

The Relationship between Reading Interest and Students' Scientific Literacy in Social Studies Subjects

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Abstract

Reading interest is a theoretically relevant factor in students' capacity to access, interpret, and use information for evidence-based reasoning. However, elementary students' scientific literacy remains a persistent concern, particularly in Social Studies learning, where students are expected to connect human-environment issues, social phenomena, and everyday decision-making with empirical evidence. This study aimed to examine the relationship between reading interest and students' scientific literacy in Social Studies learning. A quantitative correlational design was employed involving all 28 fifth-grade students at SD Negeri Genuk 01, West Ungaran District, Semarang Regency, in the 2024/2025 academic year. Data were collected using a reading interest questionnaire and a scientific literacy essay test. The data were analyzed using descriptive statistics, assumption testing, Pearson Product Moment correlation, and coefficient of determination with SPSS. The results showed that students' reading interest was in the good category ($M = 73.71$), and their scientific literacy was also in the good category ($M = 74.52$). The correlation analysis indicated a significant positive relationship between reading interest and scientific literacy, $r(26) = .724$, $p < .001$, with reading interest explaining 52.4% of the variance in scientific literacy scores. These findings suggest that reading interest is strongly associated with students' scientific literacy in elementary Social Studies, although the correlational design does not permit causal inference. Strengthening school literacy culture, access to meaningful reading materials, and inquiry-oriented reading activities may support students' evidence-based reasoning.

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Introduction

Scientific literacy has become a fundamental educational competence in the twenty-first century because students are increasingly required to interpret information, evaluate evidence, and make responsible decisions in complex social, technological, and environmental contexts. Although scientific literacy is often positioned within science education, its relevance extends beyond science subjects because contemporary learners encounter scientific information in various school disciplines, including Social Studies. In elementary Social Studies, students learn about human-environment interaction, natural resources, public health, disaster awareness, population dynamics, technology in society, and civic decision-making. These topics require students not only to remember factual information but also to read texts critically, identify relationships between social and environmental phenomena, and construct evidence-based explanations. Therefore, scientific literacy should be understood as a cross-curricular competence that supports students'

ability to participate meaningfully in everyday life and democratic society (Bybee et al., 2009; Fives et al., 2014; Gormally et al., 2012; OECD, 2023; Turiman et al., 2012).

Internationally, scientific literacy remains a major concern in basic education. The PISA framework emphasizes that scientifically literate students should be able to explain phenomena scientifically, evaluate and design scientific inquiry, and interpret data and evidence in context. These competencies are closely related to reading because students must process written information, tables, visual data, and contextual problems before making judgments or drawing conclusions (Cao et al., 2024; Caponera et al., 2016; Cromley, 2009; OECD, 2023). In Indonesia, this issue is particularly urgent because national and international evidence has repeatedly shown that students' scientific literacy still needs substantial improvement. Studies conducted in Indonesian elementary and secondary education indicate that students often face difficulties in connecting scientific concepts with real-life phenomena, interpreting evidence, and applying knowledge to contextual problems (Fakhriyah et al., 2017; Kadaritna et al., 2020; Widodo et al., 2020; Winarni et al., 2020; Yusmar & Fadilah, 2023). These findings suggest that scientific literacy problems should not be treated merely as weaknesses in science instruction, but also as literacy-related challenges that influence how students access, understand, and use knowledge across subjects.

One affective factor that may support scientific literacy is reading interest. Reading interest refers to students' enjoyment, attention, willingness, and internal tendency to engage with reading materials. It differs from reading ability, which reflects performance, and from reading habit, which refers to repeated reading behavior. Interest development theory explains that students' interest can move from situational interest to more stable individual interest when learning materials are meaningful, relevant, and supported by positive learning experiences (Hidi & Renninger, 2006; Schiefele et al., 2012; Wigfield & Guthrie, 1997). Similarly, reading motivation research indicates that students who value reading and enjoy reading activities tend to read more frequently, apply comprehension strategies more actively, and demonstrate stronger engagement with academic texts (Baker & Wigfield, 1999; Barber & Klauda, 2020; Guthrie & Klauda, 2014; Guthrie et al., 2004; Mol & Bus, 2011; Petscher, 2010). From this theoretical perspective, reading interest may contribute to scientific literacy because students who are more interested in reading are more likely to engage deeply with texts containing scientific, social, and environmental information.

