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Digital comics in primary education: A literature review on reading literacy and local wisdom integration (2020–2025)

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Abstract
Reading literacy skills are a fundamental competency for elementary school students. However, various surveys indicate that the level of reading literacy in Indonesia remains low. This situation underscores the need for innovative learning media that are engaging, contextual, and aligned with the characteristics of the digital generation. This study aims to investigate trends in the use of digital comics in primary education—particularly for improving reading literacy and integrating local wisdom—during the 2020– 2025 period. The study employs a Systematic Literature Review (SLR) guided by PRISMA methodology, encompassing the stages of identification, screening, eligibility, and inclusion. Data were gathered from Google Scholar, Semantic Scholar, and Crossref. From an initial 3,358 articles, a final selection of 27 relevant articles was obtained. Analysis was conducted via content analysis and bibliometric techniques using VOSviewer 1.6.19. The results show a significant increase in publications on e-comics from 2020 to 2023. Digital comics were found to be effective in enhancing students' reading comprehension, motivation, and character development through the integration of local cultural values. They also have the potential to serve as an innovative and contextually relevant, culture-based multimodal learning medium.
Keywords: Digital comic; local wisdom; primary education; reading literacy

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INTRODUCTION

Reading literacy skills form the foundation of the learning process for elementary school students, serving as a prerequisite for understanding knowledge across subjects (Nurani et al., 2024). International assessments such as PISA have revealed that Indonesian students' reading literacy achievement remains relatively low globally, which is a major concern for national education (OECD, 2019). This suggests that many students are not yet able to critically interpret written information, even if they can technically decode text (Anesa et al., 2020). According to a UNESCO-related report in 2022, Indonesia has a poor literacy culture in both home and school environments, ranking 60th out of 70 countries in terms of reading interest (Supiatman et al., 2025). This problem is compounded by a lack of access to engaging and age-appropriate reading materials, as students tend to lose interest when content is boring or unrelated to their lives

(Harras, 2019). Thus, aside from cognitive ability, reading literacy is also influenced by social and affective factors that shape reading habits from an early age.

Lower-grade elementary students are especially affected by this literacy issue because, despite mastering basic reading skills, they frequently struggle to understand the content of texts (Wewengkang et al., 2024). Reading often becomes a mechanical rather than meaningful activity, as many students have difficulty acquiring new vocabulary, identifying main ideas, and connecting textual information to personal experience (Ananta et al., 2023). As a result, reading is frequently perceived as a taxing and uninteresting task (Consorti et al., 2023). Students tend to avoid reading outside of mandatory academic work due to a lack of emotional engagement and the limited relevance of available reading materials to their real-life contexts (Saputri C Sukartiningsih, 2024). Therefore, the reading literacy problem in elementary education involves not only cognitive deficits but also low motivation and a limited personal connection to reading materials (Anesa et al., 2020). This situation underscores the crucial role of learning media that are engaging, interactive, and contextually relevant in fostering students' interest and comprehension in reading activities.

In many elementary schools, however, the learning media are still largely limited to textbooks and conventional worksheets, which offer little interactivity or engagement (Susanto et al., 2024). The prevalent use of lecture-based, one-way instruction renders students' passive recipients of information with minimal opportunities for independent exploration. Meanwhile, 21st-century education paradigms emphasize the incorporation of digital technology to create interactive, adaptive, and learner-centered learning environments. Digital media have indeed been shown to increase learning motivation by providing more diverse visual and auditory stimuli than traditional print media (Y. Li, 2024). Therefore, innovation in digital learning media is urgently needed to bridge the gap between the characteristics of today's digital-native students and the conventional nature of current teaching methods (Anesa et al., 2020).

One promising innovation to address these literacy learning challenges is digital comics (e-comics), which present reading materials as interactive visual narratives (Damayanti et al., 2024). Digital comics can simplify reading comprehension by simultaneously combining text and images, helping readers process content more easily (Atmojo et al., 2024). According to Dual Coding Theory, comprehension improves when textual and visual information are processed in parallel through separate cognitive channels (Csachová C Kidonová, 2022). Similarly, the Cognitive Theory of Multimedia Learning suggests that multimedia presentations enhance students' retention and reduce cognitive load (Mayer, 2024; Zheng et al., 2022). In this vein, digital comics use narrative structures that guide students' thought processes step-by-step, thereby enhancing understanding while making reading more enjoyable (C. Li, 2024). This is supported by research showing that students who learn with digital comics are better able to maintain focus and motivation compared to those using plain text (Belda-Medina, 2024).

