

A Holistic Rubric for Educational Digital Comics Based on Image–Text Relationship Analysis

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Abstract: The development of digital media has shaped Generation Alpha's reading characteristics to be more visual and multimodal, requiring more effective and adaptive digital comic design. This study aims to analyze the configuration of image–text relationships in digital comics and to develop a holistic assessment rubric. A qualitative descriptive-analytical approach was employed, involving the analysis of 100 popular digital comics and interviews with 30 Generation Alpha readers. Data were analyzed using thematic analysis and conceptual mapping to identify patterns of multimodal humor and reader preferences. The results indicate that comics with strong visual–verbal integration, coherent narrative flow, concise text, and social relevance have the highest preference levels, while one humor configuration received no preference (0%). This finding indicates that not all multimodal humor strategies equally resonate with Generation Alpha readers, highlighting the importance of aligning visual–verbal design with learners' cognitive and cultural characteristics. In addition, four contextual image–text relational configurations were identified in constructing meaning and humor. The primary contribution of this study is the development of a five-aspect holistic rubric for evaluating educational multimodal digital comics. This rubric provides an initial conceptual framework for designing and assessing digital comics in educational contexts and may assist teachers, instructional designers, and digital media developers in creating more engaging and pedagogically relevant learning media. Further studies are required to examine its validity and reliability across broader educational settings.

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Introduction

The development of digital technology has transformed how young generations interact with information, media, and knowledge. Generation Alpha, defined as individuals born since around 2010, grows up in an environment dominated by screens, visual platforms, and multimodal communication. From an early age, this generation is accustomed to accessing information through a combination of images, short texts, animations, and visual narratives, shaping distinct attention patterns, media preferences, and ways of constructing meaning compared to previous generations. Studies indicate that Generation Alpha is more responsive to visual-narrative stimuli and interactive experiences, while linear and text-dominant information delivery tends to be less effective in maintaining learning engagement (Höfrová et

al., 2024). Therefore, learning media design must be adapted to align with the visual and multimodal characteristics of contemporary learners. The use of story-based, visual, and multimodal learning media has also been shown to enhance students' interest, attention, and initial understanding of learning materials (Miller, 2023).

One medium with strong potential to address these needs is digital comics. Digital comics integrate illustrations, text, and narrative structures in a concise format that is easily accessible through various digital platforms. Previous studies have shown that digital comics can improve reading motivation, learning engagement, and comprehension through the integration of visual and verbal elements (Padma et al., 2025). This indicates that digital comics function not only as entertainment media but also as effective and relevant learning tools for Generation Alpha.

However, the use of digital comics in educational contexts does not always result in optimal learning experiences. Some educational comics are still designed similarly to conventional textbooks in visual format, with excessive text, dense panel layouts, and unbalanced image–text relationships. These conditions may increase cognitive load and reduce reading comfort. Research suggests that the effectiveness of digital comics largely depends on the quality of relationships between visual and verbal elements, including text readability, visual flow, narrative rhythm, and alignment with readers' experiences (Saputri & Mahendra, 2025).

However, previous studies have primarily focused on the effectiveness of digital comics in improving learning outcomes and reader engagement, while limited attention has been given to analyzing image–text relationship configurations as a foundation for comprehensively evaluating comic quality. In addition, no previous study has developed an operational and multimodal-based assessment rubric that systematically integrates visual, verbal, narrative, and socio-cultural dimensions in educational digital comics. This gap highlights the need for a more structured evaluation framework that is aligned with the visual literacy characteristics of Generation Alpha.

The novelty of this study lies in the development of a holistic multimodal rubric based on the synthesis of image–text relationship configurations, popular digital comic characteristics, and reader perceptions, providing a new conceptual framework for evaluating educational digital comics. Based on this background, this study addresses the following research questions: (1) How are image–text relationships configured in digital comics preferred by Generation Alpha readers? and (2) How can these configurations be synthesized into a holistic assessment rubric for educational digital comics?

