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Reconstructing Early Reading Media for Phase a Elementary Students: Pop-Up Book based Augmented Reality

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Abstract

This study aims to describe the reconstruction of early reading media through the utilization of Augmented Reality (AR) and Multiple Intelligences (MI)-based pop-up books for Phase A elementary school students. Employing a conceptual-synthesis approach, this research conducted a Systematic Literature Review (SLR) across four databases Google Scholar, Garuda, ERIC, and Scopus covering publications from 2016 to 2025. An initial search yielded 60 articles, which were screened through a two-stage selection process based on explicit inclusion and exclusion criteria, resulting in a final corpus of 30 articles for analysis. Data were analyzed using the Miles and Huberman interactive model, encompassing data reduction, data display, and conclusion drawing. The findings reveal that current early reading media development remains fragmented; the visual appeal of pop-up books, the interactivity of AR technology, and the pedagogical depth of MI have not been systematically integrated. Consequently, this study proposes a media reconstruction through a holistic design that simultaneously synergizes concrete visual elements, interactive technology, and instructional differentiation. The study concludes that reconstructing media based on pop-up books, AR, and MI is potentially effective in transforming traditional tools into a multisensory literacy ecosystem capable of making early reading instruction more adaptive and meaningful, pending empirical validation. Therefore, it is recommended that educators and media developers implement this integrative design. Furthermore, future empirical research is essential to evaluate the actual effectiveness of this MI-AR-based pop-up book in enhancing basic literacy proficiency among elementary school students.

Keywords: Learning media, early reading, pop-up book, augmented reality, multiple intelligences.

Introduction

Reading difficulties among elementary school students extend beyond comprehension issues; they encompass a fundamental struggle with early reading mastery, which serves as the cornerstone of literacy. At this stage, students are expected to recognize letters, associate symbols with sounds, and read simple words meaningfully. However, field observations reveal that many students have yet to master these competencies. According to Munajah et al. (2025), early reading difficulties are characterized by an inability to identify vowels and consonants, decode syllables, or string words into simple sentences. This aligns with the researcher's findings on the ground, where students were found unable to recognize the full alphabet, thereby hindering their ability to assemble and read basic words. In Phase A, for instance, many students struggle to read or spell, with some failing to recognize all letters properly. When given dictation tasks, they merely copy text from the whiteboard without grasping its meaning. Ironically, similar conditions were observed among some students in Phases B and C, who still require teacher

assistance to read exam questions. Consequently, this issue not only obstructs learning in early grades but also persists into higher levels, potentially widening the achievement gap.

Theoretically, primary school reading proficiency is divided into two stages: early reading and advanced reading. Early reading emphasizes "letteracy" the ability to recognize symbols and pronounce them accurately whereas advanced reading focuses on textual meaning and comprehension (Sukma & Puspita, 2023). Fahrurrozi (2016) further explains that primary school reading instruction falls into two domains: (1) early reading for grades I and II, and (2) advanced reading for grades III through VI. Early reading instruction centers on the articulation of linguistic symbols, both letters and numbers, with attention to intonation and pausing. In contrast, advanced reading prioritizes the interpretation and integration of information within a text. In the *Kurikulum Merdeka* (Independent Curriculum), Phase A learning outcomes mandate that students should read simple words fluently and comprehend meaning with the aid of illustrations Mustadi et al. (2023). This underscores that early reading mastery is a critical prerequisite for subsequent literacy success.

Foundational literacy success is determined not only by textual understanding but also by motivation and the utilization of diverse reading strategies (Mwoma, 2017). Low reading proficiency is often exacerbated by conventional, monotonous learning media that fails to capture students' visual attention. This discrepancy is increasingly evident as current students belong to Generation Alpha digital natives by nature. As Goziyah & Nufus (2026) explain, Generation Alpha possesses a high affinity for digital devices, necessitating more interactive and visual learning media to foster a positive attitude toward reading. Therefore, static paper-based media is no longer sufficient to accommodate their dynamic learning styles.

