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Conventional and Digital Flashcards in Teaching Vocabulary for Indonesian Primary Schools: A Systematic Literature Review

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Abstract. In Indonesian primary EFL classrooms, where students rarely use English beyond the classroom, flashcards offer a practical medium for teaching vocabulary. However, previous studies on conventional and digital flashcards remain fragmented, with each medium typically examined in isolation rather than compared side-by-side, and with limited attention to the challenges teachers face in practice. This study aimed to systematically review and comparatively synthesize research on the use of both conventional and digital flashcards in vocabulary learning for young learners in Indonesian primary schools. This study employed a Systematic Literature Review (SLR) following the PRISMA 2020 guidelines. Data were collected from Google Scholar, ERIC, and Semantic Scholar, and 16 peer-reviewed articles published between 2022 and 2026 were included, comprising 10 studies on conventional flashcards and 6 on digital flashcards. The articles were analyzed using Braun and Clarke's six-phase thematic analysis, and theme frequencies were calculated separately for each flashcard type to enable direct comparison. The analysis generated three major themes: challenges faced by teachers, opportunities and benefits, and strategic directions. For conventional flashcards, teachers reported challenges in classroom management, preparation cost, and visual quality, while benefiting from kinesthetic interaction and operational practicality. For digital flashcards, teachers faced infrastructural constraints, scaffolding demands, and digital literacy limitations, while benefiting from multisensory integration and gamification-driven motivation. This study contributes the comparative synthesis of conventional and digital flashcards in Indonesian EFL primary classrooms and identifies the integration and sequencing of the two media as the next research frontier.

Keyword: Conventional Flashcards; Digital Flashcards; Vocabulary Learning; Indonesian Primary School; Systematic Literature Review

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INTRODUCTION

Vocabulary is considered an essential part of language learning (Agazzi, 2022) since it enables learners to comprehend meanings and communicate through a foreign language. Where learners lack vocabulary, they tend to find difficulties comprehending texts, expressing themselves, and engaging actively in class-related activities. Besides, vocabulary enables learners to develop other language skills including listening, speaking, reading, and writing. For young learners, vocabulary becomes extremely important because language acquisition in them depends significantly on word recognition and comprehension.

Learning vocabulary at the primary school level should not only be about memorization but also comprehension and application of words. According to Fiorella and Mayer (2016), meaningful learning is a result of making connections between new information and previous experiences. Nevertheless, many students today have problems learning vocabulary in the English language. This happens due to insufficient exposure to English and demotivation of students to learn, as well as boring teaching methods. Lutfiani et al. (2025) state that the inability of students to comprehend the meaning and spelling of words happens because of the absence of interactive activities and sufficient learning media. It can be stated that vocabulary learned in the conventional way does not contribute to student engagement and interest, as shown in the study by Pramadanti (2023).

However, such issues become more evident when viewed from the perspective of Indonesia because the language is introduced as a foreign language and students do not make use of English in settings beyond the classroom. According to Webb and Nation (2017), repetition and use are two factors that must be included to facilitate vocabulary acquisition, which is not often the case in an EFL environment. This means that students will struggle to learn and make use of new vocabulary in meaningful conversation.

Flashcard is one of the media used to teach vocabulary that combines pictures with language, and it is commonly used in two forms: conventional (paper-based) cards and digital cards delivered through applications, HTML-based media, or augmented reality. Contemporary research on multimodal literacies by Serafini and Reid (2019) presents vocabulary learning not only as memorizing words but as a means of learning meaning through different modes, namely visual, gestural, and linguistic. Therefore, according to this approach, using flashcards would be very useful for teaching young learners since they allow the use of different semiotic modes in the same activity. According to Macedonia (2019), the process becomes more effective when one enacts his or her learning, something that supports the role of flashcards in vocabulary teaching. In addition, flashcards are easy-to-use tools for vocabulary learning; therefore, they can be implemented in various activities in the classroom including games and interactive lessons.

However, the two forms differ in what they offer and in what they demand from teachers. Conventional flashcards are handled physically, which fits the embodied view of learning (Macedonia, 2019), but teachers must prepare the cards themselves. Digital flashcards can add audio, animation, and game elements to the visual and linguistic modes (Serafini & Reid, 2019), but they depend on devices, connectivity, and teachers' digital skills. Because Indonesian primary schools differ in their infrastructure and resources, comparing the two media within one framework is necessary to show which challenges and benefits are tied to each form, and how teachers can choose and combine them.