The objective of this study is to analyze image–text relationship configurations in digital comics and to develop a holistic assessment rubric as a basis for evaluating digital comics that are adaptive, systematic, and aligned with the visual literacy characteristics of Generation Alpha.

Research Method

This study employed a qualitative approach with a descriptive-analytical design. This approach was chosen because the study aims to explore and analyze image–text relationships in digital comics in depth as a basis for developing a holistic rubric, without testing hypotheses or manipulating variables. The descriptive-analytical design allows for a contextual and natural examination of visual–verbal phenomena in accordance with the characteristics of digital comics distributed on online platforms (Creswell, 2017). The researcher acted as the primary

instrument (*human instrument*) throughout the research process, including data collection, interpretation, and analysis.

The data sources in this study consisted of two types. First, a corpus of 100 digital comics from both Indonesian and international creators was selected using purposive sampling. The selection criteria included popularity (number of followers and audience engagement), publication consistency, and diversity in visual style and image–text relationship strategies. The selection of 100 comics was intended to ensure sufficient variation in visual, narrative, and multimodal characteristics, enabling in-depth comparison across samples and facilitating the identification of recurring patterns. A larger corpus was also considered necessary to enhance the richness and credibility of qualitative findings through broader data representation.

Second, reader perception data were obtained through interviews with 30 respondents from Generation Alpha (born in 2010 and above), aged approximately 9–12 years and enrolled in elementary school. All respondents were students residing in Purwakarta, and interviews were conducted directly at SD Labschool UPI Purwakarta. Respondents were selected purposively based on the criterion of actively reading digital comics through online platforms. The number of respondents was considered adequate because interview responses began to show repetitive patterns, indicating data saturation and sufficient information to address the research objectives.

Data collection techniques included visual document analysis of the digital comic corpus and semi-structured interviews with readers. The visual document analysis focused on visual elements such as illustration style, color, panel composition, and character expression, as well as verbal elements including dialogue, narration, bubble text, and typography, along with the relationships between these elements.

The research instruments consisted of document analysis guidelines and semi-structured interview guides. The interview process aimed to explore reader preferences, reasons for interest in certain types of comics, and perceptions of how image–text relationships contribute to comprehension and reading comfort.

Examples of interview questions included: “Do you often read digital comics on social media?”, “What types of comics do you prefer?”, “Which comic do you prefer between these two samples, and why?”, “Do visual elements influence your interest in a comic?”, “Are the panel layouts and bubble texts easy to read?”, and “What aspects are most important to you when reading digital comics?”.

Data analysis followed the stages of thematic analysis as proposed by Braun and Clarke (2006), as cited in Adelliani (2023). The analysis began with data familiarization through repeated reading of interview transcripts and visual observation notes. Subsequently, open coding was conducted manually by identifying recurring keywords, visual patterns, narrative structures, and reader responses. Codes with similar characteristics were then grouped into broader categories based on similarities in panel composition, storytelling patterns, visual styles, humor strategies, and image–text relationships. Finally, these categories were synthesized into thematic patterns that served as the conceptual foundation for developing the holistic rubric. Second, data from the comic corpus were categorized based on visual–verbal relationship characteristics, including illustration style, color usage, text density, and narrative strategies. Third, triangulation was conducted between corpus analysis and interview data to enhance the credibility of the findings. Finally, all findings were synthesized to develop a holistic rubric for digital comic creation.

To ensure the trustworthiness of the data, validation techniques such as triangulation and member checking were applied. Triangulation was conducted by comparing findings from

multiple data sources, while member checking was carried out by confirming interview results with participants. Reliability was maintained through systematic coding procedures and repeated analysis to achieve consistent categorization. The research was conducted in Purwakarta from January to April 2026, covering the stages of corpus selection, interview data collection, thematic analysis, and rubric development. The overall research flow is illustrated in Figure 1.

