



From habit to deep learning: teacher strategies for advancing elementary students' reading literacy

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Article info	Abstract
Keywords: deep learning, reading habits, reading instruction strategies, reading literacy	Reading literacy is a fundamental competency in elementary education and a prerequisite for lifelong learning. However, literacy skills in Indonesia, particularly reading literacy, indicate that students still face challenges with higher-order literacy skills, especially in making inferences, evaluating texts, and engaging in reflective reading. This situation highlights the importance of refining teachers' strategies, promoting meaningful reading habits, and using technology to support literacy through a deep-learning approach. This study aims to analyze (1) the level of reading literacy among elementary students, (2) the influence of reading habits and teacher instructional strategies on literacy development, and (3) teachers' efforts to enhance literacy through learning models, technology, and deep learning-based experiences. The study employed a descriptive quantitative approach involving 124 elementary school teachers from 17 provinces in Indonesia. Data were collected using structured questionnaires and observation sheets, and subsequently analyzed using descriptive statistics. The results indicate varied literacy levels among students that (1) 15% require special intervention, (2) 40% are at the basic level, (3) 25% are at the proficient level, and (4) 20% are at the advanced level. Reading habit programs were implemented consistently and had a positive impact. However, they remained routine and insufficient in fostering reflective and critical thinking skills. Teachers played an active role in integrating literacy into learning, although the instructional strategies used to enhance literacy remained limited in variety and innovation. Technology integration appeared in implementation and assessment, but was mostly limited to the planning stage. A gap exists between teacher strategies and student literacy achievement. To bridge this gap, literacy instruction should shift from routine practices to a deep-learning-based approach grounded in the principles of meaningfulness, awareness, and enjoyment, accompanied by systematic teacher capacity building and technology integration to support sustainable literacy development.

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1. Introduction

Elementary education, particularly in primary schools, plays a vital role in shaping the foundations for cognitive development and 21st-century skills (Avdiu, E., Bekteshi, E., & Gollopeni, B., 2025). One of its main pillars is reading literacy, which is not merely a technical skill but a fundamental competence that influences all aspects of learning (Li, H., & Kim, S., 2024; Velandar, J., Otero, N., & Milrad, M., 2024). In the midst of the massive flow of information, students' ability to process, analyze, and utilize texts is essential (Hong, J., & Kim, K., 2025; Vettriselvan, R., 2025). Limited literacy skills at this stage may pose a serious barrier to students' comprehension of subject matter across disciplines, ranging from the natural sciences to the social sciences. Therefore, building a strong literacy foundation from an early age is a long-term investment in students' future academic and personal success (Isha, V. et al., 2024; Sulistiyawati, N., 2024; Sothorn, L. S., 2025).

Ideally, reading literacy skills among elementary students should go beyond mere decoding and word recognition. Ideal literacy encompasses the ability to comprehend texts both literally and inferentially, record key facts, compose representative summaries, and draw conclusions based on textual evidence (Wuryaningrum, R., 2025; Cerdán, R., 2025). These competencies are part of higher-order thinking skills that serve as prerequisites for deep learning and preparedness to meet the demands of the 21st century (OECD, 2023; Li, D., Fan, X., & Meng, L., 2024). Strong reading literacy also supports learning success across various subjects, particularly at the elementary level, by encompassing inferential, evaluative, and reflective skills that require analysis, synthesis, and creative critical thinking. To achieve such an ideal level of literacy, classroom instruction must shift away from traditional memorization-based methods toward strategies that foster deeper understanding (Mukhlisa, N., 2024). Ideally, literacy learning should be integrated into every subject, rather than taught as a separate component (Ding, A. C. E., 2024). Teachers need to implement methods such as group discussions, text-based projects, and reflective writing to foster students' active engagement with texts (Mumtaza, N. D., & Purnomo, H., 2025). However, significant challenges remain, including the availability of diverse and relevant reading materials, adequate teacher training, and supportive learning environments that encourage students' interest in reading. Therefore, collaboration among schools, parents, and the government is crucial in creating an educational ecosystem that enables every elementary student to optimally develop their reading literacy potential.

However, the reading literacy achievement of elementary students in Indonesia remains far below expectations. According to PISA 2022, Indonesia's reading literacy score was 359, down from 371 in 2018, and significantly below the OECD average (Husamah, H., 2024; Sarmurzin, Y., 2024). Only about 25% of students reached level 2 or above, and almost none achieved the higher levels (5-6), indicating that reflective and evaluative reading skills remain very low (Rihada, A. M., Jagat, R. S. A., & Setiabudi, D. I., 2021). The 2024 AKM report showed several improvements in average scores. However, advanced indicators such as the ability to infer, integrate information across paragraphs, and summarize texts remain major weaknesses among elementary students (Taufiq, A., 2024). Contributing factors to low literacy include limited reading habits, limited use of innovative learning models, and the persistence of conventional teaching roles (Mulatu, E., & Regassa, T., 2022). On the other hand, the integration of technology, such as interactive e-modules, instructional videos, and digital reading applications, has shown potential to enhance reading literacy skills (Herlina, E., & Abidin, Z., 2024).