In this context, Augmented Reality (AR) technology emerges as a solution capable of bridging students' visual and interactive needs. AR functions by overlaying virtual objects onto the real environment in real-time, delivering an immersive learning experience through text, images, and video Nasution et al. (2022). The integration of AR in early reading instruction offers unique advantages, transforming static 2D books into interactive 3D platforms accessible via digital device cameras (Sari & Suryana, 2019). Beyond visual appeal, AR positively impacts student motivation and interaction during reading activities Tetep et al. (2025). By visualizing abstract concepts like letters into tangible virtual objects, Phase A students can more easily grasp the relationship between symbols and sounds. Thus, AR serves not merely as an add-on but as a conduit to strengthen foundational literacy through an engaging, multisensory approach. To ensure these visual benefits are effective, development must account for the diverse ways children process information.

These individual differences in cognitive capacity underscore the vital importance of applying Multiple Intelligences (MI) theory. By acknowledging that students possess varied intelligences ranging from verbal-linguistic to visual-spatial learning media can be designed to be more personalized and engaging Murtafiah et al. (2024) and Rahayuningtyas & Yuliyani (2020). Implementing reading strategies based on multiple intelligences has proven more effective in enhancing literacy compared to conventional, rote-memorization methods (Sholeh et al., 2025).

While previous studies have attempted to develop literacy media, several limitations persist. Sari & Suryana (2019) developed physical pop-up books that stimulated language but remained limited to static visual interaction. Conversely, Munajah et al. (2025) and Ruswanti et al. (2025) integrated AR to enhance reading fluency, yet these media were not tailored to students' intelligence profiles. Furthermore, Arnez & Ishartiwi (2021) demonstrated that MI theory assists students in understanding material according to their learning styles, but relied on conventional modules that lack the interactivity required by Generation Alpha.

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Based on these considerations, the researcher proposes a reconstruction of early reading media by integrating AR technology and MI theory into a pop-up book format tailored to the characteristics of primary school students. This media is highly relevant as it combines concrete physical books with interactive visual technology. The pop-up book allows for direct physical interaction with 3D objects, while AR provides a vivid learning experience through animation and sound. The MI approach ensures the media accommodates diverse intelligences, such as visual-spatial, linguistic, kinesthetic, and musical. Consequently, early reading instruction is no longer one-dimensional but adapts to varied student needs to foster letter recognition, symbol-sound association, and reading motivation.

The novelty of this research lies in the proposed reconstruction of early reading media, addressing the limitations of previous studies that tended to develop physical, technological, and pedagogical aspects in isolation. This innovation serves as an adaptive solution that unifies 3D concrete elements with digital visualization to accommodate diverse learning styles simultaneously. The synergy between physical and digital components is expected to transform early reading instruction from a mechanical method into an inclusive, multisensory experience for Phase A students. Driven by this urgency, this study aims to systematically review existing literature and propose a conceptual reconstruction of early reading media integrating Pop-Up Books, Augmented Reality, and Multiple Intelligences for Phase A elementary school students.

Method

This study is explicitly designed as a conceptual-synthesis research driven by a structured literature examination framework, rather than an empirical trial or a pure quantitative Systematic Literature Review (SLR). This approach was selected to develop a theoretically grounded framework for reconstructing early reading media by synthesizing insights from existing literature, adhering to auditable screening procedures to ensure academic rigor. The subjects of this study are not human participants but authenticated scientific documents relevant to primary literacy and instructional technology.

Literature searches were conducted across four databases: Google Scholar, Garuda, ERIC, and Scopus, using the following keyword combinations: "pop-up book", "early reading", "membaca permulaan", "augmented reality", "learning media", "multiple intelligences", "literacy", and "elementary school". The search was limited to publications from 2016–2025

The article selection was carried out in two stages. In Stage 1 (Title and Abstract Screening), the initial search across the four databases yielded 60 articles. After screening titles and abstracts for relevance to the three focal themes, 20 articles were excluded, leaving 40 articles for full-text review. In Stage 2 (Full-Text Assessment), a further 10 articles were excluded because they: (a) did not address early reading or primary education contexts; (b) did not involve any of the three focal elements (pop-up books, AR, or MI); and (c) did not meet the journal quality threshold of national accreditation (SINTA 1-4) or international indexing (Scopus). This process yielded a final corpus of 30 articles for synthesis. Of these, 10 articles were selected as primary sources for the comparative matrix in Table 1 based on their direct relevance to the intersection of all three elements.

