

Systematic Literature Review on the Effectiveness, Methodological Trends, and Implementation Challenges of LEA-Based Flashcard Media for Early Reading and Writing Skills in Primary School

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Abstract

Early reading and writing skills constitute the fundamental academic foundation that directly determines students' success across all disciplines throughout their educational journey. Nevertheless, Indonesia's literacy achievement remains critically concerning, as evidenced by its ranking of 68th out of 81 countries in the Programme for International Student Assessment (PISA) 2022. This condition underscores the urgent need for innovative, contextually grounded, and evidence-based instructional media. This study aims to systematically examine: (1) the effectiveness of LEA-based flashcard media in supporting early reading and writing skills; (2) methodological trends in relevant empirical studies; and (3) challenges in implementing LEA-based flashcard media in elementary school contexts. A Systematic Literature Review (SLR) employing the PRISMA protocol was conducted across Google Scholar, ERIC, Scopus, Garuda, and SINTA databases, covering publications from 2022 to 2025. Of 309 initially identified articles, 25 fulfilled all inclusion criteria and were subsequently analyzed thematically and descriptively through a quality appraisal process with inter-rater reliability of $\kappa = 0.82$. Findings consistently demonstrate that flashcard media integrated with Language Experience Approach principles contributes substantially to early reading and writing competencies, though its effectiveness is mediated by teacher pedagogical competence, learning environment quality, and contextual factors such as urban-rural disparities. Three principal themes emerged: the effectiveness of experience-based media on early literacy outcomes and its affective dimensions; the pivotal yet variable role of teachers' competence and systemic support in optimizing media implementation; and the critical importance of accurate, data-driven early assessment within diverse contextual constraints. This review concludes that LEA-based flashcard media development must be embedded within a comprehensive learning ecosystem that encompasses teacher capacity-building, active parental engagement, print-rich classroom environments, and educational policies genuinely responsive to the diverse social and cultural contexts of Indonesian students.

Keywords

Early Literacy, Flashcard, Initial Reading, Initial Writing, Language Experience Approach



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INTRODUCTION

Reading and writing skills are the main foundation in the educational process, especially at the elementary school level. These two skills not only play a role as a communication tool, but also determine the success of students in understanding all subjects studied. However, facts in the field show that there are still many students in the early grade of elementary school who have difficulty mastering reading and writing skills adequately. This condition reflects a significant gap between the expected ideal conditions and the reality that occurs in the classroom. Based on data *Programme for International Student Assessment* (PISA) in 2022, Indonesia is still in a worrying position in terms of reading literacy, which is ranked 68th out of 81 countries (OECD, 2023). These findings confirm that the problem of early literacy in Indonesia is not just a pedagogical issue, but has become a national issue that requires serious and scientific evidence-based handling.

One of the learning approaches that is considered relevant and centered on the learner's experience is *Language Experience Approach* (LEA). This approach places children's real experiences as a starting point in the process of learning to read and write, so that the material learned feels meaningful and contextual. A number of recent studies have shown that integrating LEA into visual learning media has a positive impact on improving students' initial literacy skills. Nirvana (2021) It found that the use of language experience-based media significantly improved early childhood motivation and reading ability. Meanwhile, Nuriyanti et al. (2025) emphasized that the media *flashcard* Contextually designed has been shown to be effective in accelerating vocabulary mastery and early comprehension of texts in primary school students in first and second grades.

Flashcard As a visual learning medium, it has long been known to be effective in supporting the process of memorization and recognition of language symbols. The advantage of this medium lies in its concrete, concise, and easy-to-use nature in various learning conditions, both inside and outside the classroom. However, most of the existing research has just examined *flashcard* conventionally, without integrating it with language experience-based approaches such as LEAs. This gap is what becomes *Gap* Research that needs to be filled through more in-depth and systematic scientific studies. Solihah et al. (2025) reveals that there have not been many studies that explicitly develop *flashcard* with the LEA framework as its pedagogical foundation, so that the synergistic potential between the two has not been explored optimally. Furthermore, Maharani & Ramadan (2023) emphasizing the importance of learning media that is not only visually appealing, but also able to connect students' personal experiences with the literacy content being studied.