Research on flashcards in vocabulary instruction has generally reported positive outcomes, which can be grouped into three areas. The first is vocabulary achievement: conventional flashcards were associated with improved vocabulary performance among elementary students (Putri et al., 2023; Deswita & Mubarok, 2025), and digital flashcards were likewise linked to vocabulary acquisition (Aswita & Moetia, 2025; Haryati & Al Faraby, 2025; Rahma & Widagdo, 2024). The second is memory retention, where flashcards helped students understand and

memorize words (Kurniati et al., 2023; Wahyuningsih & Izzah, 2023; Haryati & Al Faraby, 2025). The third is motivation and engagement, as flashcards made learning more enthusiastic and enjoyable in both conventional (Ariyanto et al., 2024; Wahyuningsih & Izzah, 2023) and digital formats (Andriani et al., 2024; Rahma & Widagdo, 2024). Taken together, these studies suggest that flashcards, whether conventional or digital, can support vocabulary learning and create a pleasant classroom atmosphere.

While previous studies have yielded positive results concerning conventional and digital flashcards, there are several limitations that must be considered. First, most of the existing studies examine conventional or digital flashcards separately and hence do not discuss the two media within one framework. The lack of comprehensive synthesis of information in an Indonesian primary school setting means that there are no guidelines for educators about the difference between these media in terms of teacher difficulties, benefits, and strategies. Moreover, previous research has emphasized students' learning outcomes such as vocabulary performance (Putri et al., 2023; Deswita & Mubarok, 2025), memory retention (Kurniati et al., 2023; Haryati & Al Faraby, 2025), and motivation (Wahyuningsih & Izzah, 2023; Ariyanto et al., 2024). However, the actual difficulties teachers encounter in class have been neglected, which is an important point as recent research on ecological teacher agency emphasizes that teaching media should not be seen independently from institutional, material, and competency conditions (Priestley et al., 2015). Lastly, many of these studies involve a short intervention in a single class and thus may be too narrow to represent the different conditions in Indonesian primary schools.

Moreover, previous studies tend to analyze the issues related to flashcards differently or separately, including their effectiveness in retaining vocabulary, developing media, classroom participation, or digital learning tools. As a result, all the information presented by these studies remains fragmented and fails to give a complete picture of the issues faced by teachers, opportunities provided by each medium, as well as future directions to take when utilizing flashcards in Indonesian primary school EFL classrooms. Thus, the purpose of the present paper is to conduct a systematic review and comparative synthesis of previous studies on the use of conventional and digital flashcards in teaching vocabulary to young children in Indonesian primary schools. In other words, it will examine previous research using a comparative approach while drawing on theoretical perspectives such as embodied cognition, multimodal literacies, cognitive load, and ecological teacher agency, and thereby try to overcome the fragmentation of findings and offer an integrative perspective. This study seeks to answer the following research questions:

1. What challenges do teachers face in using conventional and digital flashcards for vocabulary learning in Indonesian primary schools?
2. What opportunities and benefits do conventional and digital flashcards offer in supporting vocabulary teaching for young learners in Indonesian primary schools?
3. What strategic directions and future recommendations emerge from existing research on the use of conventional and digital flashcards in Indonesian primary schools?

METHOD

1. Research Design

This research used systematic literature review (SLR) methodology to analyze the application of flashcard technique in teaching vocabulary in primary schools in Indonesia. The SLR was carried out following the PRISMA 2020 guidelines set by Page et al. (2021) to ensure that the review process would be thorough and transparent.

2. Search Strategy

The literature review was carried out through three academic sources, which include Google Scholar, ERIC, and Semantic Scholar. Each of the three academic databases was purposely chosen due to its unique complementary qualities. Google Scholar was selected to cover the

maximum number of sources including international peer-reviewed journals and nationally accredited journals (SINTA) of Indonesia. This database was considered very important in helping the researchers locate primary research carried out on Indonesian topics related to primary schools, which may not be covered in foreign major databases. ERIC was considered to be the main database for all education-related research globally due to its peer-reviewed articles regarding language learning, vocabulary learning, and primary education. Semantic Scholar was used to help the researchers discover highly-cited and emerging works on flashcards through a more advanced and targeted AI-based semantic search method than Google Scholar's one-dimensional search approach.

The search process used combinations of keywords and Boolean operators to identify relevant studies. The keywords included “flashcards” AND “vocabulary” AND “primary school” AND “Indonesia.” Additional related terms such as “elementary school,” “young learners,” “digital flashcards,” and “conventional flashcards” were also used to broaden the search results. The search string applied in this study is presented in Table 1.

Table 1. Keywords for Article Selection

No	Operator	Keywords	Number of Articles
1	AND	“flashcards” AND “vocabulary” AND “primary school” AND “Indonesia”	Google Scholar: 100 Semantic Scholar: 16 ERIC: 98
2	AND	“flash cards” AND “vocabulary mastery” AND “elementary school” AND “Indonesia”	
3	AND / OR	“picture cards” OR “flash-card” AND “primary school” AND “vocabulary” AND “Indonesia”	
4	AND / OR	“digital flashcards” OR “conventional flashcards” AND “vocabulary” AND “elementary school” OR “young learners”	

3. Eligibility Criteria

Eligibility criteria were defined to make sure that the review includes only the most relevant research articles. The inclusion criteria were: (1) articles published from 2022 to 2026; (2) studies addressing the use of flashcards (conventional or digital) in vocabulary acquisition; (3) studies conducted in the setting of Indonesian primary or elementary schools; (4) peer-reviewed articles available in SINTA Journals; and (5) articles published in English language. Articles excluded from the current review were non-peer-reviewed articles, studies not related to vocabulary acquisition, studies not employing flashcards as the learning tool, duplicate articles, and inaccessible articles.