The subjects of this study are not individuals but scientific documents. Inclusion criteria: (1) published within 2016-2025; (2) discussing early reading media or foundational literacy; (3) relevant to one or more of the three focal elements (pop-up books, AR, and MI); and (4) published in nationally accredited journals (SINTA 1-4) or internationally indexed journals (Scopus). Exclusion criteria: (1) articles outside the 2016-2025 timeframe; (2) duplicate publications or conference proceedings without a peer-reviewed journal version; (3) articles not

addressing early reading or primary education; and (4) studies with insufficient methodological transparency.

Data were analyzed using the Miles and Huberman interactive model through three stages Zulfirman (2022): (1) data reduction, involving the selection and summarization of relevant findings from the 30 articles; (2) data display, organizing findings into thematic categories and the comparative matrix in Table 1; and (3) conclusion drawing, synthesizing cross-study patterns to identify research gaps and formulate the proposed media design framework.

Results

Based on the literature search conducted over the last ten years, several studies examining the development of early reading media using various approaches were identified. The data were subsequently analyzed and presented in a comparative matrix to identify media characteristics, technological elements, and pedagogical approaches. The results of the literature mapping are presented in Table 1.

Table 1. Literature Analysis of Early Reading Media Development involving Pop-Up Books, Augmented Reality, and Multiple Intelligences

No.	Researcher (Year)	Media Type	AR	MI	Subject	*Result*
1.	Sari & Suryana (2019)	Thematic Pop-Up Book (Physical)	No	No	15 Kindergarten B Students (Language Development)	The development of thematic Pop-Up books was declared highly valid (95%) and practical in stimulating children's language development. The media significantly enhanced speaking skills and conceptual understanding through 3D visualizations that captured children's attention and curiosity.
2.	Munajah et al. (2025)	AR-Based Pop-Up Book	Yes	No	35 Grade 1 Elementary Students (Early Reading)	The integration of AR technology into Pop-Up books significantly improved letter identification and reading fluency for Phase A students through interactive real-object visualization, with media validity scores reaching 92% and material validity at 90%.
3.	Genc & Rabia (2024)	Folkloric Storybook (AR Book)	Yes	No	50 Elementary Students (Reading Literacy)	The utilization of AR in folklore books created an immersive and deep reading experience, effectively enhancing students' literacy skills in reading comprehension, content analysis, and evaluative abilities significantly.
4.	Novianti & Pratiwi (2024)	AR Media for Reading Stimulation	Yes	No	Early Childhood (Early Reading)	Declared highly feasible through the ADDIE development model to stimulate early reading skills. AR media effectively accelerated letter and sound recognition through

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						interactive 3D objects that transformed abstract symbols into concrete visual representations.
5.	Arnez & Ishartiwi (2021)	Reading Module based on Multiple Intelligences Theory	No	Yes	300 Elementary Students including slow learners (Early Reading)	The development of an MI-based reading module significantly increased word reading accuracy through activities tailored to students' intelligence profiles. N-Gain tests showed high effectiveness in helping students overcome early reading barriers by aligning instructional materials with their dominant intelligence.
6.	Amelia et al. (2025)	Digital E-Book	Yes	Yes	Early Childhood (Religion)	Produced high validity (91%) in integrating Multiple Intelligences into digital media. The study proved that MI stimulation through interactive AR features strengthened students' visual understanding of cognitive values.
7.	Jannah et al. (2023)	Big Book & Control Cards	No	Yes	44 Kindergarten B Students (Early Reading)	Statistical analysis proved a significant interaction between learning media and interpersonal intelligence. The study showed that optimizing interpersonal intelligence through collaborative media effectively increased early reading scores, where Big Books proved superior for students with dominant social characteristics.
8.	Ruswanti et al. (2025)	Augmented Reality Flash Cards	Yes	No	50 Children aged 5-6 years (Literacy)	Experimental results showed a significant influence of AR Flash Cards on children's reading interest and storytelling skills. AR integration strengthened memory retention of story content through visual and audio simulations, effectively increasing focus duration and enthusiasm.
9.	Mafruudloh et al. (2024)	Mobile AR-Based Picture Book	Yes	No	13 Kindergarten B Students (English Language Learning)	Mobile AR implementation in picture books effectively improved vocabulary mastery and learning motivation through 3D object visualization, supported by teacher practicality scores of 90% and material validity of 92%.
10.	Amal et al. (2025)	AR-Based Learning Media	Yes	No	15 Early Childhood (Vocabulary)	This pre-experimental study proved the effectiveness of AR media in significantly increasing

vocabulary mastery (specifically nouns and verbs). AR visualization provided a real-world context to the words learned, facilitating the association between language symbols and real-world objects.