Novelty From this research lies in the effort to systematically synthesize all literature related to media development *flashcard* LEA-based for early reading and writing skills, using the *Systematic Literature Review* (SLR). This approach allows for a comprehensive mapping of existing research trends, findings, and gaps. Purnama Sari et al. (2024) states that a systematic review of the basic education literature is needed to produce evidence-based recommendations that can be implemented practically by educators. In line with that, Kurniawan et al. (2025) affirm that *Systematic Literature Review* In the field of learning media, it makes a significant contribution to building a stronger theoretical framework for the development of further educational innovations.

Based on this background, this study formulates three specific research questions: (1) How effective is LEA-based flashcard media in supporting early reading and writing skills in elementary school? (2) What are the methodological trends in studies related to the development of LEA-based flashcard media? (3) What are the challenges in implementing LEA-based flashcard media in elementary school contexts? The purpose of this study is to systematically analyze relevant literature to examine the effectiveness, methodological trends, and implementation challenges of LEA-based flashcard media. Theoretically, this research is expected to enrich the scientific knowledge in the field of literacy learning media and experience-based approaches. Pragmatically, the results of this study can serve as a reference for teachers, curriculum developers, and policy makers in designing literacy learning strategies that are more effective, innovative, and rooted in students' real experiences.

METHOD

This study uses a systematic literature review approach as the main framework in the process of collecting, filtering, and analyzing relevant scientific sources. This approach was chosen because it is able to produce a comprehensive and structured synthesis of various previously published studies, so that the results have a higher level of validity and reliability than conventional literature reviews. The article search process is carried out systematically through several leading scientific databases, including Google Scholar, ERIC (*Education Resources Information Center*), Scopus, and national journal portals such as Garuda and SINTA, with a limited publication time span from 2022 to 2026. The complete search string applied was: ("flashcard" OR "flash card") AND ("Language Experience Approach" OR "LEA") AND ("early literacy" OR "beginning reading" OR "beginning writing" OR "literasi awal") AND ("elementary school" OR "primary school" OR "sekolah dasar").

The publication period was restricted from 2022 to 2025, as literature published in 2026 remains incompletely indexed in most academic databases at the time of data collection.

The article selection process in this study follows a standardized, transparent screening flow, as visualized in Figure 1. At the identification stage, 309 articles were identified from the databases searched. After the removal of duplicate data, the number of articles was reduced to 207 journals which then entered the *screening* stage. At this stage, articles were screened based on the suitability of their titles and abstracts to the research topic, resulting in 112 articles considered worthy of further search. The next stage was a thorough feasibility assessment of 56 articles that were successfully accessed in *full-text*. Of these, 36 articles were excluded for two main reasons: not meeting the established methodological criteria ($n = 20$) and not being substantially relevant to the study's focus ($n = 16$). Thus, the total number of articles finally included in the analysis was 20, all of which met the inclusion criteria set.

The inclusion criteria applied in this study include: articles published in indexed and reputable journals, specifically discussing the development or application of media *flashcard* and/or the LEA approach in the context of early literacy in primary school, using a clear and scientifically accountable research design, and available in full-text versions. Meanwhile, the exclusion criteria include articles not relevant to the primary education level, opinion or editorial articles without empirical data, and studies that do not include measurement results for reading or writing skills. The analysis of the selected articles was carried out thematically and descriptively, identifying the patterns of findings, the methodological approaches used, and the pedagogical implications of each study. Moher et al. further developed by Page et al. (2021) affirms that the use of a strict and well-documented selection protocol is an absolute requirement to produce a credible, replicable, and free literature review from unintentional selection bias. In line with that, Xiao & Watson (2021) emphasizing that transparency in the reporting of the literature selection process is the main indicator of the quality of a *Systematic Literature Review* which can be used as a scientific reference. Snyder (2019) added that the selection of diverse databases and the use of structured keywords significantly increase the scope and representativeness of findings in systematic literature review.