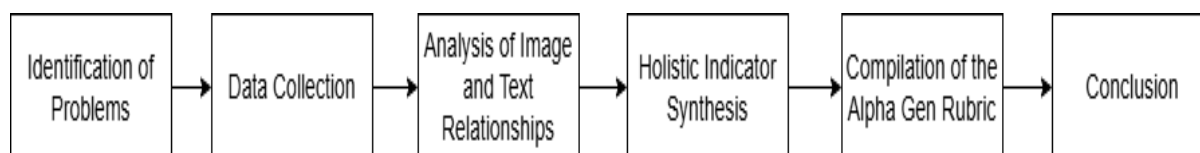


Figure 1. Research Flow

Result and Discussion

Result

As a preliminary step before formulating a holistic rubric, this study first mapped Generation Alpha readers' preferences toward digital comics to identify the dominant visual–verbal characteristics influencing reading engagement. Detailed respondent-level preference data were relocated to Appendix A to improve readability, while Table 1 summarizes the main preference patterns identified during the interview process.

Table 1. Summary of Generation Alpha Readers' Initial Preferences toward Digital Comics

Preference Dimension	Dominant Findings	Interpretation
Preferred Comic Type	Popular digital comics were chosen by most respondents	Generation Alpha readers tend to favor comics that align with their everyday digital consumption habits
Visual Characteristics	Child-like/chibi illustrations, expressive characters, attractive colors	Visually expressive elements increase emotional engagement and reading motivation
Text Characteristics	Concise dialogue, readable bubble text, low text density	Short and readable verbal elements reduce cognitive load and support reading comfort
Humor Characteristics	Everyday humor, relatable situations, light emotional expressions	Humor connected to daily experiences enhances contextual relevance
Rejection Factors	Dense text, static visuals, crowded panel layouts	Excessive verbal dominance may reduce immersion and visual attention
Most Preferred Examples	<i>Tuti and Friends</i> , <i>Aman Rilmen</i> , <i>Sans Komik</i>	Comics with balanced multimodal integration tend to achieve higher acceptance

The preference mapping revealed a clear trend: most respondents consistently preferred popular digital comics over educational comics. The dominant reasons included visually

appealing illustrations, child-like or chibi character styles, expressive emotions, concise dialogue, and relatable everyday humor. Comics such as *Tuti and Friends* emerged as the most preferred examples, indicating that Generation Alpha readers are strongly attracted to comics that integrate visual expressiveness with concise verbal narration.

In contrast, educational digital comics were generally perceived as less engaging due to high text density, static visual presentation, and dense panel layouts. This finding suggests that comic acceptance among Generation Alpha is not determined solely by educational content, but by how effectively visual and verbal elements are balanced to reduce cognitive load and maintain reading comfort. Examples of highly preferred and less preferred comics are presented in Figure 2 and Figure 3.



Figure 2. Digital Comics Preferred by Generation Alpha Readers: (a) Tuti and Friends, (b) Aman Rilmen, (c) Sans Comics.

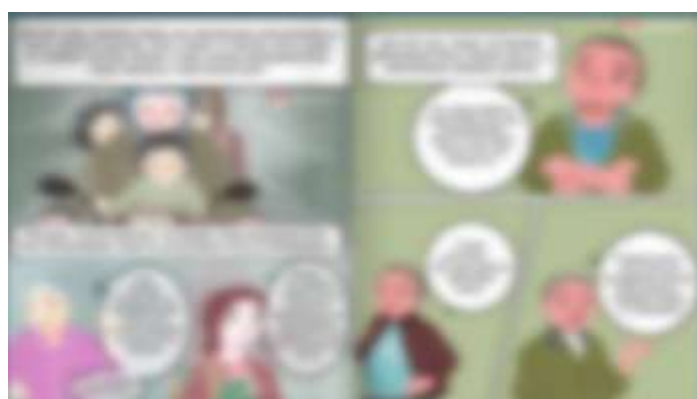


Figure 3. Digital Comics Less Liked by Generation Alpha Readers

The comparison between Figures 2 and 3 demonstrates that image–text balance functions as a critical determinant of reader engagement. Comics dominated by explanatory text tend to reduce visual immersion, whereas comics with balanced multimodal interaction create stronger emotional resonance.