Across the 30 articles analyzed, three thematic clusters emerge. The first cluster visual and physical media is represented by studies such as Sari & Suryana (2019) and Krisma et al. (2024), which consistently demonstrate that three-dimensional physical media significantly enhances letter recognition and language comprehension among early learners. The second cluster AR-integrated media groups studies by Munajah et al. (2025), Genc & Rabia (2024); Novianti & Pratiwi, (2024); Ruswanti et al. (2025); Mafruudloh et al. (2024); and Amal et al. (2025). Across these studies, AR consistently improves interactivity, student engagement, and vocabulary acquisition. However, a shared limitation is evident: none of these studies explicitly differentiate instructional content based on students' intelligence profiles. The third cluster MI-based approaches includes Arnez & Ishartiwi (2021) and Jannah et al. (2023), which demonstrate that differentiating instruction according to cognitive profiles significantly improves early reading outcomes. Yet these studies rely on conventional, non-interactive media formats that are insufficient for Generation Alpha learners.

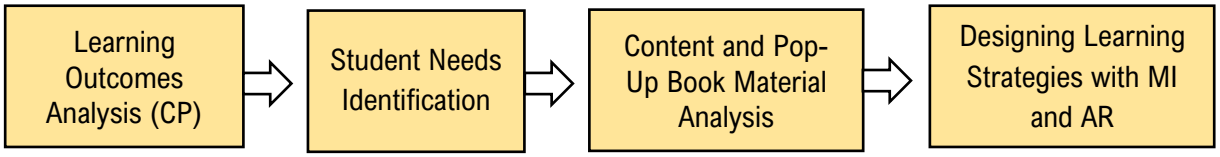
Comparing these three clusters reveals a critical structural gap: the strengths of each cluster remain siloed. AR-based studies are strong in interactivity but weak in pedagogical differentiation. MI-based studies are strong in differentiation but weak in technological engagement. Physical pop-up book studies are strong in concrete visualization but lack both interactivity and differentiation. Only one study Amelia et al. (2025) shows early signs of AR-MI integration, yet it remains general in scope and is not directed toward early reading or the pop-up book format specifically.

This cross-cluster analysis confirms that no existing study has simultaneously and systematically addressed all three dimensions concrete visualization, interactive technology, and intelligence-based differentiation within a single media design for Phase A early reading. This tripartite gap is not incidental but structural, reflecting a tendency in the field to optimize one dimension at the expense of others. It is precisely this gap that justifies the proposed media reconstruction in this study: a Pop-Up Book integrated with AR and MI that functions as a unified, adaptive, and multisensory literacy system for Phase A elementary students.

Discussion

The media reconstruction process in this study is based on the integration of three main elements that were previously developed separately: pop-up books, augmented reality (AR), and multiple intelligences (MI). Conceptually, the design flow of the media development can be visualized through the following diagram.

Figure 1. Design Flow for the Development of Augmented Reality and Multiple Intelligences-Based Pop-Up Books



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Based on the design flow, the media reconstruction process began with an analysis of the *Kurikulum Merdeka* Learning Achievement (*Capaian Pembelajaran* or CP) standards, specifically focusing on reading and viewing elements. Phase A students are expected to fluently read familiar daily words, comprehend information from personal and environmental texts, imaginative narratives, and children's poetry, and decipher new vocabulary through illustrations (Mustadi et al., 2023). This CP analysis was subsequently synchronized with the theoretical framework of primary school reading levels. As elucidated by Fahrurrozi (2016) and Sukma & Puspita (2023), reading instruction in primary education is categorized into two primary domains: early reading (*Fase A*/Grades I-II) and advanced reading (*Fase B & C*/Grades III-VI). Within the context of Phase A, early reading instruction is directed toward literacy proficiency specifically, the students ability to recognize alphabetical symbols and articulate them clearly with appropriate intonation. Consequently, the media reconstruction emphasizes the provision of instructional illustrations as mandated by the curriculum. This underscores the urgency of utilizing pop-up books and Augmented Reality as concrete, dynamic visual aids that assist students in transitioning from basic literacy to deeper information processing.

