Gondang: Jurnal Seni dan Budaya
Vol 9, No 2, (2025) Page 356-372
ISSN 2599-0594 (print) | 2599-0543 (online)
https://doi.org/10.24114/gondang.v9i2.68699
Available online : http://jurnal.unimed.ac.id/2012/index.php/GDG

Visual Literacy Design of Kebo Kicak Interactive Game for Early Age Children

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***How to cite*:** Putri, K.E.P., Warisqianto, A., & Ubaidillah, M.F. (2025). Visual Literacy Design of Kebo Kicak Interactive Game for Early Age Children. *Gondang: Jurnal Seni dan Budaya, Vol* 9(2): Page. 356-372.

Article History : *Received: Apr 19, 2025. Revised: Oct 13, 2025. Accepted: Dec 04, 2025*

ABSTRACT

The decline in children's exposure to local folktales is closely linked to the lack of digital literacy media that transform oral traditions into formats suited for digital-native learners. Kebo Kicak, a well-known folktale from Jombang Regency, holds strong cultural value and requires revitalization through accessible digital storytelling. This study aims to develop an interactive digital literacy medium in the form of an illustrated and narrated audiobook designed for kindergarten-aged children. A qualitative case study approach was applied using the Design Thinking framework, consisting of the stages of empathy, define, ideation, prototype, and user testing. Data were collected through field observations, interviews with cultural and early childhood education experts, and usability trials in local kindergartens. The prototyping process produced two audiobook modes: a self-reading mode supported by child-friendly digital illustrations, and a read-to-me mode integrating voice-over narration with gamelan-inspired background music to reinforce cultural identity. User evaluation through the User Experience Questionnaire (UEQ) indicated strong appeal, clarity, engagement, and perceived novelty. Children demonstrated positive attention, enjoyment, and improved motivation to read or listen independently, while teachers affirmed the media's relevance for early literacy learning.The implementation of this digital storytelling medium shows that the Kebo Kicak audiobook effectively connects traditional folklore with contemporary multimedia practices. It enhances early literacy experiences while serving as a practical strategy for cultural revitalization among the digital-native generation.

KEYWORDS

Folklore
Kebo Kicak
Interactive Game
Cultural Literacy
Early Childhood

INTRODUCTION

The Digital Native generation is a generation that grew up alongside technology and is accustomed to using various types of digital media every day (Putri, K. E. P., & Ardiyanto, 2024). While earlier studies mention that technological developments contribute to this shift, such explanations require deeper evaluation to understand the underlying mechanisms. The decline is not solely caused by the presence of digital entertainment, but also by the inability of traditional oral storytelling formats to compete with the rich, interactive, and visually stimulating media preferred by young children (Hariadi & Ro'is Abidin, 2022). Although folklore has long been recognized as carrying valuable cultural, moral, and educational lessons, its potential is not reaching Digital Native learners due to a mismatch between the medium and their consumption patterns (Rohmah et al., 2023). The weakening of oral tradition transmission where parents and community elders no longer consistently recount local stories, further widens this gap, leaving children dependent on mediated formats for cultural knowledge. However, the absence of accessible, technology-based adaptations

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significantly limits children's opportunities to engage with folklore independently(Zulkarnais et al., 2018). An external factor that also has an influence is the increasing popularity of foreign stories that are more easily accessible and packaged in forms that are more attractive to young readers, which increasingly threatens the existence of folk tales as a medium for cultural literacy(Maharani et al., 2023). Thus, the problem is not simply that children lose interest in local stories, but that traditional storytelling formats fail to align with contemporary digital literacy behaviors. This structural disconnect indicates an urgent need to revitalize folktales through digital storytelling media that integrate narrative, visual interaction, and culturally rooted design to suit the learning modes of today's young audience. A broader understanding of diverse cultures is not a problem. However, it would be a concerning phenomenon if foreign cultures were more popular and accessible than local Indonesian culture.

Folklore functions as a cultural repository across all regions of Indonesia, encapsulating community history, moral values, and worldviews; Jombang Regency in East Java similarly preserves its heritage through the Kebo Kicak folktale. Kebo Kicak Karang Kejambon is one of the Jombang legends that tells the origin of the name of the region. (Hariadi & Ro'is Abidin, 2022). The Kebo Kicak folktale is often called a "babon" or "babad" story because it is connected to many folktales spread throughout Jombang Regency, including myths, fairy tales, and legends.