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carried out systematically through several leading scientific databases, including Google Scholar, ERIC (*Education Resources Information Center*), Scopus, and national journal portals such as Garuda and SINTA, with a limited publication time span from 2022 to 2025. Considering that publications from 2026 remain incompletely indexed in most academic databases at the time of data collection, the upper boundary was set at December 2025 to ensure comprehensive coverage. The complete search string applied across databases was: ("flashcard" OR "flash card") AND ("Language Experience Approach" OR "LEA") AND ("early literacy" OR "beginning reading" OR "beginning writing" OR "literasi awal") AND ("elementary school" OR "primary school" OR "sekolah dasar"). Both Indonesian and English language variations were used in the search process.

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To ensure methodological rigor, each included article underwent a quality appraisal process using an adapted version of the Mixed Methods Appraisal Tool (MMAT). Two independent reviewers assessed each article against five criteria: clarity of research objectives, appropriateness of the research design, adequacy of data collection, validity of analytical procedures, and relevance of the conclusions to the research question. Inter-rater reliability was calculated using Cohen's Kappa ($\kappa = 0.82$), indicating strong agreement between reviewers. Any discrepancies were resolved through discussion and consensus.

The inclusion criteria applied in this study include: articles published in reputable, indexed journals; specifically discussing the development or application of flashcard media and/or the LEA approach in the context of early literacy in primary school; using a clear, scientifically accountable research design; and available in full-text. Given that studies explicitly developing flashcard media

within the LEA framework remain relatively limited in number, the scope of the literature search was expanded to include studies on experience-based literacy media more broadly. This expansion is methodologically justified, as Grant and Booth (2009) affirm that broadening the search scope in systematic reviews is acceptable when the primary literature base is insufficient to support a meaningful synthesis. Meanwhile, the exclusion criteria include articles that are not relevant to the primary education level, opinion or editorial articles without empirical data, and studies that do not include measurement results on reading or writing skills. The analysis of the selected articles was carried out thematically and descriptively, by identifying the patterns of findings, the methodological approaches used, and the pedagogical implications resulting from each study. Moher et al. further developed by Page et al. (2021) affirms that the use of a strict and well-documented selection protocol is an absolute requirement to produce a credible, replicable, and free literature review from unintentional selection bias. In line with that, Xiao & Watson (2021) emphasizing that transparency in the reporting of the literature selection process is the main indicator of the quality of a *Systematic Literature Review* which can be used as a scientific reference. Snyder (2019) added that the selection of diverse databases and the use of structured keywords significantly increase the scope and representativeness of findings in systematic literature review.