Following the initial preference mapping, the study analyzed the broader digital comic corpus to examine whether similar patterns appeared structurally across samples. The corpus analysis identified four recurring humor configurations, as illustrated in Figure 4.



Figure 4. Results of Mapping Image and Text Relation Categories using the Multimodal Relational Configuration Model

The first configuration, *Situational–Contextual Humor*, represents humor derived from familiar daily situations. The second, *Visual Expressive Humor*, emphasizes exaggerated facial expressions and gestures as the primary humor driver. The third, *Textual–Ironic Humor*, constructs humor through semantic tension between image and text. The fourth, *Hybrid Interactive Humor*, combines visual and verbal elements in co-constructive meaning-making.

The relatively balanced distribution across these four configurations indicates that digital comic humor does not rely on a single dominant strategy. Instead, humor emerges through flexible multimodal interactions in which visual and verbal elements dynamically shift between dominant, supportive, and co-constructive roles.

To validate the conceptual categorization, network analysis using *VOSviewer* was conducted, as presented in Figure 5.



A pie chart illustrating the distribution of comic books. The chart is divided into four segments: a large cyan segment for 'Komik 1' (46.7%), a large light blue segment for 'Komik 2' (43.3%), a smaller blue segment for 'Komik 3' (10%), and a very thin segment for 'Komik 4' (0%). Arrows point from the labels to their respective segments.

Komik	Count	Percentage
Komik 1	14	46,7%
Komik 2	13	43,3%
Komik 3	3	10%
Komik 4	0	0%

Tuti and Friends obtained the highest preference (46.7%), followed by *Aman Rilmen/Sans Komik* (43.3%), while *Tahi Lalat* received only 10%. One comic configuration received 0% preference, indicating complete reader rejection within the sample. This finding is particularly significant because it demonstrates that not all humor strategies resonate equally with Generation Alpha readers. Configurations characterized by excessive textual dominance and weak visual engagement appear to fail in establishing emotional and contextual relevance. Based on the synthesis of reader preferences, corpus analysis, and multimodal humor mapping, this study developed a holistic rubric for multimodal digital comic assessment.

Table 2. Holistic Rubric for Multimodal Digital Comic Assessment here

No.	Assessment Aspects	Observation Indicators	Assessment Criteria	Score
1.	Image & Text Relationship	The relationship of meaning between images and text in panels.	Images and text are complementary/elaborative/ironic; they contribute different information and form layered meanings; the removal of either reduces the power of the message.	4
			Images and text support each other but there is still repetition of information; the meaning tends to be explicit.	3
			Redundant images and text; text only explains visuals; literal meaning and less enriching.	2
			Images and text are incoherent or contradict each other without any clear purpose.	1
2.	Narrative Structure & Coherence	The storyline, the transitions between panels, and the overall cohesiveness of the story.	The plot is very coherent, panel transitions are smooth, conflicts and resolutions are clear, easy to follow without confusion.	4
			The flow is quite consistent, there are a few jumps or transitions that are less smooth but can still be understood.	3
			The plot is less consistent, some parts feel like they're jumping or not connected enough.	2
			There is no clear plot coherence, the story is confusing.	1
3.	Visual-Verbal Integration (Multimodal)	The integration of images, colors, panels, layout, and text in building meaning	All multimodal elements are strongly integrated and form a complete unity of meaning and support the message optimally.	4
			The visual and text elements are quite integrated, but there are parts that are less consistent.	3
			The integration is less unified, the visual and text elements feel like they are running on their own.	2