Busthomy Hariad's 2024 study demonstrates that the digital comic format can reintroduce the Kebo Kicak folktale to adolescents, yet its static and text-dependent nature limits its suitability for early childhood learners, who require more interactive and multimodal forms of engagement. Thus, the transition in this research from comic-based digitalization to interactive digital game storytelling is driven by pedagogical needs. Game-based storytelling integrates narrative, illustration, sound, and simple interaction, making it more aligned with the cognitive characteristics and media habits of Digital Native kindergarten children. This approach extends previous efforts by offering a more developmentally appropriate and culturally responsive strategy for revitalizing the Kebo Kicak folktale in contemporary digital literacy contexts.

In recent years, technology has become a common tool in education, creating new demands and opportunities for society. Educational technology has significantly impacted our education system, enabling students to take greater control of their learning rather than relying solely on teachers, as has traditionally been the case (Prawesti et al., 2022). Therefore, developing technology-based digital literacy media for early childhood education for the digital native generation is crucial. The creation of game as a tool for literacy will blend modern technology with local wisdom drawn from folklore. These media are specifically made to involve users in an active way, helping them understand and participate in gameplay that enhances their concentration. They also offer a unique visual experience during study (Yahya et al., 2024). By a variety of interesting and diverse visual elements into audiobook, the digital-native generation can learn through play, making the learning process more enjoyable (Hoesen, 2022). Using media with a technology-based approach in the process of learning Jombang folklore cultural literacy has the potential to create a fun learning environment, encouraging direct participation that helps early childhood recognize, remember, and appreciate Indonesian cultural heritage.

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METHOD

This research was conducted from April to August 2025 and involved kindergarten-aged children (5–7 years old) from three schools located in the central urban area of Jombang District: TK Negeri Pembina (8 children), TK Alfi Munir (10 children), and TK Daarunnajwa (12 children). These schools represent a socio-cultural environment directly connected to the Kebo Kicak folktale, allowing the research to capture authentic responses from Digital Native children familiar with local cultural settings. Respondents were selected through purposive sampling to ensure that participants were accustomed to touchscreen devices and suited the developmental criteria for early literacy exploration. The qualitative case study method was adopted because it enables an in-depth investigation within a bounded context to understand the stages and outcomes of digital media development (Erste Putri, 2025). The research object is an interactive digital literacy medium adapting the Kebo Kicak folktale. Each school was accompanied by 2–3 teachers who observed the trial and completed the User Experience Questionnaire (UEQ), while an additional 15 kindergarten teachers from the IGTKI organization served as expert validators.

To strengthen the validity of findings, this study applied three types of triangulation. (1) Source triangulation was conducted by comparing information obtained from cultural experts, classroom teachers, and Digital Native children to ensure that interpretations of cultural content and usability needs were consistent across respondent groups. (2) Technique triangulation involved the use of multiple data-collection methods, observations, semi-structured interviews, focus group discussions, and user testing allowing convergence of findings from different methodological perspectives. (3) Time triangulation was implemented by gathering data at several points throughout the Design Thinking cycle, including initial exploration, prototype development, and post-testing evaluation, to verify the stability and reliability of user responses over time. A series of collected data was then synthesized through this triangulation procedure to build a comprehensive understanding of user needs and media performance.

The Design Thinking method guided the creative development process by emphasizing user-oriented problem solving. Its stages consisted of empathy (identifying user needs), definition (formulating core problems), ideation (generating creative strategies), prototype (designing and producing the media), and testing (evaluating user responses) (Asi & Fauzi, 2023).

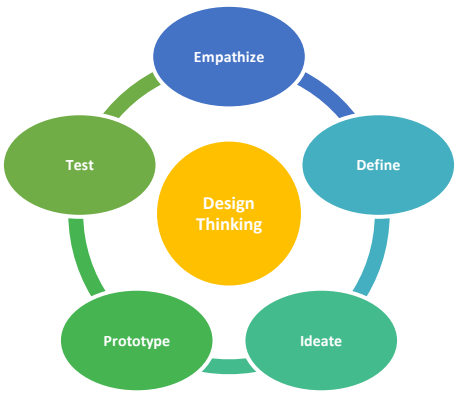

Figure 1. Design thinking flow (Putri, 2025)