Most studies indicate that the reading literacy of elementary school students in Indonesia remains relatively low (Anwas, E. O. M., 2022; Khofifah, S., & Ramadan, Z. H., et al., 2021). Research findings (Schwerter, J. et al., 2025; Ramadhani, C. D., Adrias, A., & Suciana, F., 2025) reveal that only about 40% of urban elementary students can adequately understand reading texts. This decline is also reflected in international literacy surveys such as PISA and MICS, which underscore that Indonesia's reading literacy scores remain below the global average (Sari, D. A.

K., & Setiawan, E. P., 2023; Amelia, D., 2024). Several factors hinder improvements in students' reading literacy, including limited access to quality books, a lack of varied teaching methods, insufficient parental involvement, and insufficient learning time (Ramadhani, C. D., Adrias, A., & Suciana, F., 2025). In addition, monotonous and less interactive teaching methods often cause students to quickly become bored and lose interest in reading (Ahmed, B. et al., 2024). A lack of parental support in fostering children's reading habits, whether due to limited time or lack of awareness about the importance of literacy, also poses a major challenge (Suardi, S., Sultan, S., & Herman, H., 2024). Research by Wulandari, I. R., Hadi, M. S., & Arifin, S. (2025) further found that overloaded class schedules and limited time for independent reading activities outside school hours exacerbate these obstacles, worsening the overall situation. Research in various international contexts similarly reveals that when literacy instruction lacks interactivity and engagement, students demonstrate diminished motivation and lower achievement outcomes (Nirmala, S. D., & Puspita, R. D., 2025; Shao, J. et al., 2025; Nawas, A. et al., 2024).

These findings highlight the importance of adopting a holistic and contextual approach in programs aimed at improving elementary students' reading literacy. It is evident that the challenges in enhancing reading literacy among Indonesian elementary school students are significant and demand more innovative approaches (Hariyantini, M. R., Suwindia, I. G., & Winangun, I. M. A., 2025). Various obstacles, ranging from monotonous teaching methods to a lack of parental involvement, indicate a substantial gap between existing conventional teaching strategies and the expected outcomes.

Building upon this, the present study is highly relevant and essential in providing an in-depth analysis of students' reading literacy skills and the implementation of teachers' instructional strategies. The primary aim is to bridge the gap between teaching practices and students' literacy skills. Accordingly, this study seeks to foster meaningful changes that enhance text comprehension and cultivate a sustainable love for reading and a reading habit. Specifically, the study examines students' reading literacy abilities, analyzes teachers' instructional strategies through reading habituation and deep learning, and explores the use of specific learning models alongside the integration of relevant technologies to improve literacy outcomes. The findings are expected to provide a comprehensive understanding of how instructional practices can bridge the gap between routine literacy activities and deeper, more meaningful reading comprehension.

Therefore, this study is crucial and urgent for analyzing aspects related to teachers' strategies and students' literacy skills. Specifically, it further examines the current state of students' reading literacy and analyzes the instructional strategies teachers employ to foster deep learning, including the use of specific learning models and the integration of relevant technologies to enhance literacy skills. To address these objectives, the study aims to analyze (1) the level of elementary students' reading literacy skills, (2) the extent to which reading habituation and instructional strategies applied by teachers influence students' reading literacy, and (3) the efforts undertaken by teachers to improve students' literacy skills through the integration of learning models, technology, and student learning experiences within deep learning contexts. Thus, the present study focuses on the transition from mere reading habits to deep learning to enhance literacy skills, analyzing teachers' strategies for improving elementary students' reading literacy.

2. Literature review

Reading literacy has been widely recognized as one of the most fundamental competencies in elementary education (Lin, Z., & Chen, H., 2024; Porter, S.B., 2024). It encompasses not only the ability to decode words but also the capacity to comprehend, interpret, and critically evaluate texts (Le, H. V. et al., 2024). In the context of 21st-century education, reading literacy

encompasses higher-order thinking skills, including inference-making, text evaluation, and reflective reading, all of which are essential for lifelong learning (Song, X. et al., 2025).