The relationship between reading and scientific literacy is also supported by the language-based view of science learning. Scientific knowledge is communicated through language, argumentation, representation, and evidence; therefore, students' ability to read and interpret texts is central to scientific understanding (Fang & Wei, 2010; Norris & Phillips, 2003; Yore & Treagust, 2006). In classroom contexts, students who read scientific or socio-environmental texts must identify key ideas, distinguish claims from evidence, infer relationships, and communicate explanations. These processes are not limited to science subjects because Social Studies texts also present empirical information about society, environment, geography, and human activity. Hence, when Social Studies learning involves topics such as environmental change, resource use, and social consequences of technology, reading interest may become an important motivational condition that enables students to

approach the text more actively and construct meaning more effectively (Dori et al., 2018; Dragoş & Mih, 2015; Ke et al., 2021; Suryanti et al., 2024).

Recent international studies from 2020 to 2026 have strengthened the argument that reading-related factors are associated with scientific literacy and academic achievement. Cao et al. (2024), using PISA 2018 data and machine-learning analysis, found that reading engagement was an important factor associated with students' scientific literacy. Earlier large-scale studies also demonstrated that reading literacy contributes to achievement in science and mathematics because students' success in these domains depends partly on their capacity to comprehend and use written information (Caponera et al., 2016; Cromley, 2009). In addition, studies on reading motivation and engagement show that students' affective orientation toward reading is closely associated with comprehension, persistence, and learning outcomes (Barber & Klauda, 2020; Guthrie & Klauda, 2014; Schiefele et al., 2012). These findings indicate that reading interest should not be viewed as a peripheral variable, but as a meaningful psychological and pedagogical factor that may shape how students process scientific information in school learning.

National studies in Indonesia provide similar evidence, although most have focused on language learning or science subjects rather than Social Studies. Agustin and Suprapti (2024) reported a positive relationship between reading interest and Indonesian language learning outcomes among elementary students, while Azzahra and Apoko (2024) showed that literacy movement activities could increase elementary students' reading interest through structured reading practices and school support. Resitaningrum and Saptono (2024) found that reading interest was related to reading comprehension skills in Grade IV students, particularly when children's literature was used as meaningful reading material. In science education, Winarni et al. (2020) demonstrated that discovery learning supported by ICT media improved language and scientific literacy among elementary students, whereas Kadaritna et al. (2020) identified the need to strengthen scientific literacy among elementary school students in Indonesian contexts. These studies collectively show that reading interest, reading comprehension, and scientific literacy are interconnected; however, the connection has not been sufficiently examined in elementary Social Studies learning.

Despite the growing number of studies on reading interest and scientific literacy, several gaps remain unresolved. First, previous research has mostly examined reading interest in relation to reading comprehension or language achievement, while scientific literacy is usually studied within science education. Second, limited attention has been given to scientific literacy as a cross-curricular competence in Social Studies, even though Social Studies contains many socio-scientific and environmental issues that require evidence-based reasoning. Third, studies involving elementary students in local school contexts remain relatively limited, especially those using empirical correlation analysis to examine whether reading interest is associated with students' scientific literacy. Fourth, Indonesian studies have often emphasized literacy programs or science achievement separately, but have not sufficiently explained how students' affective engagement with reading may support their ability to understand scientific information in Social Studies contexts (Agustin & Suprapti, 2024; Azzahra & Apoko, 2024; Kadaritna et al., 2020; Resitaningrum & Saptono, 2024; Winarni et al., 2020; Yusmar & Fadilah, 2023).

Preliminary observation conducted at SD Negeri Genuk 01 on May 15, 2024, indicated that several fifth-grade students experienced difficulties in understanding Social Studies materials involving scientific and environmental concepts. These difficulties included limited engagement with reading materials, unfamiliarity with technical terms, and the perception that Social Studies content was difficult when it required students to connect knowledge with real-life phenomena. This local condition reinforces the importance of examining reading interest as a potential factor associated with students' scientific literacy. The novelty of this study lies in positioning scientific literacy not merely as a science-subject outcome but as a cross-disciplinary competence relevant to elementary Social Studies. This study contributes empirical evidence from an Indonesian elementary school context by examining the relationship between students' reading interest and scientific literacy. Therefore, the objective of this study is to determine the relationship between reading interest and students' scientific literacy in Social Studies learning among fifth-grade students at SD Negeri Genuk 01, West Ungaran District, Semarang Regency, in the 2024/2025 academic year