While competency standards are explicitly defined in the curriculum, field implementation must align with the cognitive development of the students as the subjects of learning. Therefore, the second stage involved identifying student needs, focusing on mapping the characteristics of Phase A learners. From a Piagetian perspective, Phase A students are in the transition from the late pre-operational to the early concrete operational stage (Imanulhaq & Ichsan, 2022). During this period, children begin to represent the world through words and images, establishing simple connections between sensory information and physical actions (Marinda, 2020). This is supported by Sari & Suryana (2019), who demonstrated that three-dimensional visualizations in physical media significantly enhance children's language comprehension. Furthermore, Febriani et al. (2023) provided empirical evidence that pop-up books effectively improve early reading skills by capturing attention and accelerating letter recognition. In this reconstruction, the physical book format is retained to provide a tactile and concrete learning experience, allowing students to interact not only visually but also through direct exploration. This stage serves as a crucial foundation to ensure the developed media does not impose an excessive cognitive load, thereby facilitating the internalisation of alphabetical symbols through structured visual support.

Following the identification of student needs and cognitive characteristics, a systematic material analysis and content curation were conducted. Unlike conventional alphabet media, which are often fragmented and limited to static visuals, the material in this Pop-Up Media is designed for interactive early reading that contextualizes alphabetical symbols within a cohesive narrative. First, the media employs a fauna-based A-Z contextual representation. Each letter is integrated into short story scripts themed around animals. This integration aligned with environmental and ecosystem themes as studied by Irmade et al. (2022) has been proven to increase emotional engagement and visual appeal. The selection of animal names (e.g., 'A' for *Ayam*, 'B' for *Bebek*) serves as a cognitive anchor for Phase A students. Theoretically, fauna objects facilitate phonetic association because their unique visual characteristics are familiar to the long-term memory of pre-operational learners, helping them instantly connect abstract letters to real-world objects.

Secondly, each page features a short narrative script structured with simple rhymes (e.g., *"Ayam berkokok di pagi hari, suaranya keras sekali"*). The strategic use of rhyming is intended to stimulate both musical and linguistic intelligences, while simultaneously enhancing phonological awareness, which aids students in retaining the pronunciation of new vocabulary. This material is specifically engineered to meet the Learning Achievement (CP) targets

concerning the comprehension of imaginative narratives, utilizing communicative language tailored to the cognitive lexicon of children aged 6–7 years. Thirdly, as a targeted effort to reinforce early literacy, the narrative content incorporates keyword tracing features presented in a dashed-font format. For instance, following the *'Ayam'* narrative, the word *'Ayam'* is provided for students to trace. The integration of this feature within the story's arc aims to synchronize visual decoding (reading) with fine motor coordination (writing). This synergy ensures that muscle memory is developed in tandem with alphabetical symbol recognition, thereby fortifying the transition toward 'discourse literacy' (*melek wacana*). This material analysis serves as the fundamental blueprint for both the physical pop-up architecture and the development of digital components. By curating content that balances potent narratives with tactile engagement, this media functions not merely as a reading aid, but as an instructional instrument that optimizes cognitive load through a concrete and meaningful pedagogical approach.

Based on the results of the needs identification, the next stage is carried out through a holistic design approach that simultaneously integrates material analysis, Multiple Intelligences stimulation, and Augmented Reality functionality. This approach positions the media not merely as a means of content delivery, but as a multidimensional learning space designed from the outset to accommodate the diverse intelligence profiles of students. Consequently, each element within the media does not stand alone but is intertwined across aspects of content, activity, and learning experience. Operationally, the implementation of multiple intelligences in the media design is designed as follows. First, verbal-linguistic and musical intelligences are integrated through the composition of simple rhyming narratives that facilitate students in reading aloud and remembering vocabulary. These narratives serve not only as reading texts but also as rhythmic sound patterns. Furthermore, the augmented reality feature reinforces this stimulation through audio presentations such as alphabet songs and object sounds (e.g., animal sounds), thereby creating a learning experience that combines elements of reading, listening, and pronouncing simultaneously. Second, visual-spatial intelligence is facilitated through three-dimensional pop-up designs that display concrete representations of each alphabetical letter. Each object is designed with attractive, easily recognizable colors, shapes, and visual structures. Further reinforcement is provided through AR visualizations in the form of 3D objects that can be rotated and observed from various angles, thus helping students build spatial understanding while associating letter symbols with real objects more deeply. Third, Kinesthetic intelligence is manifested through physical activities inherent in the media, such as tracing letters, unfolding pop-ups, and interacting directly with book elements through barcode scans containing games and worksheets. These activities are designed to train fine motor coordination while strengthening students' memory of letter shapes through direct experience. Fourth, interpersonal and intrapersonal intelligences. The media is designed to allow for social interaction through pair or small group activities in completing challenges found within the pop-up and AR features. On the other hand, intrapersonal intelligence is facilitated through individual activities, such as independent reading, completing tracing tasks, and simple reflection on the learning experiences gained. Sixth, naturalist intelligence. The selection of fauna themes as representations of alphabetical letters is a strategy to stimulate naturalist intelligence. Through this context, students not only recognize letters but also associate them with the surrounding environment, such as animals and objects familiar in daily life. This encourages the formation of a connection between literacy learning and the students' real-world experiences.