4. Study Selection Process

In the identification phase, a total of 214 documents were retrieved from the database sources Google Scholar (100 articles), Semantic Scholar (16 articles), and ERIC (98 articles). In the process of screening, after discarding duplicates and other unrelated articles, 190 articles were selected. In the screening phase, a title and abstract-based analysis was conducted on all the selected studies, following the criteria established by this article. On the basis of the eligibility criteria, 151 articles were discarded. After the screening phase, 39 studies were selected for full-text reading. Out of these, 23 studies were discarded on the basis of the full-text review, leaving behind 16 studies for analysis. The PRISMA flow diagram of the study selection process is presented in Figure 1.

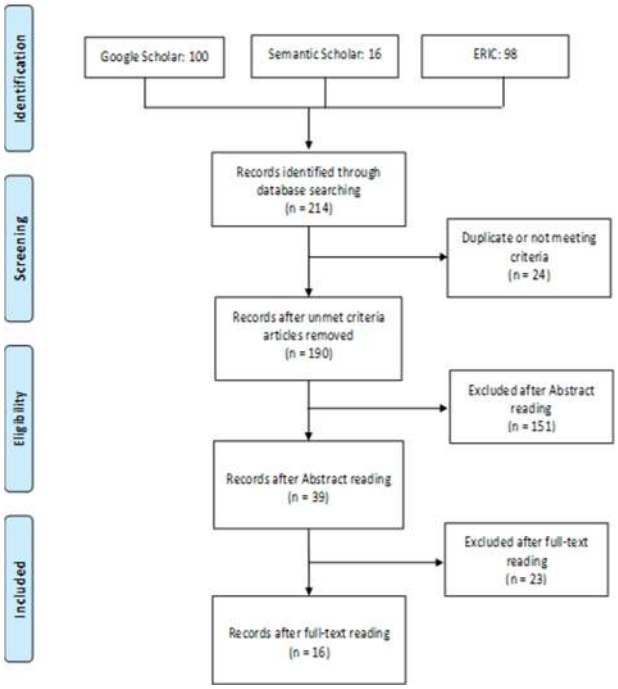


Figure 1. PRISMA Flowchart of Selection Study Process

Based on the study selection process, a total of 16 articles were included in the final review. The selected studies consisted of nationally accredited journals, including SINTA journals. These studies were further categorized based on their research design, publication source, and main focus related to flashcard implementation in vocabulary learning for young learners. The distribution of reviewed articles is presented in Table 2.

Table 2. Final Sorted Articles

No	Author	Title	Research Design	Journal	Indexing
Conventional Flashcards (10 Studies)					
1	Putri et al. (2023)	Teaching English Using Flashcards to Improve Elementary School Students' Vocabulary	Quantitative (pre-experimental)	Journal of Foreign Language Teaching and Learning	Sinta 2
2	Wahyuningsih & Izzah (2023)	Introducing English Vocabulary to Young Learners Through Flashcards	Qualitative (case study)	Jurnal Ilmiah Pendidikan Dasar	Sinta 2
3	Paldy et al. (2025)	Creating Engaging Flashcard	R&D (ADDIE)	JOLLT Journal	Sinta 2

		Materials for Young Learners			
4	Febriyanty et al. (2024)	Development of Picture Word Card Media Using Modelling the Way Method	R&D (ADDIE)	English Review: Journal of English Education	Sinta 2
5	Suryani & Majid (2022)	Introducing English Vocabulary to Young Learners with Flashcards	Quantitative (pre-experimental)	English Education Journal	Sinta 2
6	Nasution & Rahim (2022)	The development of flashcard media to improve students' English vocabulary	R&D (4-D model)	JINoP	Sinta 3
7	Deswita & Mubarok (2025)	The Implementation of Flash Card to Improve Simple English Vocabulary	Quantitative (pre-experimental)	IDEAS: Journal on Language Teaching	Sinta 3
8	Kurniati et al. (2023)	Use of Flash Card Media to Improve English Vocabulary Memory	Qualitative (descriptive)	EJECT	Sinta 3
9	Ariyanto et al. (2024)	The Use of Flashcards Through Umbul Game in Learning Vocabulary	Classroom Action Research	Eternal: English Teaching Journal	Sinta 3
10	Feranty et al. (2024)	Improving Fifth-Grade Students' Vocabulary Mastery Using Flashcards	Classroom Action Research	Journal of English Teaching	Sinta 4
Digital Flashcards (6 Studies)					
11	Haryati & Al Faraby (2025)	Using a Digital Flashcard Application to	Mixed-method	Voices of English Language	Sinta 2