			There is no clear integration between visual elements and text.	1
			The language is concise, precise, appropriate to the digital comic genre, and supports the timing of humor or messages strongly.	4
4.	Language Dialogue Quality	& Accuracy, conciseness, effectiveness of dialogue and humor/message	The language is quite appropriate and contextual, but does not fully reinforce the message.	3
			Language tends to be descriptive/repetitive and does not support the power of the message.	2
			Language is ineffective or interferes with understanding.	1
			Cultural references are clear, contextual, and highly relatable to the majority of readers.	4
5.	Cultural Social Relevance	& Proximity of cultural references to the target audience's experiences	Cultural elements are recognizable and acceptable to most readers.	3
			General cultural elements and less specific to the audience.	2
			There is no clear cultural relevance or it is not appropriate for the audience.	1

The rubric represents the primary scientific contribution of this study by operationalizing multimodal comic quality into five measurable dimensions: (1) image–text relationship, (2) narrative structure and coherence, (3) visual–verbal integration, (4) language and dialogue quality, and (5) cultural and social relevance. The findings indicate that comics receiving the highest reader preference consistently demonstrate strong performance across these five dimensions. This confirms that humor effectiveness in educational digital comics is not determined by content alone, but by the quality of multimodal integration that supports meaning construction, emotional engagement, and contextual relevance for Generation Alpha learners.

Discussion

The findings demonstrate that Generation Alpha’s preference for digital comics is influenced not merely by informational content, but primarily by the quality of visual–verbal integration. Comics with expressive illustrations, child-like or chibi character styles, concise dialogue, and relatable humor consistently received higher preference scores than educational comics dominated by dense textual explanations. This finding confirms that Generation Alpha readers, who grow up in multimodal digital environments, process meaning through the

simultaneous interaction of images, short text, color, and narrative visual structures rather than through linear textual exposition alone (Dewi, 2025).

From a visual literacy perspective, images no longer function as supplementary elements but act as autonomous meaning-making resources within multimodal communication systems (Sulianta, 2024). Therefore, reader acceptance is determined not by the dominance of either visual or verbal modes, but by the effectiveness of their integration in constructing coherent, emotionally engaging, and cognitively accessible meaning. In addition, humor that reflects familiar daily experiences and socio-cultural contexts tends to generate stronger emotional resonance among young readers, reinforcing engagement with narrative visual media (Sutanto & Shakira, 2025).

Conversely, educational comics characterized by excessive text density and static visual presentation tended to receive lower reader preference. This finding supports cognitive load theory, which suggests that excessive verbal dominance without proportional visual support may reduce reading comfort and engagement among young learners (Apostolou & Linardatos, 2023). Thus, multimodal balance appears to function as a critical determinant of reading enjoyment and sustained attention.

Corpus mapping and network analysis revealed that humor in digital comics is distributed across four relatively balanced multimodal configurations: Situational–Contextual Humor, Visual Expressive Humor, Textual–Irony Humor, and Hybrid Interactive Humor.

The absence of a single dominant configuration indicates that humor is not produced through isolated visual or verbal strategies, but through contextual interactions between multiple semiotic resources. This supports previous findings that humor in multimodal narratives is constructive, situational, and dependent on the dynamic interplay between communicative modes (Ladilova & Schröder, 2022).

Furthermore, validation through VOSviewer network analysis demonstrated structural consistency between conceptual categorization and empirical clustering. This finding strengthens the proposed Multimodal Relational Configuration Model, suggesting that the identified humor categories are not merely theoretical constructs, but recurring structural patterns naturally emerging across digital comic samples.

To strengthen the interpretation of the proposed model, the identified humor configurations were compared with several previous studies on educational comics. Studies by Lestari et al. (2021), Purwati et al. (2022), and Rosyada and Asmarani (2023) predominantly reflect Situational–Contextual Humor, characterized by familiar learning situations supported by communicative visuals. Interestingly, this configuration also corresponds with the highest reader preference in this study (46.7%), indicating that contextual humor may enhance emotional resonance and conceptual accessibility for Generation Alpha learners.