Through this multiple intelligence-based design, the media serves not only to develop early reading skills but also to provide diverse learning access aligned with the individual potential of each student. The integration with augmented reality further reinforces this learning experience by delivering interactive and adaptive content, allowing for more flexible differentiated

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instruction. This is consistent with the findings of Gebremeskel et al. (2024) and Astiti et al. (2024) which demonstrate that reading tasks based on multiple intelligences significantly increase comprehension effectiveness compared to conventional methods. By facilitating various intelligence profiles, this media transcends being a mere visual aid and transforms into a comprehensive, adaptive learning system that is entirely centered on individual student needs. Consequently, this media reconstruction emphasizes that the development of pop-up books based on AR and MI is not merely a combination of technology and content, but rather the construction of a holistic, adaptive, and student-centered learning system.

To make this conceptual design more operationally concrete, the following section describes the key features, usage workflow, and sample learning activities of the proposed Pop-Up AR-MI media. In terms of physical design, each of the 26 alphabet pages features a layered pop-up mechanism (V-fold and box-fold techniques) depicting a fauna-themed 3D object. Each page includes: (1) a large printed letter with a dashed tracing guide; (2) a short rhyming sentence (2–4 words); (3) a QR code marker for AR activation; and (4) a mini-game or worksheet accessible via the scanned QR code. Regarding the AR digital component, when a student scans the QR code marker using a tablet or smartphone running the companion application (built on Unity 3D with Vuforia AR SDK), the following interactive features are triggered: a 3D animated model of the fauna rotates and performs a contextual action (e.g., “Ayam” flaps its wings); phonic audio pronounces the letter and the fauna name; a short alphabet song segment plays; and an on-screen prompt directs the student to a mini-game (e.g., drag the letter to the correct animal silhouette). The usage workflow for a single learning session (approximately 30 minutes) proceeds as follows: (1) Teacher introduces the target letter and shows the pop-up page (5 minutes). (2) Students interact with the physical pop-up, touching and unfolding the 3D element (5 minutes). (3) Students scan the QR code and engage with the AR animation and phonic audio (7 minutes). (4) Students trace the dashed letter on the page to develop fine motor coordination (5 minutes). (5) Students complete the AR mini-game individually or in pairs (5 minutes). (6) Whole-class reflection: students share one word starting with the target letter from their daily experience, connecting naturalist and linguistic intelligences (3 minutes). Sample activities aligned to MI dimensions include: verbal-linguistic (read aloud the rhyming sentence with expression), musical (sing the alphabet song triggered by AR), visual-spatial (observe and describe the 3D animal from multiple angles via AR), kinesthetic (trace the letter and manipulate the pop-up mechanism), interpersonal (pair work on the AR mini-game challenge), intrapersonal (individual tracing and independent reading), and naturalist (connect the animal to real-world environmental knowledge). This operationalized design ensures that the three core elements pop-up book, AR, and MI function as an integrated system rather than isolated components, providing a clear blueprint for future prototype development and empirical testing. The construction of this design is consistent with various previous research findings indicating that the utilization of AR based pop-up books in early reading instruction possesses significant potential for effectiveness through the integration of visual, kinetic, and digital technology aspects. This finding aligns with research by Munajah et al. (2025), which demonstrates that integrating AR into physical books can exert a tangible impact on the reading fluency of Phase A students, with material validity reaching 92%. The use of 3D visual elements and audio within AR serves not merely as an attraction but functions as a cognitive stimulant that bridges the child's transition from the pre-operational to the concrete operational stage, in accordance with Piaget's theory.