		Improve Vocabulary Mastery		Education Society	
12	Rahma & Widagdo (2024)	HTML-Based Digital Flashcard Media to Improve Vocabulary of 1st Grade	R&D (ADDIE)	Jurnal Pendidikan Indonesia	Sinta 2
13	Prastiti et al. (2025)	Implementing English Augmented Reality Flashcards: A Need Analysis	Mixed-method	Jurnal Pendidikan Bahasa Inggris Undiksha	Sinta 2
14	Andriani et al. (2024)	Looking for a Fun Way to Learn English Vocabulary? Gamification with Digital Flashcards	Classroom Action Research	Voices of English Language Education Society	Sinta 2
15	Aswita & Moetia (2025)	The Relationship Between the Use of Digital Flashcards on Quizlet and Vocabulary Mastery	Quantitative (Correlational)	International Journal of Language Teaching and Education	Sinta 3
16	Fikriyyah & Rabbianty (2026)	Optimizing vocabulary mastery through augmented reality flashcards	Quantitative (pre-experimental)	Leksika: Jurnal Bahasa, Sastra, dan Pengajarannya	Sinta 3

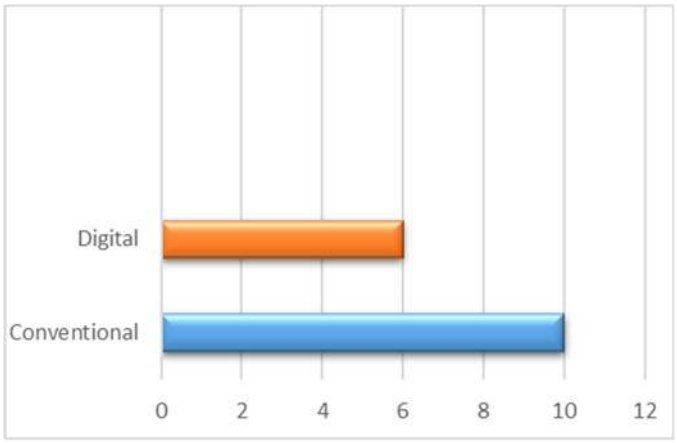


Figure 2 Distribution of the Reviewed Articles by Flashcard Type

Figure 2 demonstrates the distribution of the selected articles depending on the type of flashcard being studied. According to Figure 2, most of the 16 studies analyzed (10 studies) concerned conventional (paper-based) flashcards, while the remaining six articles were devoted to digital flashcards, such as mobile devices, HTML-based programs, and AR flashcards.

To ensure the credibility and quality of the selected studies, a quality assessment process was conducted. The selected articles were evaluated based on several aspects, including relevance to the research topic, clarity of research objectives, appropriateness of methodology, completeness of findings, and publication quality. Only peer-reviewed studies that met the inclusion criteria were included in the final review.

5. Data Analysis

The selected studies were analyzed using thematic analysis following the six-phase framework proposed by Braun and Clarke (2006): (1) data familiarization, (2) generation of initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. The findings were categorized into three major themes: challenges, opportunities, and strategic directions, and were further sub-categorized based on flashcard type (conventional vs. digital) to allow direct comparative analysis between the two media.

To show how often each sub-theme appeared, frequency was counted as the number of studies reporting that sub-theme, and percentages were calculated separately for each flashcard type, using the number of studies in that group as the denominator (10 studies for conventional flashcards and 6 studies for digital flashcards). For example, 30% in Table 3a represents 3 of the 10 conventional flashcard studies, while 66.7% in Table 3b represents 4 of the 6 digital flashcard studies. Because one study could contribute to more than one sub-theme, the percentages within each table do not add up to 100%. Since the two groups differ in size, the percentages should be read within each flashcard type rather than as shares of the same total.

RESULTS AND DISCUSSION

Results

A total of 16 articles were thematically analyzed in this review. To enable direct comparison between conventional and digital flashcards, the findings are presented in two parallel summary tables. Three major themes emerged across both flashcard types: (1) challenges faced by teachers during use, (2) opportunities and benefits, and (3) strategic directions for future development.