Deep learning in education, as distinct from surface-level processing, refers to approaches that foster meaningful understanding, critical thinking, and the ability to transfer knowledge to new contexts (Modrek, A. S., 2025). Applied to literacy instruction, deep learning emphasizes principles of meaningfulness, mindfulness, and joy in reading (Alazemi, A.F.T., 2024). Several instructional strategies have been associated with deep literacy learning, including reciprocal teaching, literature circles, and inquiry-based reading (Katan, L., & Baarts, C. A., 2023).

The role of teachers in fostering reading literacy is well-documented. Teachers who employ varied instructional strategies and integrate literacy across the curriculum tend to produce students with stronger literacy outcomes (Kehoe, K. F., & McGinty, A. S., 2024). However, research also indicates that numerous teachers continue to rely on routine reading activities, such as silent reading programs, without sufficient follow-up to promote higher-order thinking (Irayanti, I., 2026). This gap between routine literacy habits and deep literacy instruction is a central concern in the present study.

Technology integration in literacy education has grown significantly in recent years. Digital tools, such as e-modules, reading applications, and interactive media, have demonstrated potential to enhance reading motivation and comprehension (Utami, I. A., & Drajati, N. A., 2024). However, the effective integration of technology requires not only access to tools but also teachers' digital competence and pedagogical readiness to design technology-supported literacy experiences (Dockendorff, M., & Zaccarelli, F. G., 2025).

3. Method

3.1 Type of research

The present study employed a quantitative, descriptive approach. A quantitative approach was used, as the research focused on collecting numerical data through questionnaires to describe elementary students' reading literacy skills and the factors that support or inhibit them. The descriptive method was selected as it aligns with the research objective of providing a detailed depiction of the actual conditions without manipulating variables.

3.2 Time and research setting

The study was conducted in 2025 and involved elementary school teachers from various provinces across Indonesia. The research locations were distributed across 17 provinces.

3.3 Research subjects

The research subjects comprised 124 elementary school teachers selected purposively, with consideration of their involvement in school literacy activities. Of the total respondents, 98 (79%) were female, and 26 (21%) were male, with teaching experience ranging from 1 to more than 30 years. The wide distribution of respondents enables the collection of representative data on the reading literacy conditions of elementary students across various regions.

3.4 Research instrument

The research instrument used was a closed-ended questionnaire with dichotomous (yes/no) and simple Likert scales. The questionnaire consisted of 25 items grouped into four main aspects, as shown in Table 1.

Table 1. Aspects and indicators of the research questionnaire

No.	Aspects	Item Numbers	Item Numbers
1	Literacy Habituation	1 - 6	Implementation of 15-minute reading activities, consistency, provision of feedback, and its impact on students' literacy
2	Students' Literacy Skills	7 - 15	Ability to record facts, draw conclusions, understand vocabulary, connect reading with experiences, compose summaries, comprehend explicit & implicit information, reflective-critical thinking
3	Teachers' Role in Literacy	16 - 19, 21	Integration of literacy into learning, alignment with curriculum achievements, use of learning models, literacy-based assessment, and effectiveness of learning models
4	Technology Integration in Literacy	22 - 5	Use of e-modules, integration of technology in learning and assessment, and utilization of technology-based media

3.5 Research procedure

The research procedure was carried out in several stages. First, the researchers developed a questionnaire instrument based on indicators of elementary students' reading literacy and teachers' learning strategies. Second, the questionnaire was distributed online to teacher respondents in 17 provinces. Third, the completed questionnaires were collected and verified to ensure completeness and validity of the responses. Fourth, the data were analyzed descriptively to obtain a profile of elementary students' reading literacy based on teachers' perceptions.

3.6 Data analysis technique

The data were analyzed using descriptive statistics. The analysis involves calculating the minimum, maximum, mean, standard deviation, and frequency distribution of each questionnaire item. The analysis results are presented in tables and graphs to facilitate interpretation. This analysis aims to identify trends in literacy activities, students' literacy skills, and teachers' strategies for supporting the transition from reading habits to deep-learning-oriented literacy.

4. Results

4.1 Respondent profile

The present study involved 124 elementary school teachers across 17 provinces in Indonesia. The distribution of respondents demonstrates broad representation, with the largest number coming from West Java, followed by Banten and West Kalimantan. The detailed distribution of respondents by province is presented in Figure 1.

In terms of teaching experience, the respondents have diverse backgrounds ranging from 1 year to more than 30 years. The average length of teaching experience is 13.34 years, with a median of 14 years and a mode of 15-20 years. When categorized, most respondents fall within the 16 - 20 years range (25.8%), followed by the 11 - 15 years group (21.0%) and the 6 - 10 years group (20.2%).