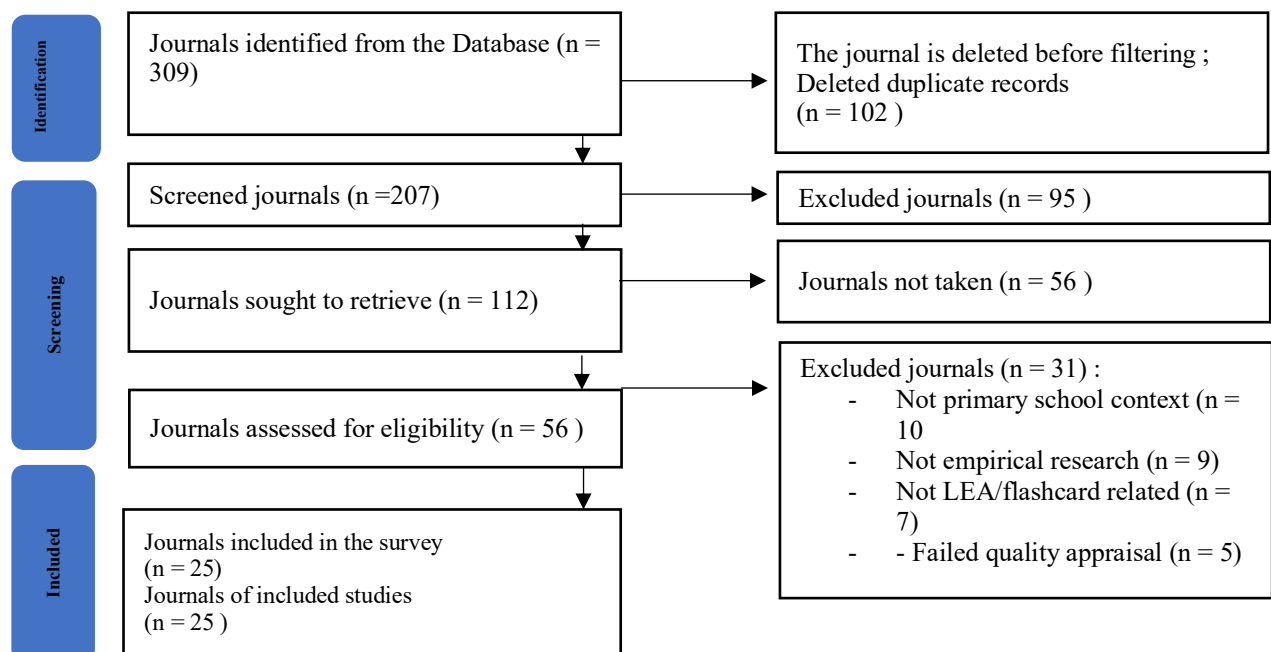


Figure 1. PRISMA Literature Selection Flow Diagram

FINDINGS AND DISCUSSION

Findings

A systematic review of 25 scientific articles that met the inclusion criteria showed that the

development of language experience-based learning media, particularly *flashcard* integrated with *Language Experience Approach* (LEA), has strong relevance to improving early reading and writing skills in primary school. Early literacy is not only seen as a technical ability to recognize letters, but rather as a cognitive foundation that determines long-term academic success (Borges et al., 2023; Schöfl et al., 2025). Literacy learning that is meaningful, contextual, and based on real experiences has proven to be more effective than conventional approaches that are mechanical (Ukumo & Berlie, 2024; Weadman et al., 2023).

Table 1. Synthesis of Research Results from 25 Selected Articles

No.	Researcher (Year)	Research Results
1.	(Borges et al., 2023)	Emergent literacy components such as alphabetic knowledge and phonological awareness account for 49% of reading variance and 55% of writing variance in first-grade students.
2.	(Dahl-Leonard et al., 2024)	Technology-based literacy learning has a significant effect ($g = 0.24$) on literacy outcomes of students in grades K-5 compared to conventional learning.
3.	(DeBaryshe, 2023)	Teacher professional development programs that include an emergent writing component improve the quality of the classroom environment and preschoolers' early literacy skills.
4.	(Everatt et al., 2025)	EAL students in innovative learning environments show literacy outcomes on par with students in traditional classrooms; however, English-speaking students in ILE are lower.
5.	(Fälth & Selenius, 2024)	As many as 82% of Swedish primary school teachers use digital technology to support early reading and writing, especially for students with special needs.
6.	(Hiebert, 2025)	The lexical complexity of elementary textbooks in 2014 increased rapidly in the first grade but stagnated in the third and fourth grades, indicating a compression of literacy development.
7.	(Honorato-Errázuriz et al., 2025)	Chile's national literacy program has succeeded in improving first-grade literacy despite the challenges of the pandemic, with high involvement of teachers and guardians.
8.	(Kargiotidis & Manolitsis, 2024)	Children with reading and writing difficulties from grades 2–3 show higher levels of social anxiety in grade 5 than their normally developed peers.
9.	(Laurent-Prophete et al., 2024)	The <i>Corrective Reading</i> curriculum based on direct instruction sequences improved reading comprehension and derivative relationships in four first-graders.
10.	(Lewis, 2024)	The systematic review identified seven effective strategies to support multilingual writers in elementary school, including mentor texts, scaffolding, and multilingual language approaches.
11.	(Li et al., 2023)	The EFL reading literacy questionnaire developed with three dimensions and 14 items had high reliability (0.729–0.823) and strong criterion validity ($r = 0.871$).
12.	(McWilliams et al., 2024)	The computer-based <i>Headsprout</i> program increased the average reading age of the intervention group by 17 months compared to 7.6 months in the control group.
13.	(Ndijuye & Beatus, 2024)	Tanzania's urban children outperform rural children in almost all aspects of literacy; limited facilities and large class sizes are major obstacles.
14.	(Newell et al., 2025)	All three fourth-graders preferred extra reading practice before reading in front of peers, improving reading fluency and confidence to read aloud.