Table 3a. Emerging Themes from Studies on Conventional Flashcards

No	Emerging Themes	Frequency	Percentage
	Challenges		
1	Difficulty managing classroom conduciveness	3	30.0
2	Preparation burden and production cost	2	20.0
3	Dependence on visual quality of the cards	1	10.0
	Opportunities and Benefits		
1	Support for kinesthetic and direct interaction	6	60.0
2	Operational practicality (no electricity needed)	5	50.0
	Strategic Directions		
1	Integration with structured cooperative strategies	5	50.0
2	Student personalization of cards	1	10.0
No	**Emerging Themes**	**Frequency**	**Percentage**
	Challenges		
1	Technical and infrastructure constraints	4	66.7
2	Need for intensive mediation and scaffolding	3	50.0
3	Limited teacher digital literacy	2	33.3
	Opportunities and Benefits		
1	Multisensory integration (visual + audio)	6	100.0
2	Motivational enhancement through gamification	5	83.3
	Strategic Directions		
1	Need analysis prior to digital adoption	5	83.3
2	Synergy of digital media with concrete realia	3	50.0

RQ 1: Challenges faced by Teachers

Three main challenges were identified in the studies on conventional flashcards. The most frequent was difficulty managing classroom conduciveness (30%), as observed by Ariyanto et al. (2024), Putri et al. (2023), and Wahyuningsih and Izzah (2023); all three noted that using physical cards during games caused the students to be overly excited and distracted, interfering with the class process. The second was the preparation burden and production cost (20%), as observed by Nasution and Rahim (2022) and Paldy et al. (2025); making and laminating the cards were both very resource-consuming activities for teachers. The least frequent was dependence on the visual quality of the cards (10%), mentioned by Kurniati et al. (2023), which involved small and unclear pictures.

For digital flashcards, the challenges faced by teachers leaned more towards technological issues. The most frequent were technical and infrastructural constraints (66.7%), according to Haryati & Al Faraby (2025), Rahma & Widagdo (2024), Prastiti et al. (2025), and Fikriyyah & Rabbianty (2026). Teachers also indicated the need for intensive mediation and scaffolding (50%), especially in augmented reality-based sessions, as reported by Fikriyyah & Rabbianty (2026), Prastiti et al. (2025), and Andriani et al. (2024). The issue of limited digital literacy skills among teachers (33.3%) was highlighted by Rahma & Widagdo (2024) and Prastiti et al. (2025).

RQ 2: Opportunities and Benefits

There were two clear advantages identified regarding conventional flashcards. The first is the use in kinesthetic and physical interaction (60%), whereby teachers can engage learners through physical activities involving word-object relations according to Putri et al. (2023), Wahyuningsih & Izzah (2023), Suryani & Majid (2022), Feranty et al. (2024), Ariyanto et al. (2024), and Deswita & Mubarok (2025). The other advantage noted was its operational feasibility (50%), which involves having no electrical needs and thus being portable to schools lacking infrastructure.

Regarding digital flashcards, there were two major benefits noted. Firstly, in all digital articles analyzed (100%), there was the combination of visual and auditory elements, meaning that teachers can effectively demonstrate how words are pronounced through audio capabilities included in digital flashcards. The second major advantage noted was that gamification enhances motivation in vocabulary learning (83.3%), which was evident in the analyses by Andriani et al. (2024) and Aswita & Moetia (2025). Specifically, Aswita & Moetia (2025) indicated that the Quizlet application was significantly related to students' vocabulary achievement.

RQ 3: Strategic Directions for Future Development

With respect to conventional flashcards, future research and application may want to include integration with structured cooperation (50%), where flashcards are integrated with TGT and Modeling The Way as advised by Ariyanto et al. (2024), Febriyanty et al. (2024), Paldy et al. (2025), Nasution & Rahim (2022), and Deswita & Mubarok (2025). Furthermore, Paldy et al. (2025) suggested personalized cards for students (10%).

As for digital flashcards, it is strongly recommended that there is need analysis done before using digital media (83.3%), where teachers would assess their capability in implementing digital media along with infrastructure preparedness. Besides, Prastiti et al. (2025), Fikriyyah & Rabbianty (2026), and Rahma & Widagdo (2024) advise synergy between digital media and realia (50%), indicating that digital flashcards should always come with physical materials for contextuality.

Discussion

As suggested by the findings of the systematic literature review conducted in the context of this research, flashcards appear to remain a useful instructional tool within vocabulary instruction in Indonesian primary schools; however, the effectiveness of such flashcard-based instruction may depend less upon the medium used and more upon the circumstances in which this medium is embedded. The current analysis critically examines the implications of this discussion, taking into account the modern conceptualizations of embodied cognition, multimodal literacies, cognitive load, and ecological teacher agency.

Why Flashcards May Still Work: Beyond the Cognitive Account

The apparent durability and efficacy of the medium even when implemented via digital flashcards leads to the consideration of the theory behind its success. According to traditional theories, flashcard learning is commonly attributed to the spaced retrieval and dual coding techniques established several decades ago. However, recent research suggests that while those principles remain important, they may not be enough to explain the success of flashcards today. More recent explanations draw on theories of embodied cognition (Macedonia, 2019). According to this approach, vocabulary acquisition may be more durable when learners manipulate and perform the word in addition to seeing it. For example, when a child takes a flashcard, manipulates it, uses it during a game or points to the picture depicted on it with fingers, motor memory may be created in addition to semantic memory. This may help learners remember vocabulary better. This embodied perspective may explain why kinesthetic interaction emerged as a theme in 60 percent of the studies on conventional flashcards. Neuroscientific research increasingly points to the importance of physical movement for vocabulary acquisition (Macedonia, 2019).