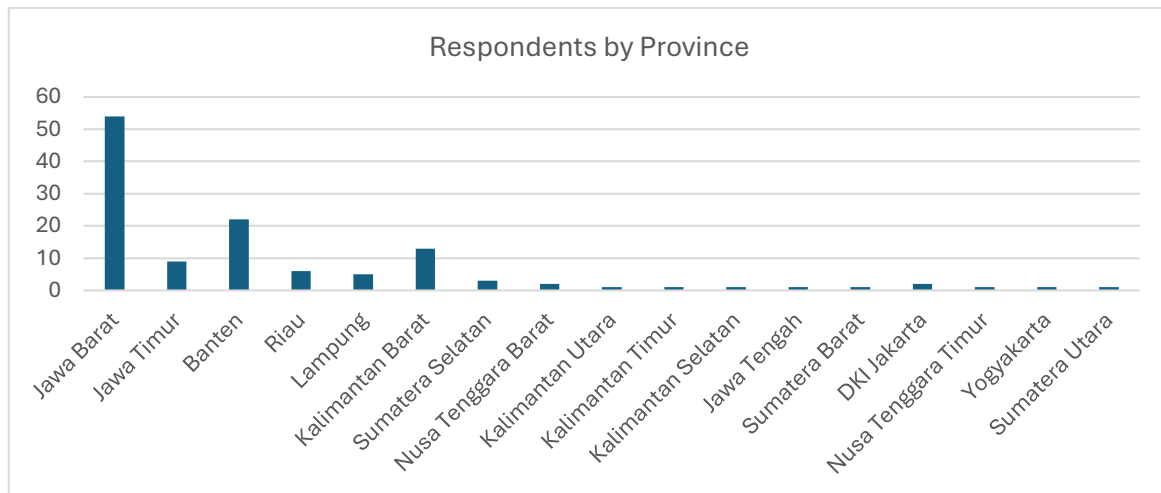


Figure 1. Distribution of respondents by province

This distribution indicates that the sample is dominated by teachers with medium to long teaching experience, suggesting that their perceptions of reading literacy implementation align with well-established professional practices in the field. Details of the distribution of respondents based on teaching experience are presented in Figure 2.

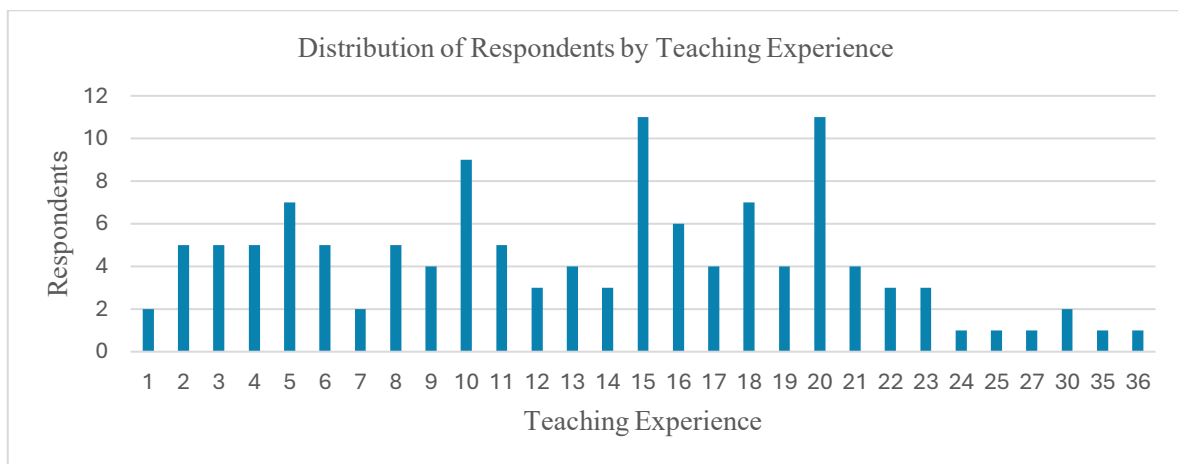


Figure 2. Respondents by years of teaching experience

4.2 Category Score distribution

In addition to describing the respondents' profiles by provincial distribution and teaching experience, the present study analyzes questionnaire scores on elementary students' reading literacy skills, measured across various indicators. The scores obtained by the respondents range from 9 to 24, with the maximum score indicating very good literacy achievement and the minimum score reflecting gaps among some students. To facilitate analysis, the scores are grouped into three categories. It consists of low (9-14), medium (15-19), and high (20-24), as presented in Table 3.