Method

This study employed a quantitative correlational design. This design was selected because the purpose of the study was to examine the direction and strength of the relationship between students' reading interest and scientific literacy without manipulating either variable. The study was conducted at SD Negeri Genuk 01, West Ungaran District, Semarang Regency, on September 18-19, 2024. The population consisted of 28 fifth-grade students enrolled in the 2024/2025 academic year. Because the population was small and accessible, saturated sampling was applied, meaning that all members of the population were included as research participants. The inclusion criteria were being officially registered as a fifth-grade student, participating in Social Studies learning during the research period, and completing both the questionnaire and the scientific literacy test.

Data were collected using two instruments: a reading interest questionnaire and a scientific literacy essay test. The reading interest questionnaire consisted of 15 statements developed from indicators of reading enjoyment, awareness of the benefits of reading, reading frequency, and access to reading resources. Students responded to the questionnaire using a Likert-type scale. The scientific literacy test consisted of 10 essay questions designed to measure students' ability to understand scientific content, apply scientific processes, and interpret scientific contexts within Social Studies-related situations. The essay format was used because it allowed students to explain reasoning, connect information with phenomena, and demonstrate evidence-based thinking rather than merely selecting answers.

Table 1. Instrument Blueprint

Variable	Indicators	Number of Items	Scoring
Reading interest	Reading enjoyment; awareness of reading benefits; reading frequency; access to reading resources	15 statements	Likert-type responses converted into total scores and categories
Scientific literacy	Scientific content; scientific process; scientific context in Social Studies-related phenomena	10 essay questions	Rubric-based scoring according to conceptual accuracy, evidence use,

Before the main data collection, the initial instruments were piloted with fourth-grade students at the same school level. The preliminary questionnaire contained 30 statements, while the scientific literacy test contained 15 essay questions. The pilot results, item clarity, indicator alignment, and content relevance were used to refine the instruments. Items that were ambiguous, repetitive, or weakly aligned with the indicators were removed, resulting in the final 15 questionnaire statements and 10 essay questions used in the main study. Although this revision strengthened instrument clarity, future studies should report item-level validity coefficients, item discrimination, reliability coefficients, and inter-rater agreement in greater detail.

The research procedure consisted of four stages. First, the researchers conducted preliminary observation to identify problems in students' reading interest and scientific literacy. Second, the instruments were prepared, reviewed, and refined. Third, the reading interest questionnaire and scientific literacy essay test were administered to all participants. Fourth, the data were scored, tabulated, and analyzed using IBM SPSS Statistics version 25 and Microsoft Excel. Participation was conducted in the school context with permission from the relevant school authority. Students were informed that their responses would be used only for research purposes, and individual identities were not reported in the article.

Data analysis consisted of descriptive statistics, assumption testing, and hypothesis testing. Descriptive statistics were used to identify the mean scores of reading interest and scientific literacy. The Shapiro-Wilk test was used to examine normality because the sample size was below 50. Pearson Product Moment correlation was used to test the relationship between the two variables. Results are reported in APA style by presenting the correlation coefficient, degrees of freedom, significance value, and coefficient of determination. Because the research design was correlational, the findings were interpreted as association rather than causation.

Result and Discussion

Result

The descriptive analysis showed that fifth-grade students' reading interest and scientific literacy were both in the good category. The mean score of reading interest was 73.71, while the mean score of scientific literacy was 74.52. These results indicate that students generally demonstrated positive reading interest and adequate scientific literacy performance in the Social Studies learning context.

Table 2. Descriptive Statistics of Reading Interest and Scientific Literacy

Variable	N	Mean	Category
Reading interest	28	73.71	Good
Scientific literacy	28	74.52	Good

Prior to the correlation analysis, normality testing was conducted using the Shapiro-Wilk test. The results showed that the reading interest data were normally distributed, $W = .977$, $p = .780$, and the scientific literacy data were also normally distributed, $W = .938$, $p = .097$. Because both p-values were greater than .05, the normality assumption was met. The

Levene test was additionally reported as a supplementary check, although homogeneity of variance is not the main assumption for Pearson correlation. The Levene value based on the mean was $p = .435$, suggesting no indication of unequal variance in the available data.