Meanwhile, studies by Putri and Sukasih (2025), Damopolii et al. (2021), Senen et al. (2021), and Chamidah et al. (2024) demonstrate characteristics of Hybrid Interactive Humor, where visual and verbal elements collaboratively construct meaning. This configuration also showed high acceptance among respondents (43.3%), suggesting that balanced multimodal interaction supports both engagement and comprehension.

In contrast, studies by Rahman and Andriani (2025) and Arief et al. (2022) tend to represent Textual–Irony Humor, characterized by stronger textual dominance. Although these comics remain pedagogically effective, similar configurations in this study received lower reader preference (10%), indicating that excessive textual emphasis may reduce multimodal appeal for Generation Alpha readers.

These comparisons suggest that educational effectiveness alone does not guarantee reader engagement; rather, the quality of multimodal integration significantly influences how educational comics are received. The primary theoretical contribution of this study lies in the development of a holistic rubric for multimodal digital comic assessment, which operationalizes comic quality into five interrelated dimensions: (1) image–text relationship, (2) narrative coherence, (3) visual–verbal integration, (4) language and dialogue quality, and (5) cultural relevance.

Unlike previous studies that primarily evaluated digital comics based on learning outcomes or content effectiveness, this study introduces a multimodal evaluation framework grounded in empirical reader preferences, corpus mapping, and structural network validation. Conceptually, this rubric extends multimodal literacy theory by translating abstract visual–verbal relationships into operational assessment indicators applicable in educational media design.

Practically, this framework provides teachers, instructional designers, and digital comic creators with a structured reference for designing comics that are cognitively accessible, emotionally engaging, and culturally relevant for Generation Alpha learners. Nevertheless, the rubric developed in this study remains conceptual and requires further psychometric validation, including construct validity, inter-rater agreement, and reliability testing across broader educational contexts. Therefore, this study provides not only an analytical model of multimodal humor, but also an initial theoretical foundation for developing evidence-based evaluation instruments in digital comic learning design.

Conclusion

This study demonstrates that Generation Alpha's engagement with digital comics is strongly influenced by the quality of multimodal integration rather than by informational content alone. Comics that combine expressive visuals, concise verbal narration, coherent storytelling, and culturally relevant contexts show significantly higher reader acceptance, confirming that effective digital comic design depends on balanced visual–verbal relationships. The primary scientific contribution of this study lies in the development of a holistic multimodal rubric consisting of five operational dimensions: image–text relationship, narrative coherence, visual–verbal integration, language and dialogue quality, and cultural relevance. This rubric extends previous digital comic research by providing an evidence-based evaluation framework grounded in reader preferences, corpus mapping, and structural validation of humor configurations. Practically, this framework offers educators, instructional designers, and digital media developers a systematic reference for designing and evaluating educational digital comics that are cognitively accessible, emotionally engaging, and contextually relevant for Generation Alpha learners. Nevertheless, the proposed rubric remains conceptual and requires further psychometric validation. Future studies are recommended to examine its construct validity, inter-rater reliability, and applicability across broader educational contexts and diverse learner populations.