A relevant contemporary concept that may explain the success of flashcards is the multimodal literacies concept (Kress, 2019; Serafini and Reid, 2019). According to this concept, vocabulary learning does not involve memorizing an abstract linguistic element but rather learning to make meaning using at least two semiotic modes including visual and linguistic. Flashcards allow students to engage multiple semiotic modes simultaneously (visual and linguistic, auditory and gestural when pronouncing the words or performing corresponding movements). Digital flashcards can add spatial and animated modes in addition to visual and linguistic. The multisensory advantages found in all of the digital flashcard studies (100 percent) may reflect not only the attractiveness of new media but also a broader understanding of vocabulary as multimodal in recent applied linguistics (Kress, 2019; Serafini & Reid, 2019). Vocabulary learning may thus be seen as multimodal rather than limited to the use of language.

In light of the above-explained concepts, future flashcard learning experiences should take into consideration not only the medium but also its multimodality and embodied aspects. Thus, a digital flashcard might be less effective than a conventional one when the conventional card is used for motor activity during learning games.

The Hidden Cost of Conventional Flashcards: Teacher Labor as Invisible Infrastructure

One notable result in the reviewed conventional flashcard studies is the preparation burden on teachers (20%). While such a result can be considered as an additional practical limitation, it seems to have more serious ramifications for educational equity and teacher sustainability in general. It has become traditional to regard conventional flashcards as low-cost teaching media, yet, in line with Creagh et al. (2023), whose systematic synthesis of 40 workload studies highlights the problem of structural time poverty in teacher work, the cost of preparing educational materials may not be eliminated, but merely transferred.

An analysis of the reviewed conventional flashcard studies suggests that the success of such interventions may have depended on whether teachers could collaborate with university researchers in preparing the educational materials (Nasution & Rahim, 2022; Paldy et al., 2025; Febriyanty et al., 2024). Alternatively, a great personal motivation of teachers seemed to play its role as the other condition for success. Otherwise, the preparation burden may have been too great for effective use of flashcards, even though they are regarded as an effective teaching method.

Consequently, the issue may not be that conventional flashcards are inexpensive and hence available, but rather who bears the cost of that accessibility. The recent literature on teacher well-being at the primary school level (Ozturk et al., 2024; Creagh et al., 2023) highlights materials preparation burden as a source of stress for teachers.

The Engagement-Comprehension Tension and the Cognitive Load Paradox

Indeed, the digital flashcard research highlights an interesting problem that may be called an engagement comprehension tension. Digital elements and Augmented Reality (AR) elements tend to attract more attention from students, although the amount of vocabulary gained does not always increase proportionally. AR flashcards appeared to be engaging for students since they were able to observe an exciting animation; however, the teachers needed to spend quite some effort to help the learners focus on the linguistic aspects of the animation as noted by Fikriyyah and Rabbianty (2026), Prastiti et al. (2025), and Andriani et al. (2024).

In line with the revised version of Mayer's (2021) theory, the engagement comprehension tension can be understood; yet, Skulmowski and Xu (2022) offer a more nuanced view of cognitive load in digital learning. They note that design factors such as interactive media, immersion, realism, and redundant elements can induce extraneous load while still promoting motivation and learning, and they suggest considering both the positive and negative effects of such factors. Thus, gamification, AR animations, reward sounds, and decorations may increase cognitive load

without necessarily harming learning, but whether they help may depend on whether they are aligned with the intended outcome, in this case learning the meaning of words.

In this regard, the role of gamification in learning that was highlighted in 83.3% of the studies needs reconsideration as well. Gamification is important to engage students; yet, the question is to which aspect motivation should be directed. Since the use of Quizlet is related to students' mastery of vocabulary as found by Aswita and Moetia (2025), it appears that the gamified application was designed carefully to direct learners' attention towards vocabulary. Consequently, visual AR applications may be less effective than simpler digital applications when the added elements are not aligned with vocabulary learning.

A critical reading may consequently lead to a redefinition of the superiority of digital flashcards as compared to conventional flashcards. Digital flashcards may not be superior just because they are multisensory, but because the multisensory aspects they incorporate have semantic links with the words and because the non-essential elements of design are carefully omitted. The mediator function of the teacher, whose task is to help the students go from the animated form of expression to its semantic interpretation, may not merely compensate for weak design; rather, it appears to be an important condition for the effectiveness of the flashcard method.