Furthermore, the potential effectiveness of this media is supported by the optimization of students' multiple intelligences. In alignment with the findings of Alotaibi & Youssef (2023) and Amelia et al. (2025), AR technology is capable of facilitating various types of intelligence, particularly visual-spatial, linguistic, and naturalist. Within the context of literacy Amal et al.

(2025) emphasize that AR is highly effective in enhancing vocabulary mastery among early childhood learners, especially regarding verbs and adjectives which are often difficult to comprehend through static text. This reinforces the argument that pop-up book media which merges the physical and digital worlds can create joyful and meaningful learning experiences, while simultaneously addressing psychological barriers such as low reading interest, which, as discussed in the research by Krisma et al. (2024), remains a significant challenge in Indonesia.

The reconstruction of reading instructional media for Phase A students is crucial, given their profile as Generation Alpha. This generation possesses digital native characteristics, being highly familiar with technology, yet they still require concrete motor stimulation (Goziyah & Nufus, 2026). According to Tafonao et al. (2020), the use of technology-based media functions not only as an attraction but also as an instrument to standardize learning perceptions and overcome the barriers of short attention spans. Therefore, the integration of physical pop-up books with Augmented Reality technology serves as an adaptive solution that aligns their cognitive development with the evolution of learning in the digital era. Consequently, this reconstructed media not only addresses technical challenges in reading instruction but also adapts to the learning evolution of a digital generation that demands interactivity, dynamic visualization, and personalized learning. Through scanning an AR QR Code, students do not merely see static letters; instead, they witness a 3D animation of a chicken accompanied by phonic audio output. According to Febriani et al. (2023), the active engagement of students through interactive physical media is proven to significantly accelerate alphabetical symbol recognition, as it transforms a previously passive learning process into an enjoyable, autonomous exploration.

The contribution of this research is not limited to the development of instructional media but also provides broader implications within the context of educational management. In the aspect of instructional planning, this media design can serve as a reference for teachers in formulating adaptive and differentiated learning strategies tailored to student characteristics. From an educational policy perspective, the results of this reconstruction underscore the importance of integrating digital technologies, such as augmented reality, into the curriculum as part of strengthening basic literacy in the digital era. Furthermore, in the context of educational leadership, this media innovation can encourage school principals and policymakers to support the development of technology-based and student-centered learning environments. Thus, this media functions not only as a teaching aid but also as part of a transformation in educational practices that is more inclusive and responsive to the evolving times.

Nevertheless, this study has several limitations. The developed media reconstruction remains at a conceptual stage based on literature reviews; thus, it has not been empirically validated through direct classroom implementation. Furthermore, this research has not specifically examined the individual effectiveness of each component, such as the separate contributions of augmented reality or the multiple intelligences approach, toward enhancing early reading skills. Another limitation lies in the absence of an analysis regarding infrastructure readiness and teacher competence in implementing technology-based media across various school contexts. Based on these limitations, future research should be directed toward empirical efficacy testing to quantitatively measure the media's influence on students' early reading abilities.

Conclusion

The conclusion of this research demonstrates that the reconstruction of early reading media through the integration of pop-up books, Augmented Reality (AR), and Multiple Intelligences (MI) is potentially effective in addressing the long-standing issue of fragmented media development, which has historically tended to be partial. Based on the results of the systematic literature review, the synthesis of these three elements produces a holistic, multisensory, and adaptive media design tailored to the characteristics of

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Phase A students. Consequently, it not only has the potential to support literacy proficiency but also to reinforce meaning-making through concrete and interactive learning experiences. Logically, these findings affirm that the synergy between three-dimensional visualization, digital technology, and MI-based differentiated approaches has the potential to enhance the quality of early reading instruction in a more meaningful and student-centered manner. However, it must be underscored that these claims of effectiveness remain theoretical and conceptual in nature; no classroom-based empirical evidence has yet been produced to validate the media's actual impact. The operational implications of this research suggest that educators and media developers should consider adopting an integrative design when planning basic literacy instruction, while also encouraging educational institutions to support the utilization of AR technology as a core component of instructional innovation. As this research remains conceptual and literature-based, further empirical studies with rigorous experimental or quasi-experimental designs are required to test whether the proposed media reconstruction genuinely improves early reading outcomes within real classroom settings.

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