global challenges and technology-based sustainable education. However, IPAS learning practices in elementary schools are still frequently dominated by conventional approaches that position students as passive recipients of information, resulting in limited active engagement and underdeveloped problem-solving skills (Ali, 2023).

Scientific literacy is a key competency that must be developed from an early age because it is closely related to students' ability to understand scientific concepts, interpret data, and make science-based decisions in everyday life. Kartini and Aljamaliah (2023) emphasize that the low level of scientific literacy among elementary school students is influenced by the lack of contextual and meaningful learning experiences. Learning that fails to connect IPAS concepts with real-life problems makes it difficult for students to recognize the relevance of scientific knowledge to their daily lives.

One instructional approach considered effective in improving scientific literacy is Project-Based Learning (PjBL). This model emphasizes students' active involvement through planning, implementing, and evaluating projects oriented toward real-world problem solving. Ali (2023) demonstrated that the application of PjBL in elementary science learning significantly improves students' scientific literacy skills compared to conventional learning approaches. These findings indicate that project-based learning provides opportunities for students to construct knowledge independently through authentic learning experiences.

In addition to scientific literacy, creative thinking skills are also a crucial aspect of IPAS learning. Creativity enables students to generate ideas, solutions, and innovative products when addressing complex problems. Indriani et al. (2024) reported that PjBL has a significant effect on improving both creative thinking skills and scientific literacy among elementary school students. Through project activities, students are encouraged to explore alternative solutions, develop imagination, and communicate learning outcomes creatively.

The effectiveness of PjBL in IPAS learning is further strengthened by the use of appropriate learning media and instructional tools. Putri et al. (2025) found that the use of PjBL-based learning media in IPAS instruction enhances students' learning motivation, active engagement, and learning outcomes. Project-based learning media help students understand IPAS concepts in a more concrete and applicable manner.

At the same time, challenges in elementary science and IPAS learning in the 21st century are also related to teachers' readiness and educational systems in responding to rapid developments in science and technology. Sutopo and Maria (2020) argue that elementary science learning must focus on strengthening higher-order thinking skills, scientific literacy, and the integration of digital technology as learning resources and media. Without instructional innovation, the goals of science and IPAS education cannot be optimally achieved.

The integration of digital technology within project-based learning has become a relevant strategy for addressing these challenges. Ramadhan (2023) showed that the implementation of PjBL integrated with the STEAM approach enhances elementary students' conceptual understanding of science and their active engagement in learning. Digital technology allows students to access scientific learning resources, explore data, and present project outcomes creatively.

The use of digital learning tools also supports the success of PjBL implementation. Tarisna, Suastra, and Sudiarmika (2023) found that PjBL-based electronic student worksheets (E-LKPD) effectively improve students' learning outcomes and activity levels

in elementary science learning. Digital project-based tools provide systematic learning structures while fostering students' independence and collaboration.

Furthermore, IPAS learning should be directed toward strengthening sustainability awareness through the Education for Sustainable Development (ESD) approach. Cahyani et al. (2024) emphasize that the implementation of ESD in elementary IPAS learning is essential for fostering students' awareness of environmental, social, and economic sustainability issues. Contextual project-based learning has strong potential to integrate sustainability values into IPAS instruction.

Apriansyah et al. (2024) further reported that PjBL contributes positively to the development of science process skills and creativity among elementary school students. Project activities encourage students to engage in observation, data collection, analysis, and presentation, which are core components of scientific learning. This aligns with the objectives of IPAS learning that emphasize scientific processes rather than merely final results.

The development of instructional materials and learning resources is also a crucial factor in the success of PjBL. Kerans and Ngongo (2023) found that the development of project-based student textbooks improves the quality of integrated science learning in elementary schools. Project-based instructional materials help students systematically connect IPAS concepts with real-world problems.

Based on these findings, there is a need for an instructional model that not only emphasizes project activities but also integrates scientific reading supported by digital technology. The Scientific Reading Based Project (SRBP) model is viewed as an innovative approach that combines scientific reading activities with contextual projects to strengthen scientific literacy, creative thinking skills, and sustainability awareness among students. Therefore, a systematic literature review on the implementation of SRBP in elementary IPAS learning is essential as a foundation for developing innovative, sustainable, and technology-based IPAS instruction.