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15. (Parrila et al., 2024) Teachers' knowledge of language and literacy predict the quality of instruction; instructional differentiation contributes to the improvement of first-graders' decoding abilities.
 16. (Schöfl et al., 2025) Accurate, data-driven, and integrated early assessments within the MTSS/RTI framework have been proven to result in measurable literacy improvements in the early years of school.
 17. (van Dijken, 2025) Print referencing interventions on *e-storybooks* improve print knowledge, phonological awareness, and vocabulary, especially for children with low regulatory skills.
 18. (Vargas et al., 2024) The habit of reading print for recreational purposes is positively related to text comprehension; digital reading for academic purposes is negatively related.
 19. (Weadman et al., 2023) Australian early childhood teachers more often use responsive statements than explicit strategies in *shared book reading*, missing out on opportunities for literacy development.
 20. (Ukumo & Berlie, 2024) Ethiopian primary school teachers did not implement proper literacy strategies in 60–80% of the lessons observed; the gap in knowledge about early reading instruction was significant.
 21. (Amaliah & Anwar, 2023) Flashcard-based digital PBL significantly improved students' literacy adaptation and cognitive development in large classes, with pretest average 66.17 rising to posttest average 77.83 ($p = 0.00$).
 22. (Khosa, 2025) Print-rich classroom environments significantly support early reading development in Grade 1; classrooms with diverse print exposure outperformed those without structured print resources.
 23. Sayenti & Wiarta (2024) Flashcard media developed using the ADDIE model was rated "very good" in validity and significantly effective in improving early reading skills in kindergarten Group B ($t\text{-count } 7.11 > t\text{-table } 2.00$).
 24. (Erlin & Saptono, 2025) The SAS (Structural Analytic Synthetic) method based on flashcards significantly improved early reading skills in first-grade students across two action research cycles, with teacher proficiency as a key factor.
 25. (Salsabila & Wahyudi, 2025) Flashcard media developed using Canva was significantly more effective than alphabet poster media in improving early reading skills, with experimental N-Gain 58.06 vs. control N-Gain 34.88.
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Discussion

The Effectiveness of LEA-Based *Flashcard* Media in Supporting Early Literacy

The synthesis of 25 selected studies consistently demonstrates that flashcard media integrated with experience-based learning principles makes a substantive contribution to early literacy development at the elementary school level. However, a comparative analysis across studies reveals an important nuance: the degree of effectiveness is not uniform and is mediated by several factors, including the design approach, the learning context, and the pedagogical competence of the teacher. Studies that explicitly embedded the LEA framework in flashcard design reported stronger and more sustained literacy gains compared to those using flashcards in a more conventional manner.

Borges et al. (2023) establish a foundational argument by showing that emergent literacy

components, alphabetic knowledge and phonological awareness, jointly explain 49% of reading variance and 55% of writing variance in first-grade students. This finding is reinforced by Sayenti and Wiarta (2024), whose ADDIE-model flashcard development yielded a significant t-test result ($t = 7.11 > t\text{-table} = 2.00$), confirming that well-designed flashcard media meaningfully accelerates early reading acquisition. Similarly, Salsabila and Wahyudi (2025) demonstrated that flashcard media created using the Canva application produced a substantially higher N-Gain (58.06) compared to conventional alphabet poster media (34.88), suggesting that visual design quality and interactivity are critical variables in media effectiveness.

In contrast, DeBaryshe (2023) and Van Dijken (2025) extend this argument by emphasizing the role of experiential and contextual grounding. DeBaryshe (2023) shows that professional development focused on emergent writing, a core element of the LEA approach significantly improved the quality of classroom literacy environments and children's invented spelling skills. Van Dijken (2025) corroborates this by proving that print referencing techniques embedded in e-storybook reading substantially improve print knowledge and phonological awareness, especially for students with low self-regulation. Together, these findings suggest that the superiority of LEA-based flashcard media lies not merely in its visual form, but in its capacity to anchor language symbols to children's lived experiences.