Table 2. Distribution of students' reading literacy scores

Categories	Score Ranges	Number of Respondents	Percentage (%)
Low	9–14	5	4.0
Moderate	15–19	36	29.0
High	20–24	83	67.0
Total		124	100

The distribution results in the table above reveal that the majority of respondents (67%) fall into the high category, indicating that most teachers have implemented effective literacy teaching strategies that lead to fairly good literacy outcomes. However, about 29% of respondents are in the medium category and 4% in the low category. These findings highlight the variation in students' reading literacy skills that still requires attention, particularly among those in the low-to-medium score range. This variation suggests that although literacy habituation and teacher support are already in place, gaps remain that need to be bridged through more in-depth, deep-learning-oriented instruction and more optimal integration of technology.

In addition to using instruments for literacy habituation and teaching strategies, this study analyzed students' reading literacy skills using the Minimum Competency Assessment (AKM) categories. AKM is employed because it provides a more comprehensive profile of students' reading skills, ranging from locating explicit information to integrating information across texts. The distribution of students' literacy skills based on AKM is presented in Figure 3 below.

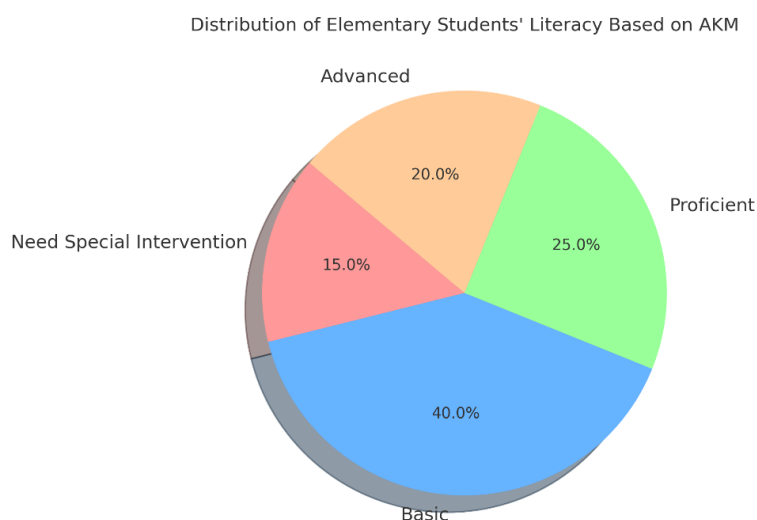


Figure 3. Distribution of students' literacy skills based on akm results

4.3 Descriptive statistics

In addition to the analysis of score distribution categories, this study also presents descriptive statistics to provide a more detailed overview of the overall data trends. Descriptive statistics include the number of data points, the range of scores, the minimum and maximum values, the mean, and measures of variability such as the standard deviation and variance. This information is crucial for understanding how students' reading literacy scores are distributed, how centered the data are around the mean, and the degree of variation among respondents. Thus, the descriptive statistics support the interpretation of the overall condition of elementary students' reading literacy.

Table 3. Descriptive statistics

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
X	124	15	9	24	2520	20.32	.286	3.184	10.139
Valid N (listwise)	124								

The results of the descriptive analysis elucidate that the present study involved 124 respondents as the unit of analysis. The respondents' scores exhibit a relatively wide range, with the highest score being 24 and the lowest 9, for a range of 15. This indicates that the distribution of responses is fairly varied. The minimum recorded score is 9, while the maximum is 24. Overall, the total accumulated score for all respondents is 2,520, reflecting the sum of all data for the measured variable.

The mean reading literacy score is 20.32, indicating that respondents generally achieve relatively high scores, approaching the maximum. The stability of the mean is further supported by the Standard Error of the Mean (SEM) of 0.286, which is considered small. This underscores that the mean score can be considered sufficiently consistent if samples are repeated in a similar population. Furthermore, the analysis reveals a standard deviation of 3.184, indicating that the data's dispersion around the mean is moderate. This implies that most data points cluster relatively close to the mean, despite several variations among respondents. The variance of 10.139, the square of the standard deviation, further confirms that the data exhibit moderate variability.

In addition to analyzing the distribution of total scores, this study also presents descriptive statistics for each item in the reading literacy questionnaire. These statistics include the number of respondents (N), minimum and maximum scores, mean values, and standard deviations. Presenting this data is crucial for identifying the response tendencies for each literacy indicator, thereby highlighting which indicators have been well achieved and which require further attention. Consequently, the item-level analysis provides a more detailed understanding of the specific aspects of students' reading literacy skills and the instructional strategies applied by teachers.