There are five important stages of design using the design thinking method (Abdillah, A. S., & Marsudi, 2023) In media design research, there are:

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Empathy Stage

The empathy stage is conducted to understand the research needs. This initial stage requires an empathetic understanding of the field conditions and an appropriate approach to the audience (Sutanto & Suhartono, 2022). The data collected was primary data focusing on media user preferences, which served as a basis for designing media outputs. As the first step in the design process, a range of data collection activities were carried out through observation, interviews, and research into literature related to the Kebo Kicak folktale, a Jombang legend. Among the activities included were visits to cultural sites, observing how audiences interacted, interviewing experts and cultural figures about the Kebo Kicak folktale, consulting child education experts to understand the needs of the target audience, and conducting research on existing literature about Kebo Kicak.

Define Stage

This stage comes after the data collection process that has already taken place. Here, "definition" refers to the process of understanding the problem by gathering, analyzing, and combining data. (Bastian & Saputro, 2021). If the main problem has been found, it will produce a solution that suits the needs of the target audience(Suprihatin et al., 2024). During this phase, the problem was clearly defined, and potential opportunities for creating innovative educational and cultural media were identified. The design of the interactive Kebo Kicak game media is intended to address the need for digital literacy materials that include local wisdom content, specifically for digital-native children in Jombang district. It is expected that this new media will help the audience engage more effectively and gain a better understanding of literacy learning through the rich visual-cultural context of Jombang.

Ideation Stage

The ideation stage is the period during which ideas are created to solve the problems identified in the earlier stage. This phase is also known as the pre-production stage in media design. (Bastian & Saputro, 2021). During this time, various creative solutions for designing digital literacy media were developed, including themes, storylines, visual moodboards, characters, and layout designs, all aimed at addressing the identified issues. A brainstorming approach was used to come up with as many innovative design ideas as possible. In this stage, the author came up with the core creative concept for developing an game as digital literacy media application for Android, based on Kebo Kicak the legend of Jombang. The main focus of the media development included the creation of visual elements and the user experience process for the audience.

Prototype Stage

The initial model or prototype creation stage is the production stage of media design (Novianti, 2023). During this phase, a smaller version of the design product is developed with specific features that have been planned. The prototype is still open to feedback and further improvements in order to create a more refined version. The final prototype will be an interactive digital literacy game titled "Kebo Kicak," which includes two main educational sections: self-reading and being read aloud. The game design process begins with script creation, followed by storyboarding, sketching, voiceover recording, coloring, and final touches. All of these steps are performed using graphic design and audio editing software.

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Testing Stage

The testing stage was conducted after the prototype reached functional readiness and served to evaluate usability, narrative clarity, and visual–auditory coherence. User experience validation was implemented through direct observation, semi-structured interviews, and documentation of children's interaction with the digital storytelling media (Aditia et al., 2025). The UEQ instrument was completed by teachers and companions rather than the children themselves, considering that UEQ is not designed for early childhood respondents (Andrean et al., 2025). This proxy-based evaluation ensured methodological appropriateness while capturing the perceptual and behavioral responses of users aged 5–7.

During testing, minor difficulties were identified particularly in menu navigation and page transitions which provided insight into necessary refinements in iconography, hierarchy, and interaction cues. Researcher observation also noted potential bias from adult companions who occasionally assisted too early; therefore, companions were instructed to minimize intervention to preserve the authenticity of children's interaction patterns. Despite these factors, the triangulation of observational data, interview responses, and proxy UEQ ratings offered a reliable evaluation of the media's appeal, clarity, efficiency, stimulation, and novelty. These findings informed iterative refinement to ensure that the digital storytelling experience aligned with the cognitive, cultural, and perceptual characteristics of young Digital Native learners.

The questionnaires were distributed to children's companions, the target audience, in several kindergartens in Jombang District. The test results will demonstrate several aspects, including media appeal, clarity of storyline, media efficiency as a learning tool, media stimulation in motivating children, and the novelty of the media innovation. Researchers also conducted direct observations during the children's media use, assessing engagement, concentration, and satisfaction. The results of the product testing will be used to further refine the media product to create a better design.