Crucially, Kargiotidis and Manolitsis (2024) add an affective dimension that is frequently overlooked in media effectiveness studies. Their longitudinal findings reveal that children who experience early literacy difficulties are at significantly higher risk of social anxiety by fifth grade. This finding stands in contrast to studies that focus exclusively on cognitive outcomes, and it highlights that effective early literacy media must simultaneously address both the cognitive and emotional dimensions of learning. LEA-based flashcard media, by rooting content in students' personal experiences, is inherently better positioned to reduce the anxiety associated with unfamiliar literacy content a feature that conventional flashcard approaches do not systematically provide.

The Role of Learning Context and Teacher Competence in Optimizing Experience-Based Media

Across the 25 reviewed studies, teacher competence emerges as the most consistently cited contextual factor determining the success or failure of flashcard-based literacy interventions. However, the studies do not unanimously agree on what constitutes adequate teacher competence, revealing a productive tension within the literature. Parrila et al. (2024) argue that teachers' declarative knowledge of language structures (phonology, morphology, and syntax) is the primary

predictor of instructional quality, and that teachers who engage in instructional differentiation produce measurably better decoding outcomes in first-grade students. This positions teacher knowledge as a prerequisite condition, not merely a supporting factor.

Erlia and Saptono (2025) offer a complementary but distinct perspective: their action research using the SAS (Structural Analytic Synthetic) flashcard method found that significant reading improvements across two cycles were closely linked to targeted teacher training in implementing the method systematically. This suggests that even teachers with general pedagogical competence may require method-specific professional development to implement structured flashcard approaches effectively. This nuance is important because it implies that teacher competence is not a monolithic construct, it must be understood in relation to the specific instructional method being deployed.

The findings of Ukumo and Berlie (2024) and Weadman et al. (2023) paint a sobering picture of the implementation gap between policy and classroom practice. Ukumo and Berlie (2024) document that 60–80% of observed lessons in Ethiopia failed to apply proper literacy strategies, while Weadman et al. (2023) found that Australian early childhood teachers predominantly used responsive conversational strategies during shared book reading rather than explicit literacy-building techniques. Although these two studies operate in radically different geographic and socioeconomic contexts, their convergent findings reinforce a single conclusion: the pedagogical knowledge gap is a global phenomenon, not a context-specific anomaly.

Fälth and Selenius (2024) provide a more optimistic counterpoint, showing that Swedish teachers who perceived digital media as participatory tools used them significantly more frequently, including for students with special needs. This finding diverges from those of Ukumo and Berlie (2024) and Weadman et al. (2023), and the divergence is likely explained by systemic factors: Sweden's robust teacher training infrastructure and high digital literacy among educators create enabling conditions that are absent in lower-resource contexts. For the development of LEA-based flashcard media in Indonesia, this comparison underscores the importance of designing teacher support systems alongside the media itself, rather than treating media development as an isolated instructional solution.

At the macro level, Honorato-Errázuriz et al. (2025) demonstrate that Chile's national literacy program achieved sustained first-grade literacy improvements even during the pandemic, driven by coherent policy frameworks, teacher buy-in, and active parental engagement. Amaliah and

Anwar (2023) further contribute evidence that even in large classroom settings, a common challenge in Indonesian schools flashcard-based digital PBL produced significant gains in literacy adaptation and cognitive development (pretest mean 66.17 to posttest mean 77.83, $p = 0.00$). These two studies together support the argument that the effectiveness of LEA-based flashcard media depends on a systemic ecosystem of support, not on the media quality alone.