Digital comics also hold considerable potential for incorporating regional cultural values, serving not only to improve comprehension and motivation but also as a medium for cultural preservation and educational entertainment (Murti et al., 2020). By depicting characters, settings, and plots drawn from local community life, digital comics provide elementary students with reading experiences that are emotionally and socially relevant (Damayanti et al., 2024). When local wisdom is embedded in digital comic stories, students' comprehension improves because they can relate to the moral lessons being conveyed (Istiq'faroh et al., 2024). For example, the Tri Hita Karana philosophy, emphasizing harmony between humans and the divine, among people, and between people and nature as the basis of a balanced life, is one form of local wisdom that can be integrated into comics (Hadjar et al., 2021). Similar values exist in other cultures, such as Whanaungatanga in Māori society, which stresses spiritual interconnectedness in the community, and Omoiyari in Japanese culture, which emphasizes empathy as a core social value (Loudoun et al., 2024). Thus, incorporating regional wisdom into digital comics enriches the reading content and fosters literacy development while also promoting cultural identity and character building (Alhamad et al., 2024). However, despite the

widely recognized potential of digital comics for literacy learning and cultural education, studies specifically examining the linkage between digital comics, reading literacy, and local wisdom remain limited, particularly in the context of primary education.

Few studies explicitly connect e-comics to reading literacy in a local wisdom context for primary education, even though advances in educational technology have made the use of digital comics increasingly popular for literacy improvement (Suprapto et al., 2024). Most of the existing research tends to focus on either learning outcomes or student motivation, overlooking how e-comics might integrate cultural values and foster character development (Sumarwati et al., 2023). Moreover, little research has explored how visual narrative media can merge cognitive learning theories with cultural values in a cohesive pedagogical framework (Rasamimanana et al., 2025). This gap in the literature highlights the need for a systematic review that maps recent research developments on the use of digital comics to enhance reading literacy and integrate local wisdom in elementary education.

Given the potential of e-comics in primary education to improve reading literacy and incorporate local cultural wisdom, the present study aims to examine trends and patterns in this research area between 2020 and 2025. It is expected that this review will advance the theoretical understanding of culture-based digital literacy and provide practical insights for developing innovative, contextual, and character-oriented learning materials suited to the current generation of digital-native learners.

METHODS

This research used a Systematic Literature Review (SLR) methodology aligned with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, which is an internationally recognized standard for transparent and rigorous review reporting (Page et al., 2021). The PRISMA approach involves a structured process with four main stages: identification of sources, screening of articles based on predefined criteria, eligibility assessment, and final inclusion of articles relevant to the research focus. The PRISMA principles in this study were adapted from the model developed by Rodrigues-Silva and Alsina (2023), who conducted a comprehensive review of literacy-focused teacher education. Through this SLR approach, the study seeks to identify research trends and future directions in the use of digital comics to enhance elementary students' reading literacy, as well as to examine how these instructional media incorporate regional cultural values.

Three major scholarly databases, Google Scholar, Crossref, and Semantic Scholar, were utilized in conjunction with Publish or Perish (PoP) software to locate relevant publications. Search keywords included "digital comic," "reading literacy," "primary education," and "local knowledge." The search was limited to publications from 2020 through 2025 and included both English-language and Indonesian-language sources, to capture recent developments in both international and regional research contexts. The process of article selection following the PRISMA framework is illustrated in Figure 1.

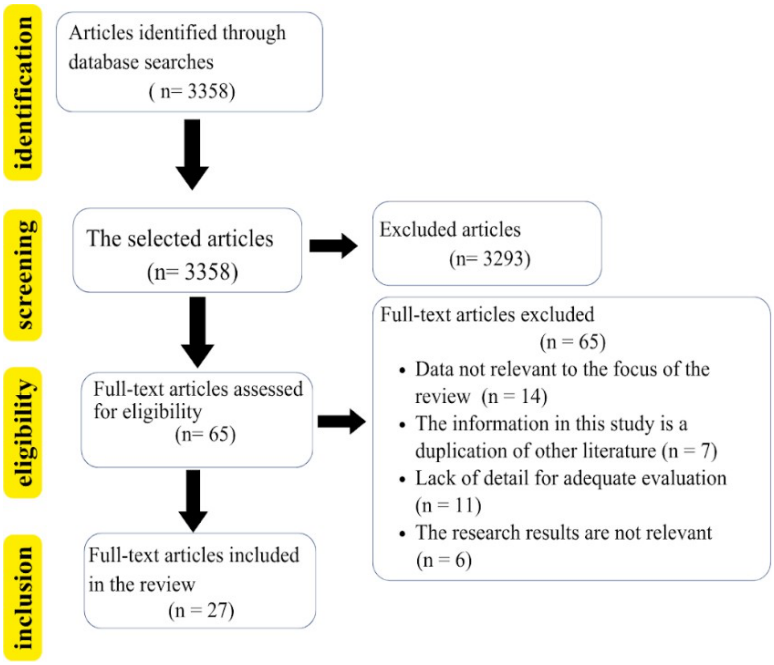

Figure 1. PRISMA flow chart

During the initial identification stage, 3,358 articles related to the topic (indexed in the three databases) were found. The collection then underwent a screening stage to remove duplicate entries and to ensure topical relevance based on titles and abstracts.