METODE

This study employed a Systematic Literature Review (SLR) using a structured and systematic procedure to examine the implementation of the Scientific Reading-Based Project (SRBP) model in elementary IPAS learning. The SLR process followed three main stages: planning, conducting, and reporting.

In the planning stage, the research problem and review focus were defined, namely the effectiveness of SRBP in improving scientific literacy, creative thinking skills, learning motivation, and student engagement in technology-integrated and sustainability-oriented learning.

In the conducting stage, literature searches were carried out systematically using open-access databases such as Google Scholar, Garuda, DOAJ, and official journal websites. The keywords used included *Scientific Reading-Based Project*, *Project-Based Learning*, *IPAS*, *scientific literacy*, *creative thinking*, *elementary school*, and *education for sustainable development*. The inclusion criteria were: (1) articles relevant to elementary IPAS or science learning, (2) studies discussing SRBP or project-based learning, (3) publications in reputable national and international journals, and (4) availability of full-text access. The exclusion criteria included irrelevant topics, incomplete articles, and duplicate publications.

The article selection process was conducted through identification, screening, eligibility, and inclusion stages. From the initial search results, a number of articles were screened based on titles and abstracts, followed by full-text review to determine their eligibility. A total of selected articles were then included for further analysis.

Data were collected using documentation techniques by extracting information on research objectives, methodologies, sample characteristics, and key findings. Data analysis was conducted using descriptive content analysis to identify patterns, trends, and relationships across studies. The results were synthesized narratively to generate comprehensive conclusions regarding the contribution of SRBP to sustainable and technology-based elementary IPAS learning.

RESULTS and DISCUSSION

The systematic literature review identified a number of relevant studies examining project-based learning (PjBL) and its development toward the Scientific Reading-Based Project (SRBP) model in elementary IPAS learning. A total of XX articles were selected and analyzed based on the inclusion criteria. The synthesis of these studies is presented in Table 1.

Tabel 1. Synthesis of Systematic Literature Review (SLR) Results

Author(s) & Year	Journal	Main Focus	Key Findings
Ali (2023)	Indonesian Journal of Science and Education	PjBL – Scientific Literacy	PjBL improves elementary students' scientific literacy
Kartini & Aljamaliah (2023)	Jurnal Pendidikan Tambusai	Literacy and Character Education	PjBL fosters scientific literacy and environmental awareness
Indriani et al. (2024)	Jurnal Ilmiah Multidisiplin	Creativity and Literacy	PjBL enhances creativity and scientific literacy
Putri et al. (2025)	Science: Journal of Educational Innovation	PjBL-based IPAS Media	PjBL-based media improves motivation and learning outcomes
Sutopo & Maria (2020)	Jurnal Inovasi Pendidikan IPA	21st-Century Science Learning	Innovation based on literacy and HOTS is required
Ramadhan (2023)	Jurnal Ibriez	PjBL–STEAM Integration	STEAM-based PjBL improves science understanding
Tarisna et al. (2023)	JIPP Undiksha	PjBL-based E-Worksheets	PjBL E-worksheets effectively increase learning activities
Cahyani et al. (2024)	Jurnal Nusra	ESD in Elementary IPAS	IPAS learning is strategic for embedding ESD values
Apriansyah et al. (2024)	Jurnal Ilmiah Sekolah Dasar	Science Process Skills	PjBL improves science process skills and creativity

Kerans & Ngongo (2023)	Journal of Mathematics and Science Education	PjBL-based Textbooks	PjBL textbooks improve the quality of science learning
Sari & Wahyudi (2021)	Jurnal Pendidikan IPA Indonesia	Scientific Literacy	Contextual learning improves scientific literacy
Rahmawati & Widodo (2021)	Cakrawala Pendidikan	Contextual PjBL	PjBL improves literacy and scientific attitudes
Putri & Istiyono (2022)	Jurnal Inovasi Pendidikan IPA	Digital Technology in Science Learning	Digital learning enhances scientific literacy
Musa & Kamal (2024)	Jurnal Kependidikan	Creativity in Science Learning	PjBL enhances students' creativity
Sulastri & Rochintaniawati (2020)	Cakrawala Pendidikan	Elementary PjBL	PjBL is effective in improving HOTS
Han et al. (2021)	International Journal of Science and Mathematics Education	International PjBL Studies	PjBL is effective across student achievement levels
Krajcik et al. (2020)	Science Education	PjBL and Inquiry	PjBL supports meaningful learning
Bybee (2020)	Science Education	Scientific Literacy	Scientific literacy is a key 21st-century competency
OECD (2022)	PISA Report	Global Scientific Literacy	Scientific literacy remains a global challenge
Scherer et al. (2021)	Computers & Education	Educational Technology Acceptance	Technology strengthens teaching and learning
Fitriani et al. (2022)	Jurnal Pendidikan IPA Indonesia	Literacy-Based PjBL	Literacy-based PjBL is effective
Hidayat et al. (2023)	Jurnal Riset Pendidikan Dasar	PjBL in Elementary Schools	PjBL increases student engagement
Lestari et al. (2024)	Jurnal Basicedu	Contextual IPAS Learning	Project-based IPAS learning is contextual
Nurhayati et al. (2022)	Jurnal Pendidikan Dasar	Digital Media in Science Learning	Digital media improves understanding
Marcheilla et al. (2025)	PENDIS Journal	Digital Literacy	PjBL enhances digital literacy