Trends and Challenges in the Assessment and Implementation of Early Literacy

A third major theme emerging from this review concerns the role of assessment accuracy and environmental context in shaping early literacy outcomes. Schöfl et al. (2025) establish that data-driven early assessment within the MTSS/RTI framework produces measurable improvements in literacy when the cycle from measurement to instructional adjustment operates efficiently. Li et al. (2023) complement this by validating an EFL reading literacy instrument with high reliability ($\alpha = 0.729\text{--}0.823$) and strong criterion validity ($r = 0.871$), demonstrating that psychometrically sound measurement tools can be systematically constructed for early literacy contexts. McWilliams et al. (2024) further validate the role of structured flashcard-based interventions as assessment tools: the Headsprout program produced an average reading age gain of 17 months in the intervention group versus 7.6 months in the control group, confirming both the instructional and diagnostic value of well-designed flashcard media.

However, the literature also reveals significant tensions in the area of contextual applicability. Ndijuye and Beatus (2024) document a persistent urban-rural gap in Tanzania, where limited physical infrastructure and overcrowded classrooms substantially constrain the effectiveness of any literacy media. This finding directly challenges the assumption that a well-designed media intervention will produce uniform outcomes across diverse settings, a challenge that is particularly relevant for Indonesian contexts given the country's geographic and socioeconomic diversity. Khosa (2025) reinforces this from a print environment perspective, showing that Grade 1 classrooms with rich and varied print resources outperformed those without, regardless of the specific media used. This suggests that flashcard media, however well-designed, operates most effectively within a broader print-rich ecosystem.

Dahl-Leonard et al. (2024) confirm through meta-analysis that technology-delivered literacy instruction produces a significant effect ($g = 0.24$, $p < 0.001$), while Vargas et al. (2024) introduce a critical caveat: recreational print reading correlates positively with comprehension, whereas academic digital reading correlates negatively. This apparent contradiction is not irreconcilable, it

points to the importance of purpose and volition in reading activity. Literacy media that builds on students' intrinsic experiences and purposes, as the LEA approach prescribes, is therefore better aligned with the conditions under which reading engagement leads to comprehension gains. Finally, Newell et al. (2025) and Laurent-Prophete et al. (2024) jointly affirm that sequenced instruction and emotional readiness are non-negotiable design considerations: students perform significantly better when reading practice occurs in psychologically safe conditions, and when instructional sequences are planned with both cognitive and affective scaffolding in mind.

CONCLUSION

This systematic literature review of 25 scientific articles successfully demonstrates that *flashcard* media integrated with *Language Experience Approach* (LEA) principles makes a significant and multidimensional contribution to early reading and writing skills at the elementary school level. A comparative synthesis across studies revealed a consistent pattern: experience-based literacy approaches that anchor language symbols to students' personal and contextual experiences produce deeper literacy internalization than conventional, decontextualized methods. This superiority, however, is not absolute, it is contingent on the quality of media design, the pedagogical competence of the implementing teacher, and the broader learning ecosystem in which the media is deployed.

Three core findings emerge from this review. First, regarding effectiveness, studies employing well-designed flashcard interventions consistently produced significant gains in early reading and writing outcomes. These gains are amplified when the media design integrates the LEA framework, connecting literacy content to students' lived experiences and thereby reducing the affective barriers associated with early literacy failure. Second, regarding teacher competence and contextual factors, the literature reveals a global implementation gap between the theoretical potential of literacy media and its actual classroom application. Teacher knowledge of language structures, method-specific training, and systemic support structures are non-negotiable prerequisites for effective media implementation. Third, regarding assessment and contextual challenges, accurate early assessment within structured frameworks and the quality of the physical print environment emerge as critical determinants of whether literacy media interventions translate into measurable long-term outcomes.

These findings collectively affirm that the development of LEA-based *flashcard* media cannot be treated as an isolated instructional solution. Future research is recommended to develop an

empirically validated LEA-based *flashcard* prototype specifically contextualized for Indonesian elementary schools, taking into account the affective dimension of learning, local cultural relevance, urban-rural contextual diversity, and the integration of data-driven assessment as a sustainable evaluation framework. Collaborative efforts among teachers, curriculum developers, and policy makers are essential to ensure that media innovations are supported by the systemic conditions necessary for their effectiveness to be fully realized.

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