The next step was an eligibility assessment, where each article was reviewed for full-text availability, relevance to elementary education contexts, and specific focus on the use of digital comics for improving reading literacy. After a thorough screening, 65 articles met all eligibility criteria.

Finally, in the inclusion stage, the content and research focus of these 65 articles were examined in depth. From this final review, 27 articles were deemed fully relevant to the research criteria—namely, studies that discuss the use of digital comics in developing reading literacy at the elementary level and/or the integration of local wisdom values into learning media. These 27 articles constitute the primary sources of analysis in this study. Details of the inclusion and exclusion criteria applied are presented in Table 1.

Table 1. Inclusion and Exclusion Criteria

Aspect	Inclusion Criteria	Exclusion Criteria
Article Availability	Full-text article available	No full text / inaccessible article
Topic Relevance	Consistent with the focus/objectives of the review	Not relevant to the focus of the review
Study Originality	Not a duplicate of another study	Duplicates information from other literature
Information Completeness	Provides sufficient detail for evaluation (methods, results, etc.)	Insufficient detail for proper evaluation
Findings Appropriateness	Findings are relevant to the topic	Findings are not relevant to the topic

The selected articles were analyzed using two main approaches: content analysis and bibliometric analysis. Content analysis was used to examine each study's focus, the learning

strategies employed, the characteristics of the digital comics used, and the integration of local cultural values, along with their influence on students' reading literacy skills. Meanwhile, bibliometric analysis was conducted using VOSviewer (version 1.6.19) to map connections and thematic trends among the selected articles. VOSviewer produced three types of visualizations, network, overlay, and density maps, which illustrate keyword relationships, the strength of thematic linkages, and the evolution of research themes related to the use of digital comics for reading literacy from 2020 to 2025.

RESULTS AND DISCUSSION

Results

From the review of 27 selected articles, there has been a clear upward trend in publications discussing the use of digital comics in primary education over the past five years. At the beginning of the period (2020), only two articles were found that explicitly addressed using digital comics to improve reading literacy. This number increased to four publications in 2021, and then to six articles in 2022, with topics in 2022 beginning to incorporate aspects of character building and local wisdom. The year 2023 marked the peak of research productivity in this area, with a total of nine publications. Most studies in 2023 focused on developing digital comic media grounded in scientific literacy, character education, and the integration of local culture into the learning process (Damayanti et al., 2024; Widyawati et al., 2024). In 2024 and 2025, the number of relevant publications decreased to four and two articles, respectively. This decline does not necessarily indicate waning interest; rather, it suggests a shift toward more in-depth conceptual, evaluative, and implementation-focused research in the latter years of the review period. Overall, this publication trend reflects a transition from conventional print media toward more interactive, contextual, and adaptive visual-narrative digital media tailored to the needs of 21st- century learners. Figure 2 provides an overview of the growth of research publications on digital comics in primary education over 2020–2025.

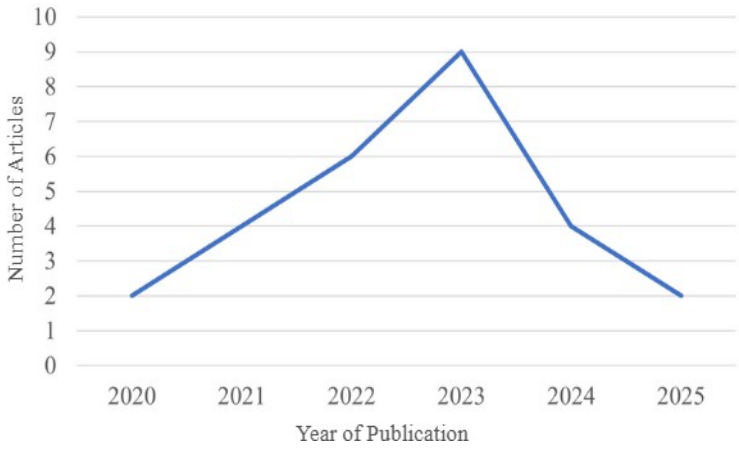

Figure 2. Trend chart of research development on the use of digital comics

A bibliometric analysis using VOSviewer was conducted to explore thematic connections and research development in the field. The analysis yielded network, overlay, and density visualizations (Figures 3, 4, and 5).