Table 3. Assumption Testing Results

Assumption Check	Variable/Statistic	Value	p-value	Interpretation
Normality	Reading interest (Shapiro-Wilk)	$W = .977$.780	Normally distributed
Normality	Scientific literacy (Shapiro-Wilk)	$W = .938$.097	Normally distributed
Supplementary variance check	Levene statistic	.619	.435	No indication of unequal variance

The Pearson Product Moment correlation showed a significant positive relationship between reading interest and students' scientific literacy, $r(26) = .724$, $p < .001$. The correlation coefficient indicates a strong positive association, meaning that students with higher reading interest tended to obtain higher scientific literacy scores. The coefficient of determination showed that reading interest explained 52.4% of the variance in scientific literacy scores. This value indicates practical significance, but it should not be interpreted causally because the study did not use an experimental design.

Table 4. Pearson Correlation between Reading Interest and Scientific Literacy

N	df	r	p	R Square	Interpretation
28	26	.724	< .001	.524	Strong positive correlation

Discussion

The main finding of this study indicates that reading interest is strongly and positively associated with students' scientific literacy in Social Studies learning. The coefficient, $r(26) = .724$, $p < .001$, suggests that students who demonstrated stronger interest in reading tended to show better performance in understanding, interpreting, and explaining scientific information embedded in Social Studies contexts. This result addresses the research objective and confirms that reading interest may function as an important affective and motivational condition for scientific literacy, particularly when students are required to understand written information, interpret evidence, and relate concepts to real-life phenomena.

The finding is theoretically plausible because scientific literacy depends heavily on students' ability to process texts, identify important information, and construct evidence-based explanations. Norris and Phillips (2003) argued that literacy is central to scientific literacy because scientific reasoning is mediated through language, representation, and interpretation. Similarly, Yore and Treagust (2006) emphasized that language and science literacy are mutually reinforcing in instruction. In Social Studies, this relationship is equally relevant because students encounter written explanations about population, environment, technology, society, and human interaction with nature. Therefore, reading interest may increase students' willingness to engage with texts that contain scientific and socio-environmental content.

This study is consistent with recent international evidence showing that reading engagement is related to scientific literacy. Cao et al. (2024), using PISA 2018 data and machine-learning analysis, found that cognitive engagement in reading was a dominant

component associated with scientific literacy achievement. Caponera et al. (2016) also reported that reading literacy significantly influenced mathematics and science achievement, while Cromley (2009) showed that reading achievement was linked to science proficiency across international assessment data. These studies support the present finding by suggesting that reading-related factors are not peripheral but structurally connected to students' ability to perform in science-related domains.

The magnitude of the present correlation is relatively strong compared with several previous studies. Wahyuni et al. (2018) reported a moderate relationship between reading comprehension and scientific literacy among high school students, while Radiyah et al. (2023) found a lower correlation between reading motivation and reading comprehension among junior high school students. In contrast, this study found a stronger association, which may be explained by the smaller and more homogeneous sample, the elementary school context, and the close connection between the reading interest questionnaire and the literacy demands of the Social Studies test. This difference should be interpreted cautiously because correlation magnitude may vary according to sample size, measurement format, grade level, and school literacy culture (Petscher, 2010; Schiefele et al., 2012).

The findings also align with reading motivation theories. Interest development theory explains that students who find reading meaningful are more likely to sustain attention, use strategies, and reengage with learning materials (Hidi & Renninger, 2006). The multidimensional view of reading motivation proposed by Baker and Wigfield (1999) and Wigfield and Guthrie (1997) also suggests that reading activity is shaped by intrinsic motivation, self-efficacy, value, and social motivation. In the present study, students with higher reading interest may have been more willing to read Social Studies texts carefully, identify evidence, and construct responses in the scientific literacy essay test. This interpretation is further supported by Guthrie et al. (2004) and Guthrie and Klauda (2014), who showed that reading engagement contributes to comprehension through motivation, strategy use, and conceptual learning.

Indonesian studies provide additional contextual support. Winarni et al. (2020) demonstrated that language literacy and scientific literacy can be improved through discovery learning supported by ICT media among elementary students. Fakhriyah et al. (2017) found that Indonesian students' scientific literacy requires stronger attention to content and competence aspects. Kadaritna et al. (2020) reported that elementary students' scientific literacy in Central Lampung required instructional support, while Yusmar and Fadilah (2023) noted that Indonesian students' low scientific literacy was associated with limited practice in literacy-based scientific tasks. These studies strengthen the argument that reading interest should be cultivated not only for language learning but also for science-related reasoning across subjects.