In addition to presenting simple descriptive statistics, the present study provides a more comprehensive statistical analysis for each questionnaire item. The statistics presented include the number of valid and missing data points, mean, standard error, median, mode, standard deviation, variance, range, minimum and maximum values, and the total score. This presentation offers a deeper understanding of the distribution of respondents' answers for each literacy indicator.

Table 4. Result of analysis questionnaire items

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
x1	124	0	1	.99	.090
x2	124	0	1	.85	.354
x3	124	0	1	.83	.377
x4	124	0	1	.86	.345
x5	124	0	1	.94	.247
x6	124	1	1	1.00	.000
x7	124	0	1	.93	.260
x8	124	0	1	.88	.327
x9	124	0	1	.73	.448
x10	124	0	1	.93	.260
x11	124	0	1	.79	.409
x12	124	0	1	.63	.485
x13	124	0	1	.85	.354
x14	124	0	1	.67	.472
x15	124	0	1	.41	.494

Such information makes it possible to identify the consistency of respondents' answers, the extent of data dispersion, and the differences across indicators. This analysis is also crucial to ensure that the data obtained are of good quality and can serve as a solid basis for further interpretation in the discussion.

Table 5. Statistical Analysis Statistics

		x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	x17	x18	x19	x20	x21	x22	x23	x24	x25	total
N	Valid	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	0	124	124	124	124	124	124
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	124	0	0	0	0	0	0
Mean		.99	.85	.83	.86	.94	1.00	.93	.88	.73	.93	.79	.63	.85	.67	.41	.99	.99	.86	.88		.96	.65	.90	.83	.96	20.32
Std. Error of Mean		.008	.032	.034	.031	.022	.000	.023	.029	.040	.023	.037	.044	.032	.042	.044	.008	.008	.031	.029		.018	.043	.027	.034	.018	.286
Median		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	21.00
Mode		1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1		1	1	1	1	1	23
Std. Deviation		.090	.354	.377	.345	.247	.000	.260	.327	.448	.260	.409	.485	.354	.472	.494	.090	.090	.345	.327		.198	.478	.297	.377	.198	3.184
Variance		.008	.125	.142	.119	.061	.000	.068	.107	.201	.068	.167	.235	.125	.223	.244	.008	.008	.119	.107		.039	.228	.088	.142	.039	10.139
Range		1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	15
Minimum		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	9
Maximum		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	24
Sum		123	106	103	107	116	124	115	109	90	115	98	78	106	83	51	123	123	107	109		119	81	112	103	119	2520

The results of the statistical analysis indicate that all questionnaire items (x1-x25) have 124 valid responses, with no missing data. The mean values for most items are in the high range (≥ 0.80), while the median and mode are generally 1, indicating that most respondents agree with the statements. However, several items have relatively lower mean values, such as x9 (0.73), x12 (0.63), x14 (0.67), and x15 (0.41), suggesting variations in respondents' answers on certain aspects.

In terms of measures of dispersion, the standard deviations for each item range from 0.090 to 0.494, indicating that response variability is relatively low to moderate. The variance, as the square of the standard deviation, also falls within a small-to-moderate range, reinforcing the finding that the data distribution is fairly consistent across respondents. Meanwhile, the total scores range from 9 to 24, with a mean of 20.32 and a standard deviation of 3.184. These results indicate that respondents' scores are generally high, although moderate variation remains.

5. Discussion

The present study analyzes the level of elementary students' reading literacy skills, teachers' reading habits and strategies, and the extent to which teachers' efforts enhance literacy skills through the integration of learning models, technology, and students' learning experiences. The findings reveal an interesting pattern that, overall, students' literacy scores were relatively high, yet variations were observed across indicators. Literacy habits and the teacher's role were categorized as high, whereas students' deep literacy skills and technology integration were categorized as moderate. These findings confirm the existence of a gap, in which teachers' well-implemented strategies are not yet fully reflected in students' higher-order literacy achievements (Ashri, S. U. et al., 2025). This pattern is consistent with the findings of Erwandi, A. M. A., & Utami, N. C. M. (2025), who stated that although Indonesian students are accustomed to reading, they remain weak in inferential skills.

The reading literacy assessment based on the AKM categories reveals that 15% of students were in the Need Special Intervention category, 40% in the Basic category, 25% in the Proficient category, and only 20% in the Advanced category. This distribution elucidates that most students remain at the Basic and Proficient levels, with literacy skills generally limited to locating explicit information and making simple interpretations. Meanwhile, a small group of students in the Advanced category reveals potential to integrate information across texts and conduct critical

evaluations, although their number remains insignificant. The presence of 15% of students in the Need Special Intervention category underscores a learning gap that must be addressed through more targeted instruction. These findings align with international literacy research indicating that surface-level reading instruction produces surface-level outcomes, while deep instructional approaches yield more profound literacy competencies (Gourvennec, A.F. et al., 2024).