RESULT AND DISCUSSION

The research resulted in the design of a digital-based visual literacy media entitled the Kebo Kicak folktale, a Jombang legend, as part of a cultural reproduction process to maintain its relevance according to the times and generations of the audience. The form of cultural reproduction in this study is the preservation of the cultural values of folklore from generation to generation. This approach serves as a revitalization of culture into contemporary digital consumption patterns to ensure its sustainability and relevance are maintained(Kartika & Arifin, 2024). In addition, this research can also be an initial step in efforts to instill moral and local values in a fun way in accordance with the three main principles in the deep learning method for early childhood. The three main principles are Meaningful Learning, Mindful Learning, and Joyful Learning (Nurul, A., Iskandar, S., Amalia, M., & Naziha, 2025). The following is an explanation of the research results at each stage:

1. Empathize

The empathy stage is the initial stage of the research, collecting data through observation, interviews, and literature review on the Kebo Kicak folktale, a Jombang legend. Information about cultural sites and potential sources was obtained from interviews with the Head of the Jombang Regency Education and Culture Office. The first cultural site observation was the Kebo Kicak family burial site in Dapurkejambon Village, Jombang. The second cultural site observed was the Mbah Kusir burial complex, believed to be related to

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Kebo Kicak's teacher. The cultural site observations included several indicators, including the physical condition of the cultural site, location accessibility, cultural and religious symbols, and narrative information about the potential adaptation of the cultural site as a visual asset for media.

Figure 2. Empathy stage at cultural site (Putri, 2025)

The observations revealed several visual symbols with distinctive colors that could be adapted into a color palette for visual assets. Observations at the cultural sites were also accompanied by interviews with cultural experts about the history of the Kebo Kicak story in various versions, the meaning and values that can be passed down to the younger generation, and details of rituals and cultural traditions that are still preserved. Interviews were conducted at the Kebo Kicak tomb complex cultural site with a village elder and caretaker as the resource person. Interviews at the Mbah Kusir tomb complex were conducted with the seventh generation of the Mbah Kusir and Surontu families. Both sources revealed significant differences in the story's version of the battle that Kebo Kicak fought in carrying out his father's duties, the Patih of the Majapahit Kingdom. These differences in the folktale's version are likely due to the fact that, as a form of oral literature, folktales have typically undergone various modifications according to the medium of delivery (Kartika & Arifin, 2024). A literature review was also conducted on library documents that tell the story of Kebo Kicak in 11 different versions.

Figure 3. Empathy stage FGD (Putri, 2025)

Interviews with child education experts and cultural experts were conducted during focus group discussions to obtain information about cultural content that is appropriate to the behavior and learning needs of the target audience. Based on the interview results, it was

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found that there is no digital literacy media containing Jombang local wisdom culture that is introduced to children in learning. The idea of developing the media is very appropriate to the needs of children's literacy learning which is in line with the need for introduction to digital media that has been introduced since the early childhood education level of kindergarten. This statement is also reinforced by the statement of the resource person about the suitability of the development of research media with the needs of deep learning media for early childhood, especially kindergarten children in the Jombang sub-district area. The target audience used a purposive sampling method with several criteria including: Age range: 5–7 years, taken from several kindergarten schools in Jombang sub-district, and children are in the pre-operational stage of cognitive development who have operated mobile media. This aligns with Piaget's criteria for children's digital behavior, and several standards are also applied, including: early use of digital media (smartphones or tablets), and a preference for media content with interactive visuals and audio(Wulandari Wangi Ni Kadek, 2024). The duration of media use will be guided by teachers and parents as facilitators.

2. Define

Based on the results of data collection conducted in the empathy stage, several key issues were identified that will be further analyzed. In the definition stage, data analysis was conducted to produce creative media development solutions that meet the need for digital-based visual literacy media innovation with local wisdom content for the target audience of digital native children in Jombang district. The Kebo Kicak digital literacy media will be based on a script version of the Kebo Kicak story that suits the target audience, namely a clear plot with simple vocabulary that is easy for children to understand. The design of the digital literacy media visual assets is also adjusted to user preferences. The design of the game flow will also be adjusted to the needs of digital literacy media in deep learning that prioritizes learning with moral values, active learning that involves children, and also calming learning. With new media innovations based on digital technology, it is hoped that the audience can enjoy the literacy learning process more with Jombang's local cultural content.