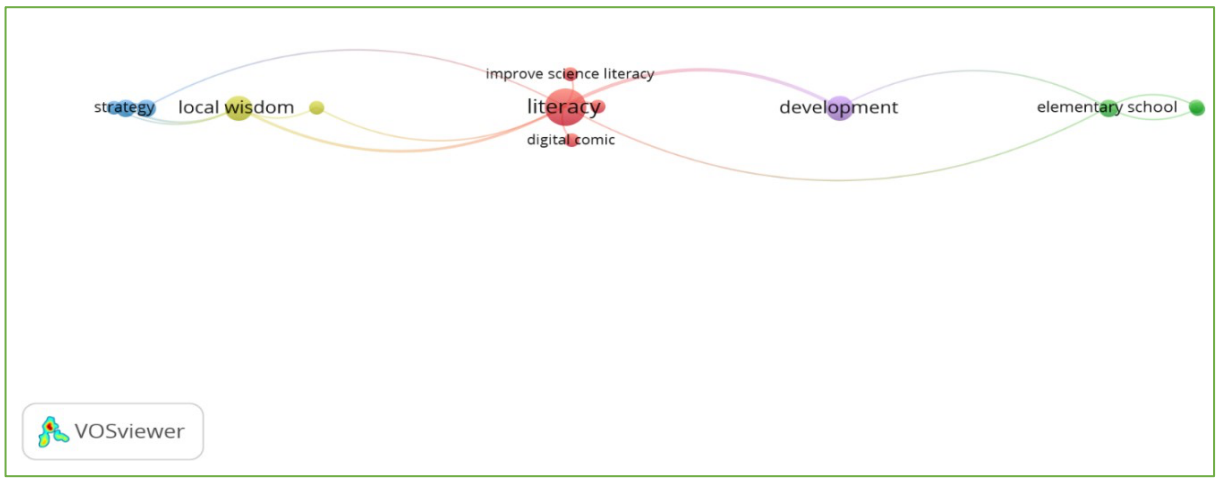

Figure 3. Network visualization of VOSviewer analysis results

Figure 3 presents a network visualization map illustrating relationships among keywords in the analyzed publications, based on their co-occurrence frequencies. In this map, each node represents a keyword, and the lines between nodes indicate the strength of association or co-occurrence between topics; different colored node clusters represent distinct thematic groupings. For instance, there is a strong correlation between the keyword's "literacy" and "digital comics" (forming one prominent cluster, shown in red) and other related clusters such as "elementary school" (green), "development" (purple), and "local wisdom" (yellow). This pattern of connections suggests that research on digital comics in primary education often centers on developing literacy media that incorporate local cultural elements as part of educational innovation.

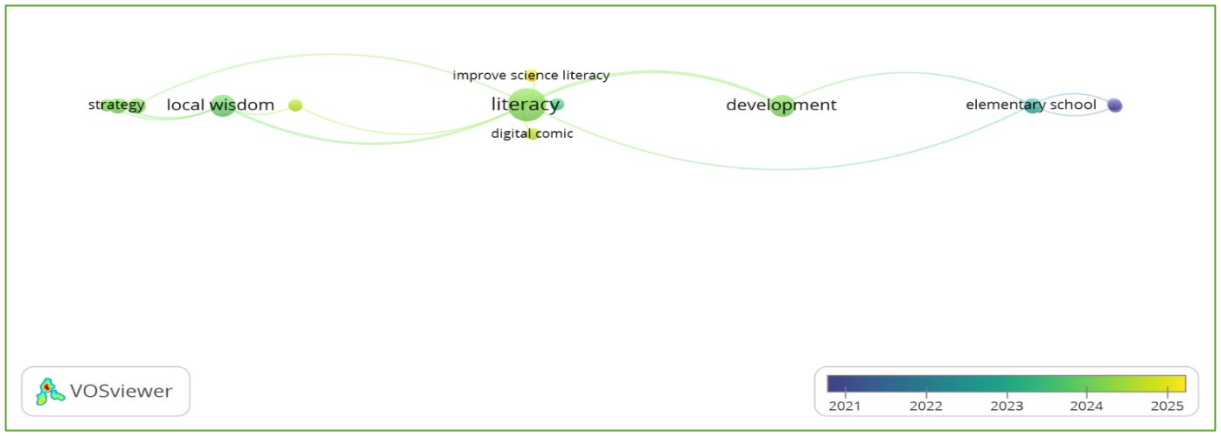

Figure 4. Overlay visualization of VOSviewer analysis results

Figure 4 provides an overlay visualization showing the temporal evolution of research themes based on publication year (2020–2025). In this overlay, colors indicate the average publication year of studies associated with each keyword (with blue tones representing earlier studies and yellow tones indicating more recent studies). The mapping suggests that more recent research (2023–2025) places greater emphasis on innovation in digital-based learning media for elementary schools, evidenced by keywords like "elementary school" and "development" appearing in later years (shaded in yellow). In contrast, themes such as "local wisdom" and "strategy" appear more frequently in publications from the 2020–2022 period (shaded in blue/green), which often focused on applying local cultural values in education. This indicates an evolution of research interests from initially emphasizing local wisdom-based learning strategies to later focusing on modern digital literacy resources for elementary education.