Reframing Teacher Challenges: Agency, Structure, and the Post-Pandemic Reality

An interesting dynamic becomes apparent upon comparison of the nature of the challenges that each type of flashcard imposes on teachers. The challenges imposed by conventional flashcards (classroom management, costs associated with preparing for a class, quality of visuals) are mostly personal and skill-based. On the other hand, the challenges of digital flashcards (the need for appropriate infrastructure, scaffolding, digital literacy skills) are largely structural and infrastructural in nature. In other words, the former category of challenges can potentially be addressed through individual means (training); the latter is much less likely to be.

The contrast is particularly relevant in terms of the post-pandemic framework suggested by recent theoretical developments related to the concept of teacher agency. Recent studies of teacher agency during the COVID-19 pandemic and in under-resourced environments (Ashton, 2022; Gu et al., 2022) adopt the ecological approach (Priestley et al., 2015), which holds that teacher agency should be understood in an ecological sense. It refers to how teacher's agency and capacity interact with the institutions, environments, and materials within which teachers operate. In view of the above, it seems rather disturbing to note that, when policy discourses group teacher challenges under the category of professional development, the implicit message may be that responsibility lies with the individual teacher, while little attention may be paid to the underlying structural and infrastructural conditions that must change in order to solve the problem. No matter how much a teacher might improve their skills, she would still be unable to develop her own internet connection or influence a school's budget.

The new perspective also offers a different understanding of the role of teacher autonomy in modern times of Indonesia's EFL education. Based on the complex systems perspective suggested by Cameron & Larsen-Freeman (2007), teacher autonomy could be defined as situated teacher agency – the ability to make effective pedagogical decisions given the field of opportunities within which teachers can operate. If that field is highly restricted due to structural limitations, then it might not be considered a true exercise of teacher's agency anymore. A choice between conventional flashcards and digital alternatives may not be a pedagogical decision; it might just be a choice between what is possible and impossible under the current structural conditions.

The post-pandemic landscape brings additional layers of complexity. According to some recent literature focusing on Indonesian EFL teachers (Rohmana, 2025), despite accelerating teachers' acquaintance with digital devices, the post-pandemic period does not appear to decrease the disparity between the technical resources provided to various schools. In other words, there

is a rather contradictory situation wherein today's teachers are more knowledgeable about the use of technology; however, they still teach in classes where such knowledge is difficult to utilize. Thus, the literature reviewed above may reflect mainly relatively well-equipped classrooms and may therefore depict only one part of post-pandemic reality.

The Comparative Picture: Toward an Integrated Pedagogy

By reading the conventional and digital flashcard literatures concurrently instead of separately, an integrated understanding may be reached, which might not be possible otherwise. The main strengths of the former in terms of learning lie in its kinesthetic approach, its reliance on teacher mediation, and its ability to be infrastructure independent. The main strengths of the latter in turn lie in their multisensory nature, self-paced approach, and motivational value. It should be pointed out, however, that these aspects represent not different versions of the same affordance; they may, in fact, be pedagogically complementary. They each address a different dimension of vocabulary acquisition that contemporary theoretical frameworks highlight as important.

In particular, an interesting perspective can be gained through sociocultural theory's latest extensions. According to Lantolf et al. (2020), the alternation between socially mediated activity (where learners cooperate with other people in class in creating meaning) and internalization (where they reflect upon that meaning in their private activity) is considered important for learning. Conventional flashcards tend to facilitate socially mediated activity through games in class and interactions between learners and the teacher. Digital flashcards, in turn, may promote internalization through self-paced reflection. Therefore, from a sociocultural perspective, a pedagogy that utilizes only one of these tools may not cover all aspects of the development process, while the use of both may allow for covering both halves of the cycle – the use of conventional flashcards for encoding and digital flashcards for consolidation.

Moreover, such a combination could prove to be effective from the point of view of Reschly & Christenson's (2022) recent model of student engagement, which distinguishes behavioral, cognitive, and emotional dimensions thereof. As mentioned above, conventional flashcards appear to support the behavioral and cognitive dimensions. The use of digital flashcards, on the other hand, may help attain the emotional dimension. Therefore, while neither tool may be sufficient alone, their integration might help achieve the desired goal. In this regard, these findings suggest a practical implication for Indonesian EFL teachers, which is elaborated in the Conclusion.

Limitations of the Review

This review has several limitations that should be considered when interpreting its findings. First, the corpus is small and unevenly distributed, with 10 studies on conventional flashcards and only 6 on digital flashcards. Because each digital study accounts for roughly 16.7 percentage points, the percentages in Table 3b may shift noticeably if a single study is added or removed, so the comparison between the two media should be treated as indicative rather than definitive. Second, the comparison is indirect. The two groups of studies differ in design, grade level, and setting, and none of them compared both media within the same classroom, so differences between the media cannot be fully separated from differences between the studies. Third, Table 2 lists no randomized or true experimental designs. Most of the studies were pre-experimental, classroom action research, or research and development, and many involved short interventions in a single class. This limits the strength of causal claims and the extent to which the findings can be generalized to the diverse conditions of Indonesian primary schools. Moreover, because most of the studies focused on student outcomes, teachers' challenges were often reported as part of the implementation description rather than as a primary research focus, so the challenge themes may not fully capture teachers' own perspectives.