These findings are consistent with the results of PISA 2022, which reveal that most Indonesian students remain at low to medium literacy levels, with major difficulties in inferential, reflective, and evaluative thinking skills (OECD, 2023). The National AKM Report also confirmed that elementary students tend to be weak in integrating information and evaluating reading content (Ashifa, A. N., 2024). The implication of these findings is the importance of shifting learning strategies from merely emphasizing reading routines to strategies oriented toward deep literacy learning. Students in the Basic and Proficient categories need reading activities that encourage them to produce critical summaries, interpret implicit texts, and connect these to real-life experiences. Meanwhile, students in the Need Special Intervention category require differentiated instruction to help them catch up on fundamental reading skills. Additionally, strengthening teachers' capacity to design reflective literacy strategies and integrate learning technologies is crucial for increasing the number of students who can achieve the Advanced category (Malik, A., & Susanti, S., 2021). This pattern aligns with previous studies demonstrating that systematically designed and structured literacy instruction can significantly enhance students' higher-order thinking and deep comprehension skills (Putri, M. E. et al., 2023; Lumbanraja, B., 2025; Kim, Y. S. G., & Zagata, E., 2024). Thus, the literacy achievement distribution reinforces similar patterns at both national and international levels.

The literacy habit programs implemented by teachers yield very strong results. Almost all teachers implemented 15 minutes of either read-aloud or silent reading activities, with most doing so consistently and providing feedback on their outcomes. All respondents even stated that these reading practices had a positive impact on students' literacy. However, the results also indicate that follow-up activities such as producing summaries and mastering vocabulary were still considered difficult and had not been optimized. This condition implies that literacy habits are more focused on quantity and routine than on reflective learning that supports deep literacy. Zur, S., Sunra, L., & Dollah, S. (2025) emphasized that reading habits are more effective when followed by reflective activities, critical discussions, and text interpretation. This is further supported by Marlina and Hidayat (2022), who noted that routine reading programs only have a superficial impact if not accompanied by follow-up strategies (Dermitzaki, I., 2025). Thus, the achievement in the literacy habit aspect addresses the second research objective by demonstrating that reading routines positively influence literacy. However, these practices must be designed more meaningfully to foster students' inferential and reflective skills. This is consistent with Hagen, Å.M., and Rydland, V. J. (2025), who found that routine reading programs yield stronger outcomes only when combined with structured comprehension follow-up. Reading habits must be paired with guided comprehension activities to produce measurable improvements in student literacy (Berhanu Jarssa, A. et al., 2025).

In addition to literacy habits, the role of teachers through literacy learning strategies demonstrates strong results. Almost all teachers reported integrating literacy into Indonesian language instruction and aligning it with curriculum objectives. Most teachers also implemented learning models to improve literacy skills. However, these efforts were not always consistent or specifically focused on enhancing literacy. Teachers prepared literacy-based lesson plans and assessments and generally considered the models used effective. These findings elucidate that the teachers not only promote literacy habits but also employ strategies and models to improve literacy skills, although the implementation has not yet been optimal. Nevertheless, the variety of strategies applied remains limited—numerous teachers have been innovative, while others have not fully developed comprehensive approaches, particularly in fostering literacy

improvement. Widodo et al. (2021) and Sung et al. (2020) emphasized that teachers' capacity to implement literacy learning models that emphasize critical thinking skills is a key factor in students' achievement (Afriyasant, R., Basthomi, Y., & Zen, E. L., 2025). Therefore, although the second research objective is addressed by showing that teachers' strategies significantly influence students' literacy, there is a need to strengthen teachers' capacity through continuous professional development and lesson study. Such efforts ensure that the strategies employed not only support basic literacy but also promote deep literacy learning.

Beyond habits, teachers' roles in applying literacy learning strategies further indicate strong results. Almost all teachers integrated literacy into Indonesian language lessons and aligned it with curriculum goals, although the use of models specifically designed to enhance literacy was not always consistent. The variation in strategies was also uneven; numerous teachers were innovative, while others had not yet adopted comprehensive approaches. Thus, strengthening teachers' capacity through continuous training is crucial to ensure that the strategies applied foster deep learning, guided by the principles of awareness, meaningfulness, and enjoyment. In this way, students not only comprehend texts literally but also analyze, evaluate, and apply information critically and creatively (Andayanie, L. M. et al., 2025).