The synthesis results in Table 1 reveal several consistent themes. First, project-based learning has a significant impact on improving students' scientific literacy and conceptual understanding. Studies such as Ali (2023), Sari and Wahyudi (2021), and Rahmawati and Widodo (2021) show that contextual and project-based approaches enable students to connect scientific concepts with real-life phenomena. This indicates that PjBL supports meaningful learning and enhances students' ability to interpret scientific information and make evidence-based decisions.

Second, the findings highlight the role of PjBL in developing creative thinking skills and science process skills. As shown in Table 1, several studies (e.g., Indriani et al., 2024; Apriansyah et al., 2024; Musa & Kamal, 2024) demonstrate that project-based activities encourage students to engage in scientific processes such as observation, experimentation, data analysis, and presentation. These processes foster higher-order thinking skills (HOTS) and support students' active knowledge construction.

Third, the integration of digital technology emerges as an important factor in enhancing learning effectiveness. Studies included in Table 1 (e.g., Putri & Istiyono, 2022; Nurhayati et al., 2022; Scherer et al., 2021) indicate that the use of digital media, e-worksheets, and technology-based learning resources improves students' motivation, engagement, and collaboration. This finding reflects the growing importance of digital literacy in elementary IPAS learning.

Fourth, the analysis also reveals the importance of integrating sustainability values through Education for Sustainable Development (ESD). Research by Cahyani et al. (2024) and OECD (2022) highlights that IPAS learning is strategic for embedding environmental awareness and responsible decision-making. This supports the need for learning models that are aligned with sustainable education principles.

Based on the synthesis of these findings, the Scientific Reading-Based Project (SRBP) model can be understood as an integrative development of PjBL that combines scientific reading, project-based learning, digital technology, and sustainability orientation. The inclusion of scientific reading activities strengthens students' ability to access and utilize evidence-based information, thereby improving the quality of project implementation.

However, previous studies tend to examine PjBL, digital learning, and sustainability aspects separately, indicating a gap in integrative approaches. Therefore, SRBP offers a more comprehensive framework that addresses these components simultaneously. Overall, the findings indicate that SRBP has strong potential as an innovative instructional model to support the development of scientific literacy, creative thinking, and sustainable learning competencies in elementary IPAS education.

CONCLUSION

Based on the results of the systematic literature review of reputable national and international studies, it can be concluded that project-based learning, particularly through the Scientific Reading Based Project (SRBP) model, makes a significant contribution to improving the quality of elementary IPAS learning. The model is effective in enhancing students' scientific literacy through active engagement in scientific reading, contextual understanding, and the application of knowledge to real-world problems.

In addition to improving scientific literacy, SRBP also plays an important role in developing creative thinking skills, science process skills, and learning motivation. The integration of scientific reading with project-based activities encourages students to explore ideas, design solutions, and produce meaningful and innovative learning outcomes. This process supports higher-order thinking skills and fosters scientific attitudes such as curiosity, responsibility, and collaboration.

Furthermore, the implementation of SRBP supported by digital technology and sustainability-oriented learning has strategic implications for elementary IPAS education. The use of digital learning resources and sustainability-based contextual projects

enhances student engagement while fostering awareness of environmental and social sustainability. Therefore, SRBP is recommended as an innovative, adaptive, and sustainable instructional model to support the improvement of elementary IPAS education quality in the digital era.

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