3. Ideate

The ideation stage in this research focuses on the exploration of creative ideas through a structured brainstorming process and the preparation of a visual moodboard as a conceptualization medium. Some creative solutions that became the design topics were about the storyline, visual moodboard, characters and also the storyline as part of the pre-production ideation. The research team's brainstorming process included the activity of compiling alternative character visuals with a choice of cartoon illustration style or realistic illustration style. Discussions were also held to determine the output of the game media consisting of an illustrated story and audio narration. The production of voiceover and music was also carried out to determine the style of the atmosphere and tone of the story narrator who uses light gamelan instruments for children.

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Figure 4. Ideate visual moodboard (Putri, 2025)

The moodboard design for the visual assets was developed from the visual concepts and character concepts used for the audiobook. The visual moodboard served as a means to crystallize emerging ideas and served as a visual communication tool among team members. The moodboard encompassed several key components, including the selection of illustration styles, colors, and typographic fonts. The chosen color palette represented Javanese cultural aesthetics, with a tendency toward bright and contrasting hues (red, green, yellow, and blue) to suit the taste preferences of a young audience. The illustration style used as a visual reference included a cartoon illustration style with a watercolor effect. The typographic style selection included a decorative font for the headlines, embodying traditional nuances, and a sans serif font for the body text, emphasizing readability, to suit the needs of a young audience.

4. Prototype

After completing the ideation stage, which serves as a bridge between the needs analysis (define) and the design (prototype) stage, media development continues by ensuring that the prototype remains contextual and aligns with the target audience. At this stage, an initial version of the design product is created with carefully designed features. The prototype design process begins with narrative flow, storyboarding, character design, audio editing and final design.

a) Narrative flow

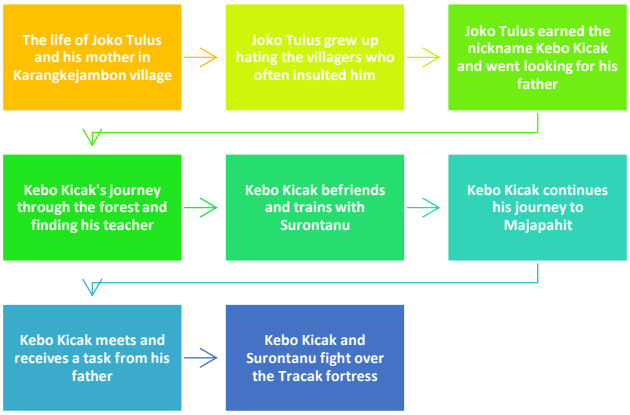

Figure 5. Kebo Kicak script flow for visual asset guidelines (Putri, 2025)

The narrative flow of Kebo Kicak;s story, used as the basis for designing the storyboard, is divided into three main parts that represent a classic dramatic structure: introduction, conflict, and resolution. In the first part, the narrative introduces the characters and setting. This introduction of characters and setting serves to prepare the audience for the context of

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the story and provides a moral foundation about simplicity and honesty as noble values that should be upheld. The second part presents the conflict that is the core of the narrative journey. In this phase, supporting characters also appear who help Kebo Kicak, strengthening the values of togetherness and cooperation. The final part is the climax and resolution of the narrative. The conflict that occurs is not only interpreted as a conflict but also given a narrative resolution that emphasizes the moral message of the story.

b) Character Design

The character design in the Kebo Kicak game project began with a visual exploration stage through collecting references from cultural sites, especially iconography related to the characters and the story's setting. The purpose of this stage is to ensure that the character visualization still represents cultural identity, even though it undergoes a stylistic simplification process to be more friendly to child audiences. The main character, Joko Tulus, nicknamed Kebo Kicak, is depicted as a simple young man, dressed in typical green clothing and wearing a headband. The surontanu character is visualized with darker skin, wearing a typical red costume. In simple terms, the design of the Kebo Kicak and Surontanu characters represents the two main colors of Jombang Regency, namely green and red, which in Javanese is called ijo abang. This color symbol is also used to represent the color of their power when fighting in the climax scene. Other supporting characters are Kebo Kicak's elderly mother, Kebo Kicak's father, a Patih with the attributes of a Majapahit royal official, and also The teacher of Kebo Kicak, visualized as an old hermit dressed all in white. Cultural properties in the setting feature several palace ornaments, Majapahit gates, and a typical javanese village house.