The aspect of technology use in literacy (Instrument E) is closely related to the third research objective. The results reveal that the integration of technology in the planning of technology-based learning tools, such as e-modules, remained low (mean = 0.65). However, the implementation of technology in teaching (0.90), technology-based assessments (0.83), and the use of digital media (0.96) were relatively high. This indicates a gap between planning and implementation, as while teachers were quite effective in using technology in practice, they had not yet fully designed technology-based learning to foster deep literacy skills. Rawal, D. M. (2024) found that limited digital competence and infrastructure are the main barriers for teachers in integrating technology. Accordingly, the third research objective indicates that teachers' efforts have begun, but they still need to be directed to ensure that technology integration truly supports deep learning literacy experiences.

Overall, this study reveals that (1) the level of students' reading literacy was relatively good but not evenly distributed, especially in inferential and reflective aspects, (2) reading habits and teachers' strategies were proven to have a positive impact on students' literacy, although they tended to support basic literacy rather than deep literacy, and (3) teachers had made efforts to integrate learning models and technology, but technology-based planning remained suboptimal in supporting deep literacy. Previous studies similarly emphasize that literacy instruction must move beyond literal comprehension toward analytical, reflective, and evaluative processes in order to achieve deep literacy (Sari, E. F., et al., 2025). These findings highlight a teaching and learning gap that needs to be bridged by transforming teachers' strategies from routine habits to reflective instruction, innovative deep-learning-based models, and well-planned technology integration. Furthermore, reading literacy in elementary schools should not be limited to habit formation but must be directed toward developing sustainable critical, analytical, and reflective thinking skills. This recommendation is consistent with research demonstrating that deep learning-oriented instructional designs foster reflective engagement, higher-order thinking, and meaningful learning experiences through structured and experiential activities (Mustika, D. et al., 2025).

6. Conclusion and implications

This study elucidates that elementary students' reading literacy skills remain varied, with the majority at the Basic and Proficient levels, while only a small portion reached the Advanced level. This condition indicates that literal reading skills have developed fairly well, but inferential, reflective, and critical abilities are still limited. Regular reading habits have been implemented

consistently and have had positive impacts, yet they tend to be routine and have not fully supported the achievement of deep literacy. Moreover, teachers' roles in integrating literacy into learning are relatively strong, but improvements in reading literacy would be more effective if learning strategies were aligned with the principles of meaningful, mindful, and joyful learning. Meanwhile, technology integration has begun, particularly in implementation and assessment, although it remains weak at the planning stage and in its strategic use. Thus, there is a gap between teachers' strategies and students' literacy outcomes, which can be bridged by strengthening reflective practices, enhancing teachers' capacity for deep-learning-based instruction, and systematically integrating technology to ensure the sustainable development of students' reading literacy.

7. Limitation

The present study has several limitations that should be acknowledged. First, the data were collected exclusively through self-reported questionnaires from teachers, which may introduce response bias. Second, although the study covered 17 provinces, the sample was purposively rather than randomly selected, which may limit generalizability to the broader population of Indonesian elementary school teachers. Third, classroom observations and direct assessments of students' reading literacy were not conducted; thus, the findings reflect teachers' perceptions rather than direct measures of student performance. Finally, the cross-sectional nature of the study does not allow for causal inferences regarding the relationship between teacher strategies and student literacy outcomes. Future research employing mixed-methods designs with direct literacy assessments and longitudinal data collection is recommended.

Credit authorship contribution statement

Sri Dewi Nirmala contributed to conceptualization, methodology, formal analysis, data curation, writing the original draft, and writing, review, and editing of the manuscript; **Ryan Dwi Puspita** contributed to the investigation, provision of resources, and writing, review, and editing of the manuscript; **Sendi Ramdhani** contributed to the investigation, formal analysis, visualization, writing, review, and editing of the manuscript.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. Because the data include information from human participants, they are not publicly available to protect participant privacy.

Ethical Declaration

This study involved human participants (elementary school teachers) and was conducted in accordance with the principles of the Declaration of Helsinki. Prior to data collection, all participants were informed about the study's purpose, procedures, the voluntary nature of participation, and their right to withdraw at any time without consequence. Written informed consent was obtained from all participants. To protect confidentiality, no personally identifiable information was collected; all records were anonymized at the point of collection, stored securely, and access was restricted to the research team. The study protocol was reviewed and approved by the relevant institutional review process.

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Declaration of AI statement

During the preparation of this work, the authors used AI-assisted tools to improve the clarity, academic tone, and readability of certain sections of the manuscript. After using these tools, the authors thoroughly reviewed and edited all content as needed and take full responsibility for the accuracy and integrity of the published article. Generative AI was not used to generate research data, perform statistical analyses, or make decisions affecting the study's findings.

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