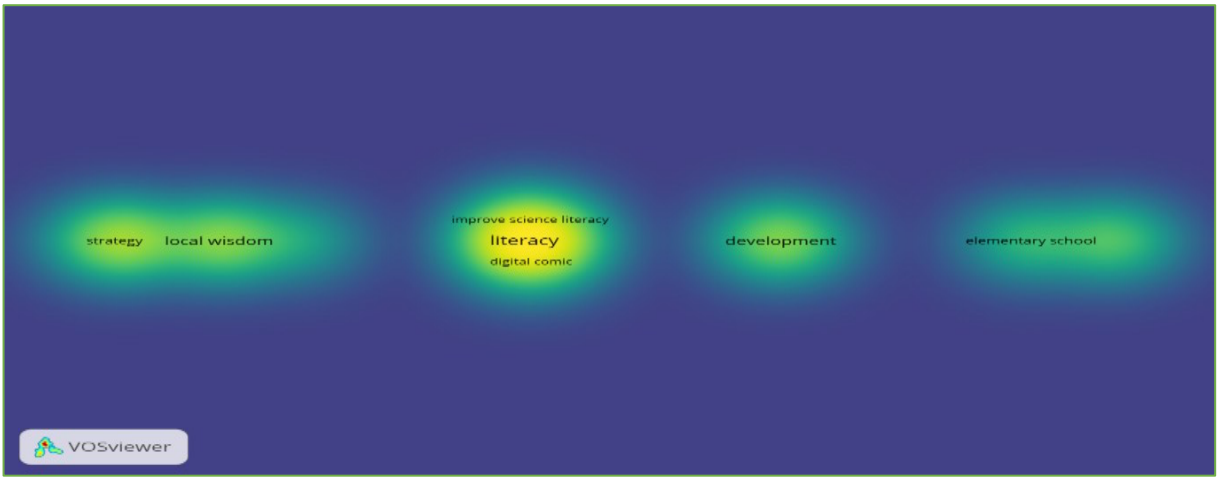

Figure 5. Density visualization of VOSviewer analysis results

Figure 5 shows a density visualization map highlighting the frequency of keyword occurrences related to using digital comics for enhancing reading literacy and integrating local wisdom (2020–2025). In the density map, frequently occurring keywords are depicted in warm colors (yellow), whereas less common terms appear in cooler colors (green or blue). The mapping confirms that "literacy" is the central focus, strongly linked with other key terms like "elementary school," "development," "local wisdom," and "digital comics." This density pattern illustrates how these subjects interconnect to form a cohesive cluster of research on digital comic-based learning materials aimed at improving reading literacy at the elementary level.

In addition to the bibliometric findings, content analysis was conducted to identify research characteristics and thematic trends in the selected articles. Table 2 summarizes the content analysis results, highlighting each article's focus, the learning model or method used, the form of e-comic utilized, whether local wisdom was integrated, and the main impact on students reported.

Table 2. Results of content analysis of selected articles (2020–2025)

No.	Research Focus	Learning Model/Method	Form of E-Comic	Local Wisdom Integration	Main Reported Impact
1	Basic reading literacy improvement	Contextual and thematic	Static e-comic (PDF or print)	–	Enhanced reading comprehension and meaning making
2	Scientific literacy	SETS-based learning	Digital interactive comic	–	Improved critical thinking and scientific literacy
3	Cultural literacy	Project-based learning	Interactive web comic	*Tri Hita Karana* (Java–Bali values)	Strengthened social and emotional character
4	Visual and multimodal literacy	Discovery learning	Augmented reality (AR) comic	–	Increased information retention and motivation
5	Local-culture-based literacy	Blended learning	Articulate Storyline e-comic	Papua culture content	Strengthened cultural identity and emotional attachment
6	Moral literacy	Contextual teaching C learning	Digital comic for character education	Nusantara folktales	Reinforced moral values, responsibility, and integrity
7	Digital literacy	STEM/STEAM approach	Web-based e-comic	–	Enhanced 21st-century skills
8	Cross-cultural literacy	Cross-cultural learning	Narrative digital platform	*Whanaungatanga* (Māori), *Omoiyari* (Japanese)	Increased empathy and intercultural awareness

The content analysis suggests three primary thematic strands in research on digital comics in primary education: (1) improving reading literacy, (2) integrating local cultural values, and (3) producing interactive digital learning media. Most studies employed contextual or thematic instructional approaches, although some used STEM/STEAM or project-based learning models to enhance students' cognitive skills and character development through comics.

The findings indicate that nearly 74% of reviewed papers report a positive impact of digital comics on reading literacy development in primary school students. This is evidenced by improvements in reading motivation, comprehension, memory retention, and critical thinking abilities. A meta-synthesis highlights that the combination of textual and visual elements in digital comics enhances the dual-coding process, allowing students to process information more efficiently, which leads to a reading comprehension improvement of about 23% compared to traditional media.