Figure 6. Main and supporting characters in Kebo Kicak (Putri, 2025)

c) Storyboard

In the initial stages, storyboards were created manually in the form of black-and-white sketches to speed up the iteration process. These sketches were then selected based on visual readability and alignment with the characterizations established in the script. The final storyboard was digitized using graphic design software. The character designs were developed using a semi-cartoon approach, combining simple body proportions with typical Javanese visual elements, such as batik patterns, crown shapes, and traditional weapon attributes. The color palette was chosen by considering the psychology of color in early childhood; for example, bright colors were used for the protagonist, while darker colors with contrasting accents were used for the antagonist. After internal team discussions, the final design of eight scenes for the game was selected.

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Figure 7. Storyboard scenes (Putri, 2025)

d) Digital design

The prototype stage translated narrative logic into a structured visual communication system, where each storyboard frame was evaluated for semiotic clarity, compositional hierarchy, and cognitive load appropriate for early childhood audiences; this semiotic approach ensures that cultural signs embedded in the Kebo Kicak folktale are legible and meaningful to young viewers (Monteira et al., 2024). Color selection and palette modulation were informed by cognitive affective theories of multimedia learning and context-relevant color research, with deliberate use of hue and contrast to support attention, reduce extraneous cognitive load, and serve as retrieval cues for story elements (Meusel et al., 2024). Visual style choices favoring a softened, texture-rich illustration mode were justified through evidence that culturally resonant aesthetic cues can strengthen emotional engagement and aid meaning-making in children's visual narratives; therefore, stylistic decisions were evaluated not merely for aesthetic preference but for their semiotic and pedagogical affordances(Liang & Hangeldiyeva, 2024).

Figure 8. all pages of digital illustrations (Putri, 2025)

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Iterative refinement proceeded by assessing visual legibility, narrative pacing, and cultural fidelity against these theoretical criteria, yielding a prototype that functions as a purposeful visual pedagogy for digital-native early readers. To ensure methodological rigor, each prototype iteration was reviewed through expert walkthroughs and heuristic assessments aligned with the UEQ constructs clarity, stimulation, novelty, and efficiency establishing a traceable link between design decisions and user-experience indicators. Findings from this evaluation were then used to adjust visual density, symbolic emphasis, and story pacing before the prototype advanced to the field-testing phase.

e) Audio Editing

The audio prototype was conceptualized as a semiotic layer that mediates narrative meaning and cultural context, positioning sound not merely as a technical complement but as a pedagogical instrument that reinforces local identity within the digital storytelling experience (Harjanti et al., 2023). Within the framework of visual communication design, the integration of traditional sonic elements—such as gamelan motifs—functions as a cultural soundmark that activates collective memory and enhances children's emotional engagement with the narrative (Maulana et al., 2025).

Figure 8. voice over recording process (Putri, 2025)

The structuring of auditory hierarchy and cognitive load management serves as the conceptual foundation to ensure that verbal narration remains in the perceptual foreground, while background music and sound effects contribute affective depth without overwhelming children's information processing (Arif et al., 2022). Methodologically, each audio iteration was evaluated through formative testing that combined structured observation with UX instruments adapted for early childhood contexts, enabling empirical tracing of the relationship between audio design decisions and user responses as the basis for iterative refinement.

The evaluation process was directly aligned with the dimensions of the User Experience Questionnaire (UEQ), particularly clarity, stimulation, and emotional resonance, which are most relevant for early-childhood auditory media. Insights from UEQ scoring were triangulated with observational indicators—such as attention span, affective response, and engagement behavior—to validate whether the audio prototype effectively supported comprehension and cultural immersion for children aged 5–7.

f) Animation 2D

The animation prototype was developed using a visual approach distinct from the audiobook, employing simplified cartoon-style illustrations with clear lineart to differentiate movable components and support legibility for early readers. This stylistic variation was intentionally introduced to diversify children's visual experiences and reduce monotony, thereby maintaining engagement throughout the narrative sequence. The characters,

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environments, and motion sequences were constructed in a two-dimensional format that emphasizes clarity, symbolic representation, and consistency with early-childhood visual processing patterns. The incorporation of Javanese gamelan as background music further situates the animation within a localized cultural framework, functioning not only as an aesthetic complement but also as an auditory cue that fosters emotional stability and cultural familiarity among young audiences.