The Social Studies context makes this study distinctive. Scientific literacy in this article is not treated as a narrow science-subject outcome, but as the capacity to understand evidence and phenomena related to human life, society, and the environment. This interpretation is consistent with studies emphasizing that scientific literacy is needed for citizenship, environmental decision-making, and interdisciplinary problem-solving (Bybee et al., 2009; Dragoş & Mih, 2015; Holbrook & Rannikmae, 2009; OECD, 2023; Turiman et al.,

2012). As a result, Social Studies learning can become a meaningful space for developing scientific literacy when teachers integrate reading activities with social and environmental issues.

The result also implies that school literacy culture matters. Azzahra and Apoko (2024) showed that literacy movement activities, such as library visits and reading competitions, could increase elementary students' reading interest. Resitaningrum and Saptono (2024) further reported that children's literature can improve reading interest and comprehension among elementary students. Agustin and Suprapti (2024) found a positive relationship between reading interest and elementary students' learning outcomes, while Baba and Affendi (2020) emphasized the importance of reading habits and attitudes. These findings suggest that students' scientific literacy may be strengthened when schools provide attractive reading materials, supportive library programs, teacher guidance, and structured opportunities to read texts connected to real-world problems.

Nevertheless, the coefficient of determination should be interpreted with care. The R Square value of .524 means that reading interest explained 52.4% of the variance in scientific literacy scores in this sample, not that it caused 52.4% of students' scientific literacy. Other variables may also influence scientific literacy, including prior knowledge, reading comprehension, vocabulary mastery, family literacy environment, teacher instruction, classroom discourse, socioeconomic background, and access to learning resources (Cao et al., 2024; Fang & Wei, 2010; Fives et al., 2014; Gormally et al., 2012; OECD, 2023). Therefore, the strong correlation should be considered a meaningful signal for further investigation rather than definitive evidence of causal influence.

This study contributes to the literature by highlighting reading interest as a potential correlate of scientific literacy in elementary Social Studies learning. The novelty lies in positioning scientific literacy as a cross-disciplinary competence relevant to Social Studies and not limited to science subjects. Methodologically, the study offers school-level evidence from a complete fifth-grade population in one elementary school. Practically, the findings suggest that teachers should integrate reading-for-inquiry activities, evidence-based discussion, contextual reading materials, and reflective writing tasks into Social Studies lessons. Such practices may help students connect reading interest with deeper understanding of social and environmental phenomena (Dori et al., 2018; Juleha et al., 2019; Ke et al., 2021; Suryanti et al., 2024; Suwono et al., 2021; Winarni et al., 2020).

This study has several limitations. First, the sample consisted of only 28 students from one elementary school, so the findings cannot be generalized to broader populations without caution. Second, the correlational design does not allow causal conclusions. Third, although the instruments were refined through preliminary testing, this article still needs more detailed reporting of item-level validity, reliability, scoring consistency, and inter-rater agreement. Future studies should involve larger and more diverse samples, use longitudinal or experimental designs, include additional variables such as reading comprehension and family literacy environment, and conduct more rigorous psychometric analyses of the instruments. Further research may also compare Social Studies, science, and language-learning contexts to clarify how reading interest supports scientific literacy across subjects.

Conclusion

This study concludes that there is a significant positive relationship between reading interest and students' scientific literacy in Social Studies learning among fifth-grade students at SD Negeri Genuk 01. Students' reading interest was in the good category, and their scientific literacy also reached the good category. The Pearson correlation analysis showed a strong positive association, $r(26) = .724$, $p < .001$, with reading interest explaining 52.4% of the variance in scientific literacy scores. These findings indicate that students who show stronger interest in reading tend to demonstrate better scientific literacy, particularly in understanding and explaining socio-environmental phenomena. However, because the study used a correlational design and a small single-school sample, the findings should not be interpreted causally or generalized broadly. Future research should use larger samples, stronger instrument validation, and comparative or experimental designs to examine how reading interest, reading comprehension, and school literacy culture jointly support scientific literacy in elementary education.

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