In addition to cognitive gains, the use of digital comics has been shown to enhance students' intrinsic motivation and emotional engagement in reading activities. Studies comparing experimental and control groups found significantly higher enthusiasm and participation in learning among students using digital comics (Anesa et al., 2020). Beyond the cognitive domain, comics based on specific approaches (e.g., SETS-based comics) have demonstrated meaningful contributions to character formation and the development of critical thinking skills (Widyawati et al., 2024). These findings reinforce the value of digital comics as a multimodal learning medium that is both humanistic and contextually grounded. Figure 6 provides a graphical overview of the literacy components (such as interest, comprehension, and critical thinking) that are improved with digital comics.

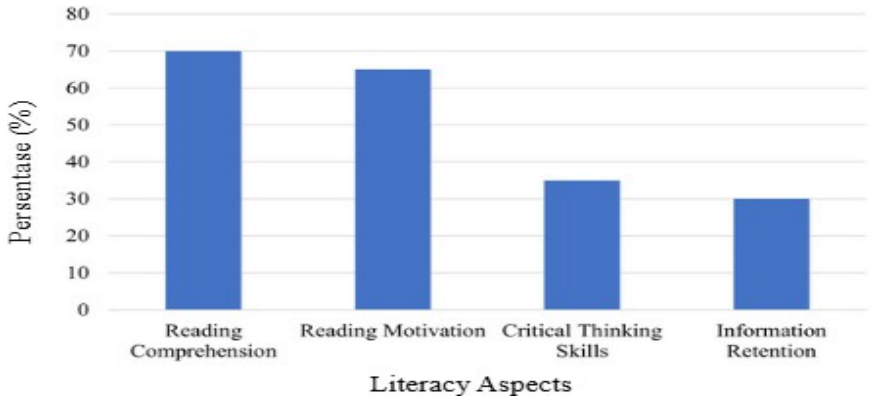

Figure 6. Graph of literacy aspects improved by digital comics

Out of the 27 articles reviewed, nine studies (33%) explicitly discussed the incorporation of local cultural values into the development of digital comics. These studies consistently found that local wisdom content is essential for helping students connect reading material with their personal experiences, thereby improving comprehension and aiding in the internalization of moral values (Murti et al., 2020). For example, digital comics adapted from Indonesian folktales have been used successfully to promote virtues like honesty, responsibility, and teamwork among students.

Research also indicates that digital comics not only improve reading comprehension but also foster students' pride in their cultural identity. In a study focusing on Papuan culture, Istiq'faroh et al. (2024) found that integrating local cultural elements into e-comics improved both reading literacy and students' appreciation of their local culture. Similarly, Wulandari and Hapsari (2020) reported that digital comics based on the Tri Hita Karana concept (a Balinese philosophy) helped in still values of spirituality and social harmony, enhancing students' emotional engagement in learning.

Moreover, studies have shown that incorporating cross-cultural values into digital comics can enhance social empathy and cross-cultural literacy. For instance, comics that include concepts like Omoiyari (Japanese empathy) and Whanaungatanga (Māori communal bonds) were found to improve students' empathy and social awareness (Loudoun et al., 2024). In line with these outcomes, Belda-Medina (2024) underscores the role of multimodal literacy in a global context, suggesting that narrative-visual media such as digital comics can bridge humanistic values, language learning, and cultural education in the digital age. A summary of how various studies integrated local wisdom values into digital comics is presented in Table 3.

Table 3. Integration of local wisdom values in digital comic development

Author (Year)	Focus on Local Value	Media/Platform	Impact on Students
Murti et al. (2020)	Indonesian folklore (moral and responsibility values)	*Comic Education* (digital)	Improved students' attitudes and understanding of cultural values
Istiq'faroh et al. (2024)	Papuan culture (identity and cultural diversity)	Articulate Storyline	Improved reading literacy and appreciation of local culture
Wulandari and Hapsari (2020)	Javanese culture (mutual cooperation and honesty)	Interactive web comic	Increased students' emotional engagement
Loudoun et al. (2024)	Cross-cultural values (intercultural empathy)	Digital narrative platform	Enhanced students' empathy and social awareness

In summary, the evidence from 27 studies indicates that using digital comics significantly enhances elementary students' reading literacy skills. An increasing trend in publications from 2020 to a peak in 2023 highlights a shift in educational practices from traditional print media to more interactive and contextually relevant digital narratives. The findings reveal that digital comics not only improve reading comprehension but also positively affect students' emotional engagement, reading motivation, and active participation in reading activities. Furthermore, by incorporating local wisdom into content, digital comics relate more closely to students' real-life contexts, fostering positive cultural values, strengthening social character, and reinforcing cultural identity among learners.