Figure 9. Animation cover (Putri, 2025)

From a visual communication design perspective, the animated prototype operates as an extended semiotic layer that enhances narrative meaning through motion, pacing, and audiovisual synchronization (Diehm et al., 2020). Lineart-based limited animation was selected to minimize extraneous detail and manage cognitive load, aligning with multimedia learning principles that emphasize perceptual prioritization and reduced visual complexity for early childhood users. The integration of culturally embedded acoustic motifs—such as gamelan patterns—functions as a cultural soundmark that activates collective memory and strengthens children's emotional connection to the storyline. This combination of visual and auditory strategies is theoretically supported by findings on multimodal storytelling, which indicate that coordinated audio-visual cues improve comprehension, recall, and narrative coherence in young learners.

The animation prototype was tested using a 3–5 minute narrative segment, reflecting recommended screen-time and media-attention durations for early-childhood digital engagement. This trial enabled researchers to assess the effectiveness of the audio-visual integration in supporting children's focus, narrative understanding, and emotional response. Within the application container, the animation is accessible through the "Nonton Kartun" submenu, serving as one of the primary story delivery modes within the digital literacy media ecosystem.

g) Coloring Game interactive

The interactive coloring game prototype was developed as a complementary component within the Kebo Kicak digital storytelling ecosystem, employing lineart-based character assets designed for simple tap-and-fill interaction. The use of clean lineart ensures high perceptual clarity for early-childhood users, enabling children to easily identify character boundaries and apply color with minimal visual ambiguity—a principle aligned with foundational theories of children's visual cognition and perceptual organization. The game provides nine color options (black, cream, brown, green, red, purple, pink, yellow, and blue), selected to balance cultural relevance, emotional accessibility, and developmental appropriateness.

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Figure 10. coloring game (Putri, 2025)

From a visual communication design perspective, the coloring activity functions as an interactive semiotic exercise in which children co-construct meaning through color selection, thereby engaging both creative expression and narrative identification. This form of low-complexity interaction is consistent with gamification frameworks that emphasize agency, sensory exploration, and intrinsic motivation in early literacy environments. Moreover, the coloring game supports fine-motor development by requiring controlled touch gestures, while simultaneously reinforcing children's familiarity with the characters from the Kebo Kicak folktale.

Within the application interface, the feature is presented through the "Character Coloring" menu, forming an accessible entry point for independent exploration. As part of the broader prototype, this module contributes to a multimodal literacy experience in which visual engagement, cultural symbolism, and motor interaction are integrated into a cohesive digital learning environment.

h) Final design Game

The final design of the Kebo Kicak digital game integrates visual, audio, and interactive components within a coherent Android-based application structure. The interface is intentionally designed to be intuitive and child-centered, featuring Javanese cultural aesthetics through consistent use of color, typography, and iconography, which function not just decoratively but as semiotic devices guiding user interaction and cultural recognition. Aligned with design communication principles, such visual coherence aims to reduce cognitive load and foster cultural identification.

The game combines three media modules interactive audiobook, 2D animation, and a coloring game accessible from a unified homepage menu. In its APK prototype, the simple click-and-play mechanism allows young users to engage with the narrative while emphasizing accessibility over complexity. The design reflects gamification strategies that support deep learning through scaffolded interactivity without overwhelming early-childhood cognitive capacities (Asi & Fauzi, 2023). Despite its simplicity, the prototype constitutes a novel digital-literacy innovation by embedding local folklore into gamified learning experiences (Putri, K. E. P., & Ardiyanto, 2024).

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ISSN 2599-0594 (print) | 2599-0543 (online)
https://doi.org/10.24114/gondang.v9i2.68699

Figure 11. Game Kebo Kicak apk (Putri, 2025)

Construction of the prototype involved deliberate spatial design of interactive elements, where audiobook, animation, and coloring modules are placed to encourage seamless transitions and sustained engagement. Each component's design underwent iterative review and refinement based on theoretical criteria and user feedback, keeping the model responsive to user needs and cultural integrity. The estimated play session time is 15–20 minutes, facilitated by teachers or parents, to encourage guided exploration and mediation of meaning. In the final development phase, all elements were integrated into the Android application, followed by usability testing and performance optimization across devices. Thus, the Kebo Kicak game functions not only as a digital literacy medium but also as a tool for cultural preservation: by combining text, illustration, interactivity, and gamelan-inspired sound, the game embodies a multimodal platform where local heritage and modern learning converge.