References

- Adelliani, N., Sucirahayu, C. A., & Zanjabila, A. R. (2023). *Analisis tematik pada penelitian kualitatif*. Penerbit Salemba.
- Apostolou, D., & Linardatos, G. (2023). Cognitive load approach to digital comics creation: A student-centered learning case. *Applied Sciences*, 13(13), <https://doi.org/10.3390/app13137896>
- Arief, Z. A., Mujahidin, E., & Hartono, R. H. (2022). The effect of digital comic media on East Asian students' English language learning outcomes. *International Journal of Society, Culture & Language*, 10(3), 117–124. <https://doi.org/10.22034/ijscsl.2022.551349.2604>
- Chamidah, I. A., Ahdhianto, E., & Barus, Y. K. (2024). Digital comics based on problem based learning materials of past kingdom heritage to train students' critical thinking skills. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, 8(3), 519–530. <https://doi.org/10.23887/jipp.v8i3.82896>
- Creswell, J. W. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.
- Damopolii, I., Lumembang, T., & İlhan, G. O. (2021). Digital comics in online learning during COVID-19: Its effect on student cognitive learning outcomes. *International Journal of Interactive Mobile Technologies (iJIM)*, 15(19), 33–47. <https://doi.org/10.3991/ijim.v15i19.23395>
- Dewi, A. C. (2025). Transformasi pembelajaran menulis teks melalui media visual interaktif. *Jurnal Ilmiah Multidisiplin Mahasiswa dan Akademisi*, 1(3), 99–111.
- Höfrová, A., Balidemaj, V., & Small, M. A. (2024). A systematic literature review of education for Generation Alpha. *Discover Education*, 3(1), Article 125.
- Ladilova, A., & Schröder, U. (2022). Humor in intercultural interaction: A source for misunderstanding or a common ground builder? A multimodal analysis. *Intercultural Pragmatics*, 19(1), 71–101.
- Lestari, F. P., Ahmadi, F., & Rochmad, R. (2021). The implementation of mathematics comic through contextual teaching and learning to improve critical thinking ability and character. *European Journal of Educational Research*, 10(1), 497–508. <https://doi.org/10.12973/eu-jer.10.1.497>
- Miller, D. (2023). Embracing the technological metamorphosis: Envisioning higher education for generation alpha in a shifting educational landscape. *International Journal Software Engineering and Computer Science (IJSECS)*, 3(2), 88–96.
- Padma, D., Male, H., & Naibaho, L. (2025). Students' perception of English reading practice using LINE Webtoon application. *Journal of English Teaching*, 11(1), 118–137.
- Purwati, L., Subali, B., & Ridlo, S. (2022). The development of digital comic media for science subject to improve information technology literacy skill for grade IV elementary school students. *Journal of Primary Education*, 11(3), 373–387. <https://doi.org/10.15294/jpe.v11i3.74829>
- Putri, A. A., & Sukasih, S. (2025). Development of digital comics to improve reading comprehension and self-efficacy of grade V students. *JINoP (Jurnal Inovasi Pembelajaran)*, 11(1), 88–99. <https://doi.org/10.22219/jinop.v11i1.38194>
- Rahman, K. A., & Andriani, A. E. (2025). Development of digital education comics on style around us to improve IPAS learning outcomes. *Journal of Educational Sciences*, 9(4), 2950–2966. <https://doi.org/10.31258/jes.9.4.p.2950-2966>

- Rosyada, T. N., & Asmarani, R. (2023). The development of digital comics learning media based on scientific approach as character strengthening for grade 2 elementary school. *IJPSE Indonesian Journal of Primary Science Education*, 4(1), 58–65. <https://doi.org/10.33752/ijpse.v4i1.2858>
- Saputri, M., & Mahendra, Y. (2025). Enhancing elementary students' learning outcomes through digital comic-based media: A systematic literature review. *International Journal of Elementary Education*, 9(3), 566–576.
- Senen, A., Sari, Y. P., Herwin, H., Rasimin, R., & Dahalan, S. C. (2021). The use of photo comics media: Changing reading interest and learning outcomes in elementary social studies subjects. *Cypriot Journal of Educational Science*, 16(5), 2300–2312. <https://doi.org/10.18844/cjes.v16i5.6337>
- Sulianta, F. (2024). *Semiotika digital*. Feri Sulianta.
- Sutanto, S. M., & Shakira, C. (2025). Perancangan webkomik sebagai media naratif untuk memperkenalkan pariwisata Aceh melalui pendekatan desain sistematis. *Jurnal SASAK: Desain Visual dan Komunikasi*, 7(2).