Discussion

An increasing body of research highlights that digital comics significantly enhance students' reading engagement, comprehension, character development, and cognitive skills. The combination of narrative text and visual illustrations makes learning more interesting and accessible, especially for elementary students in the context of reading literacy (Anesa et al., 2020). Enhanced engagement through digital comics provides two primary benefits: it boosts students' comprehension of text and fosters deeper cognitive interaction with the content (Saputri et al., 2024). These results align with other studies indicating that using a blend of images and narrative can reduce initial cognitive load while creating a more enjoyable learning experience (Murti et al., 2020).

In line with these findings, Ananta et al. (2023) emphasize that visual media such as digital comics help reduce cognitive load while enhancing the contextual meaning of text. They note that elementary students' poor reading comprehension often stems from an inability to connect important concepts in the text with personal experiences. This view is reinforced by several studies showing that students grasp new concepts more easily when information is

delivered in a multimodal format. Learning experiences that go beyond linear text—by linking visual and verbal representations—facilitate deeper meaning-making (Nurani et al., 2024). In visually rich learning environments, students can form stronger mental representations; over time, this helps them retain and understand information more effectively (Afifah et al., 2025). This phenomenon is consistent with Dual Coding Theory, which describes how text and images work together to enhance the storage and retrieval of information in long-term memory.

Local context and cultural elements further enhance the effectiveness of digital comics as learning tools. Incorporating local wisdom into digital comic content has been shown to deepen students' emotional and cognitive connections to the material, because students recognize values, characters, and situations that mirror their own social experiences (Sumarwati et al., 2023). Folklore, local history, and regional culture embedded in stories not only enrich the content but also support the development of students' literacy skills and cultural identity (Wewengkang et al., 2024). This kind of culturally contextualized learning aligns with Indonesia's Merdeka Curriculum, which emphasizes making education relevant to students' social contexts as part of cultivating the Profil Pelajar Pancasila (Pancasila Student Profile).

Studies have also found that students who use digital comics improve not only in reading skills but in critical thinking and character development. For example, a digital comic model based on the SETS approach (Science, Environment, Technology, Society) was shown to foster a sense of responsibility, social awareness, and nationalism in students by using storylines that address social and environmental issues (Widyawati et al., 2024). These results are consistent with other research indicating that incorporating conflict, dialogue, and problem-based situations in comic narratives can prompt students to engage in analysis, inference, and reflection on events (Damayanti et al., 2024). Additionally, culture-based science and social studies comics have been effective in conveying the importance of regional history and values to learners (Atmojo et al., 2024).

Importantly, digital comics yield the best outcomes when paired with appropriate reading strategies. Using strategies like the "Fix-Up" strategy for monitoring understanding, image-based scaffolding, and interactive QCA sessions, teachers can help students gradually and contextually improve their text comprehension (Istiq'faroh et al., 2024). Furthermore, the use of sketch noting within comics has been found to enhance concept retention and the organization of information (C. Li, 2024)). Thus, beyond serving as visual aids, digital comics function as dynamic learning tools that support the development of students' visual literacy, creative imagination, and metacognitive awareness.

As educational technology advances, the format of digital comics has evolved into increasingly interactive forms, including the use of Augmented Reality (AR). Numerous studies report that AR-integrated digital comics (or AR storybooks) can boost curiosity, enrich learning experiences, and improve memory recall (Alhamad et al., 2024). Although gains in reading comprehension from AR comics are not always immediately apparent, the immersive visual-spatial experience provided by AR can, when well-designed, enhance narrative memory and reduce attentional barriers (Berube et al., 2024). New platforms such as Metabook enable teachers and even parents to create 3D interactive storybooks accessible via AR headsets, illustrating how technology can be leveraged to produce more engaging literacy experiences (Wang et al., 2024).

Despite these technological opportunities, certain practical challenges remain. Greater access to digital devices and improved technological literacy among students have made the adoption of digital comics more feasible in schools, but infrastructure and teacher readiness continue to be significant challenges. Hadjar et al. (2021) found that teachers often need targeted training—such as how to select appropriate comic platforms, align content with curriculum objectives, and assess learning outcomes—in order to effectively use digital comics as teaching tools.

Furthermore, Susanto et al. (2024) emphasize that one major obstacle to using digital media (including e-comics) in elementary classrooms is the persistence of lecture-centric

teaching methods, which inhibit active student participation. The integration of digital comics offers an alternative approach that can facilitate a shift toward a more interactive, student-centered learning environment. However, other factors such as limited availability of devices, patchy internet connectivity, and an underdeveloped reading culture also influence the successful implementation of digital comics in schools (Rasamimanana et al., 2025). Table 4 summarizes some key implications, current obstacles, and future opportunities related to the use of digital comics in education.