5. Testing

The testing phase was conducted to systematically assess whether the interactive Kebo Kicak game prototype functions as intended and is well received by the target audience, namely kindergarten-aged children. This assessment was carried out in three partner kindergartens in Jombang District—Pembina State Kindergarten, Alfi Munir Kindergarten, and Daarunnajwa Kindergarten—and included validation by expert educators associated with IGTKI Jombang District. The evaluation process consisted of technical testing (bug identification and fixes) as well as user experience testing designed to reflect characteristics specific to early childhood learners.

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Figure 12. Game User Trial (Putri, 2025)

User experience validation employed a combination of direct observation, semi-structured interviews, and visual documentation of children engaging with the interactive digital literacy game. Researchers focused observation on variables such as engagement, concentration, and satisfaction during gameplay. Additionally, expert validators—teachers and parents—completed a media questionnaire using an adapted version of the User Experience Questionnaire (UEQ) that measured dimensions of appeal, narrative clarity, learning efficiency, motivational stimulation, and innovation.

Results from the trial indicated a generally positive reception. Children expressed clear preferences: approximately 50% favored the coloring activity, while both the audiobook and animation modes received roughly 25% preference each. The coloring interaction fostered longer focus and higher enthusiasm compared to passive listening or viewing. In terms of early literacy, around 35–40% of children could read independently, while others relied on the audio narrator. Their average attention span for the audiobook and animation modes ranged between 3–7 minutes, consistent with developmental patterns of distraction yet capacity to grasp core narrative content. Moreover, over 80% of participants were able to correctly identify the main characters and retell the storyline in simple language, demonstrating comprehension and narrative recall.

Expert validation via UEQ revealed strong positive assessment across all measured dimensions, with average scores of 100% for appeal, 90% for clarity, 80% for efficiency, 90% for accuracy, 90% for stimulation, and 100% for novelty. Evaluators emphasized the effectiveness of this culturally grounded digital literacy medium, noting that it presents folklore in a manner that is engaging, relevant, and developmentally appropriate for digital-native children. Minor suggestions included adding more visual variety and a shorter story mode to accommodate children who may lose focus quickly. These findings affirm the potential of the Kebo Kicak interactive game as a creative, culturally responsive, and pedagogically meaningful innovation in early-childhood literacy.

To contextualize these results, prior studies show that the use of interactive digital games in early childhood literacy significantly enhances engagement and learning efficacy (Christianti, 2023). Meanwhile, teacher- or parent-led validation through observation and structured questionnaires offers credible and developmentally appropriate user-experience feedback (Sari, 2024).

CONCLUSIONS

The study demonstrates that developing the Kebo Kicak interactive digital literacy application, integrating audiobooks, 2D animations, and interactive coloring games, effectively operationalizes a culturally grounded approach to early childhood digital literacy. Implemented through a design thinking framework, the prototype successfully responds to the cognitive, affective, and socio-cultural needs of young learners by providing multimodal

learning stimuli embedded with local wisdom. User testing across three partner kindergartens indicated the application was positively received, with the coloring game emerging as the most engaging feature. Furthermore, teacher validation via the UEQ confirmed that the media satisfies all dimensions of user experience including appeal, clarity, efficiency, stimulation, and novelty, with consistently high scores. Overall, the findings suggest the Kebo Kicak interactive game holds substantial potential as a culture-based digital literacy medium that aligns with the learning characteristics of digital-native children. The application enhances engagement and contributes significantly to the revitalization of local folklore through meaningful, interactive, and pedagogically appropriate digital experiences.

Despite these positive findings, a key limitation of this study is its reliance on short-term user validation, which does not encompass the long-term pedagogical effectiveness or sustained impact on children's visual literacy development. Future research should thus employ longitudinal methodologies to evaluate the sustainable use and measure the quantifiable improvement in visual literacy skills among early childhood participants over an extended period. Furthermore, the findings strongly imply the need for curriculum developers and educators to integrate culturally specific, interactive digital resources into early childhood education to actively preserve local heritage in the digital era.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to all parties who have provided support in the implementation of this research, especially cultural experts, early childhood educators, as well as fellow lecturers and research assistants who contributed through input and technical assistance. This research was funded by the Directorate of Research and Community Service, Directorate General of Research and Development, Ministry of Higher Education, Science, and Technology. In accordance with the 2025 Research Contract No. SP DIPA-139.04.1.693320/2025, revision 04, dated April 30, 2025.

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