Several limitations also relate to the review procedure. The search covered only Google Scholar, ERIC, and Semantic Scholar, and was restricted to articles published between 2022 and

2026 in English, in SINTA journals. Relevant studies in other databases, in Indonesian-language journals, or outside this period may therefore have been missed, and studies reporting positive results may be overrepresented. The quality assessment relied on general criteria rather than a formal appraisal tool, so the studies were not weighted by methodological quality. In addition, thematic analysis involves interpretation, and the frequencies reported in Tables 3a and 3b show how often a theme was reported, not how important it is for teachers. The digital flashcard group also combines different forms (mobile applications, HTML-based media, and augmented reality), so the themes may not apply equally to each form. These limitations point to several directions for future research, which are discussed in the following section.

The Research Frontier: From Comparison to Integration

First of all, this comparative analysis offers insights into what has been achieved in terms of knowledge about the effectiveness of both flashcards in question and what still remains to be determined. In other words, the studies reviewed provide evidence that both flashcards can be used; they describe the situations in which one of the two flashcards may be more effective; and they highlight the difficulties encountered by teachers using them. However, they appear not to have examined how to effectively combine these two media and adapt them for a particular school context in order to create an optimal learning environment.

This research gap is identified by the review at hand. Further work should aim to conduct research on integrating different kinds of flashcards in one pedagogical framework in the context of one language curriculum. Specifically, the design-based research paradigm proposed by Bakker (2018) may be promising because of its iterative nature, when pedagogical solutions are tested and improved on a case-by-case basis in real educational contexts. This may make it possible to develop and refine the models of combining flashcards in the Indonesian EFL setting. Future studies may therefore move beyond verifying that flashcards work toward explaining how they do so.

CONCLUSION

This systematic literature review of sixteen peer-reviewed articles published from 2022 to 2026 offers a comparative overview of conventional flashcards and digital flashcards in relation to Indonesian primary school EFL vocabulary teaching. The most frequently reported positive aspects of conventional flashcards were kinesthetic engagement and operability, whereas the negative points for teachers were classroom management, preparation cost, and low-quality visuals. On the other hand, multisensory integration and gamified motivation were the most frequently reported positives of digital flashcards, while digital infrastructure, scaffolding, and digital literacy were the negative aspects for teachers.

The findings suggest that the two media may be complementary rather than competing, because conventional flashcards tend to facilitate social and physical activities whereas digital flashcards may facilitate self-paced consolidation through multimodality. In this way, neither medium appears inherently more valuable than the other; its value seems to depend on the context of use.

For teachers, the findings suggest that vocabulary teaching need not involve choosing between conventional and digital flashcards. Teachers could introduce new words through physical, game-based activities with conventional cards (60%), supported by structured cooperative strategies to manage the classroom (50%). Digital flashcards could then be used for review, drawing on their multisensory features (100%) and gamified practice (83.3%), with teacher scaffolding to link animations to word meanings (50%). Before adopting digital media, a simple needs analysis of devices, connectivity, and teachers' digital skills is advisable (83.3%); where these are lacking, conventional cards remain a practical option because they require no electricity

(50%). This sequence is a suggestion drawn from the reviewed themes and should be tested in future classroom research.

For policymakers and educational administrators, it is necessary to distinguish between skills-related and infrastructural difficulties. Skills-related difficulties, such as material preparation (20%) and limited digital literacy (33.3%), can be addressed through teacher training and shared materials, whereas technical and infrastructure constraints (66.7%) require the provision of devices and connectivity.

Future research should address the limitations of this review in four directions. First, because the comparison here was indirect, studies are needed that examine conventional and digital flashcards within the same classrooms, including how the two media can be combined and sequenced in an integrated pedagogy. Design-based research (Bakker, 2018) would suit this purpose because integrated models can be tested and refined in real Indonesian primary school contexts. Second, since most reviewed studies were short interventions in a single class, longitudinal and multi-site studies with stronger designs, such as quasi-experimental studies, are required to verify whether the motivation gains from digital flashcards lead to long-term vocabulary retention and whether the findings hold across different school conditions. Third, because teachers' challenges were rarely the primary focus of the reviewed studies, future research should examine teachers' experiences directly, for example through interviews or classroom observation, particularly in schools with limited infrastructure. Fourth, as digital flashcard studies were few and varied in form, future reviews should update this synthesis as more studies become available, search additional databases and Indonesian-language journals, apply a formal quality appraisal tool, and examine mobile, HTML-based, and augmented reality flashcards separately.

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