Table 4. Implications, obstacles, and opportunities for digital comics in education

Aspect	Findings/Implications	Current Obstacles	Future Opportunities
Reading Literacy	Improves students' motivation and comprehension	Uneven access to devices and internet connectivity	Integration with school e-learning platforms and digital libraries
Local Wisdom	Strengthens cultural identity and learning relevance	Varied quality of cultural content; rigid curricula	Collaborations with local communities; development of folklore-based narratives
Character C Values	Aids cultivation of moral values and empathy	Teachers not yet skilled in explicitly integrating values	Development of value-based e-comics supporting the *Pancasila* Student Profile
AR C Interactivity	Enhances retention and immersion in learning	Limited infrastructure and teacher readiness	Development of hybrid AR-comics for interactive learning
School Implementation	Supports instructional delivery	Dependent on supportive policy and leadership	Incorporation into the *Merdeka* Curriculum and literacy programs

The points outlined in Table 4 show that the effectiveness of digital comics in education is influenced by both the quality of the comic content/design and the readiness of the broader educational ecosystem (including curriculum flexibility, infrastructure availability, teacher preparedness, and cultural relevance). Rather than viewing digital comics as merely supplementary teaching aids, they should be regarded as transformative pedagogical innovations that can address a range of educational goals—from improving literacy and engagement to fostering character development and integrating digital learning. If implementation challenges are mitigated through supportive policies, multi-stakeholder collaboration, and sustainable content development, digital comics have the potential to significantly transform learning experiences in elementary education.

To fully realize this potential, the development and introduction of digital comics in schools may need to proceed in stages. An incremental approach could start with static or PDF-format digital comics, then progress to interactive digital comics, and eventually incorporate advanced features like augmented reality. Such a phased implementation allows teachers and students to acclimate gradually to new media without disrupting the learning process, and it can reduce technical resistance at the school level (Muhassin et al., 2021). Ensuring the sustainability of digital comic use also requires provisioning adequate devices, forging partnerships with digital libraries or literacy communities, and securing institutional support through literacy-promoting policies. Ultimately, the success of this medium depends not only on

resource availability but also on how effectively students engage with and internalize their reading experiences.

It is also important to note that simply increasing students' interest in reading (through fun media like comics) does not automatically translate into academic improvement unless it is coupled with follow-up educational activities. Prior research has shown that reading engagement has a significant impact only when accompanied by deeper learning exercises—such as group discussions, rewriting stories from different perspectives, or summarizing text content (Consorti et al., 2023). Therefore, teachers are encouraged to integrate digital comics with reflective activities, creative reinterpretations, or even having students produce their own comics ("student-made" comics), as these strategies can help learners internalize and comprehend the material more profoundly. Such combined models of practice have been shown to encourage critical thinking and creativity (Wulandari C Sulasmono, 2020).

Overall, the use of digital comics in reading literacy instruction is supported by strong theoretical rationales and a growing body of empirical evidence. Numerous studies in primary education contexts have documented improvements in reading interest, text comprehension, reinforcement of cultural values, and even critical thinking skills as a result of comic-based learning interventions. Nonetheless, to achieve successful outcomes, appropriate instructional design, sufficient infrastructure, competent teachers, and relevance to students' social context are all necessary. Technological innovations like interactive multimedia and AR open new possibilities for literacy education, but maintaining manageable cognitive load and ensuring the preparedness of the educational ecosystem remain crucial considerations.

Looking ahead, future research on digital comics in education should consider longitudinal designs to examine the long-term effects on students' literacy development, character formation, and digital readiness. Cross-contextual comparative studies (e.g., across different regions or cultures) could provide further insight into how digital comics perform under various educational settings. Investigations into teacher–student collaboration in creating digital comics and evaluations of culturally based implementations would also strengthen our understanding. Such research efforts will help solidify the status of digital comics as an educational medium that is both pedagogically effective and aesthetically engaging.

CONCLUSION

A wide range of studies have demonstrated that digital comics (e-comics) are effective in enhancing elementary students' reading literacy through an engaging combination of text and visuals that appeals to the digital generation. Integrating local wisdom content into these comics further reinforces character development, cultural identity, and the contextual relevance of learning materials. The successful implementation of digital comics in the classroom is highly dependent on teacher competencies, infrastructure readiness, supportive school policies, and a conducive overall literacy environment. Based on the findings of this review, teachers are encouraged to use digital comics in conjunction with reflective activities (such as discussions or journaling) and creative projects (such as having students create their own comics) in order to deepen comprehension and foster creativity. Meanwhile, content developers and education policymakers should strive to ensure that digital comic media align with curriculum goals and local cultural values, and that their use is supported by adequate facilities and continuous teacher training. With a well-integrated educational ecosystem, digital comics have the potential to become a transformative and sustainable learning medium—one that not only improves literacy outcomes but also strengthens character education for elementary school students.

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