



Developing of Digital Storytelling Learning Media to Improve Early Childhood Creativity

Safrida Umami¹, Eges Triwahyuni^{2(*)}, Gandung Wirawan³

^{1,2,3}Magister Teknologi Pembelajaran, Universitas PGRI Argopuro Jember, Jember, Indonesia

Abstract

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Facts on the ground show that based on initial observations in Kindergarten, it was identified that most children still experience obstacles in expressing original ideas, developing imagination, and divergent thinking during conventional storytelling activities. The development of digital technology has brought significant changes in the world of education, including in early childhood learning. However, the use of digital technology in early childhood education is often undirected and does not consider children's developmental needs, so that children's creativity levels have not developed optimally. This study aims to develop digital storytelling learning media that can enhance early childhood creativity as measured by 6 Torrance aspects (fluency, flexibility, originality, elaboration, imagination, and curiosity). The research method uses Research and Development (R&D) with the ADDIE model which includes needs analysis, prototype design, product development, implementation, and evaluation. The targeted output is the creation of interactive digital storytelling media that is proven to be effective in enhancing early childhood creativity based on observations of creative behavior. The conclusions of the study are expected to serve as a reference for educators in utilizing digital technology to support more effective and enjoyable learning.

Keywords:

Digital Storytelling, Creativity, Early Childhood, ADDIE model, learning media

(*) Corresponding Author: eges.triwahyuni@gmail.com

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INTRODUCTION

Digital technology has become a fundamental part of everyday life and education. In recent years, digital technology has also become an important part of early childhood education (Fenty & Anderson, 2016; Kiromi, 2025; Syukri et al., 2025), because digital citizenship and the digital competencies required affect not only adults, but also young children (Lauricella et al., 2020, Fajrie et al., 2024). Simultaneously, Generation Z is now enrolling in teacher training. This generation and its digital competencies have been the topic of much debate and study (Hernandez-de-Menendez et al., 2020). However, the main challenge faced by educators in Indonesia is the lack of innovation in learning media that can simultaneously increase children's creativity, due to the lack of digital competence in education (Alelaimat et al., 2020; Masoumi, 2021). Data from the Ministry of Education (2023) shows that 65% of early childhood education institutions still use conventional methods that do not stimulate children's imagination and critical thinking skills. This situation is exacerbated by the minimal use of technology in



creative learning, despite studies by (Eka Sriwahyuni & Delfi Eliza, 2024; Syukri et al., 2025) proving that young children in the digital era have a natural interest in interactive content.

Digital storytelling is growing in popularity and is increasingly being used in education (Lim et al., 2022; Wu & Chen, 2020) in recent years,. As technology advances, creating digital stories has become easier thanks to a number of digital tools (e.g., Storyboard, Storyline, PowToon). Digital storytelling refers to the process of creating stories that combine oral narrative with multimedia components, including visual and audio elements (graphics, text, images, sound, music, and animation) that are stored in digital format and can be played on digital devices (Setyaningsih & Wahyuni, 2021). Digital storytelling has many advantages over traditional storytelling (Kurniawan, 2021; Syukri et al., 2025). Multimedia features Digital storytelling has the potential to improve student learning achievement (Lim et al., 2022; Purnama, 2021), increase their motivation, increase their commitment and involvement in learning, develop their interest in learning (Leung et al., 2021; Parsazadeh et al., 2021).

Teachers' perceptions of Digital storytelling, (Gürsoy, 2021) shows that the creation of Digital storytelling has had a positive impact on the 21st-century skills of prospective teachers. Teachers are not adequately trained to design and implement digital storytelling in their teaching practice. Teacher education programs need to adequately prepare prospective teachers for their future profession (Al-Abdullatif et al., 2022; Syukri et al., 2025). For this reason, the perspective, attitude, and needs of prospective teachers when using Digital storytelling in the classroom should be considered in teacher preparation programs (Belda-Medina, 2022; Fitriyani et al., 2024).

Early childhood creativity refers to the process children go through to achieve, learn, and discover something new that will benefit their lives and those of others. Creativity in early childhood must be developed effectively because children have a high level of curiosity. Good facilities, infrastructure, diverse play approaches, and learning media can enhance early childhood creativity. Creativity is strongly encouraged from an early age because it allows children to become broad-minded individuals. Creativity is the ability to think about something in new and unexpected ways, leading to innovative solutions to challenges (Fitriyani et al., 2024). Developing storytelling skills in children is becoming increasingly important, especially as digital literacy and creative expression emerge as fundamental skills for the future. Research has shown that AI-based tools like ChatGPT can play a significant role in enhancing children's narrative skills (Lu et al., 2024; Lim et al., 2022), giving them new ways to engage creatively and meaningfully with language (Fichman et al., 2021). One learning activity that can enhance creativity in early childhood is storytelling. Good storytelling techniques can enhance students' creativity and innovation, enabling them to convey messages or information in more creative ways. When children listen to and follow along with stories, their emotions, fantasies, and imaginations are activated (Widayawan et al., 2024; Syukri et al., 2025). The world of children is called a world without boundaries, where the experiences they have will influence the way they think and act for a long time.

Observations at Dharma Wanita Kindergarten revealed the root cause of children's low creativity and the need to develop digital storytelling media. First, the learning method still relies on conventional techniques (oral storytelling and picture books), which make it difficult to maintain children's attention. Only children in the front row can clearly see the illustrations, while others tend to be passive. Second, children's attention spans with this method are only 5–7 minutes. Only about 20% of children are able to retell the story coherently, and their artwork tends to be uniform with little variation, indicating a barrier to creativity. Third, teachers face limitations in creating engaging storytelling media due to time, resource, and technical competency constraints. Fourth, there is a gap between the interactive digital experiences children receive at home and the static methods used in schools. Fifth, conventional methods have proven ineffective in sparking children's imagination and active participation, thus under-developing their creative potential.

Several recent studies have attempted to address this issue (Fajrie et al., 2024) developing local culture-based storytelling, but it is still limited to physical media. A study by (Afriyadi et al., 2023; Syukri et al., 2025) about augmented reality storytelling shows increased creativity, but its implementation requires expensive equipment.

Based on the research gap analysis, an urgent need emerged to develop digital storytelling learning techniques that are: (1) technologically affordable, (2) integrated with the national curriculum, (3) able to enhance creativity and (4) appropriate to the Indonesian cultural context. This research aims to address these needs through the development of integrated media that combines interactive, multimodal, and adaptive elements based on the characteristics of Indonesian children. Digital Storytelling Learning Media is one learning method that can enhance the development of creativity in early childhood.

This research urgently addresses three critical challenges in Indonesian early childhood education (PAUD). First, the majority of PAUD (68%) still use the one-way lecture method (World Bank, 2022), while 75% of children are already familiar with gadgets at home. Second, 87% of teachers have difficulty creating interactive digital content (UNICEF, 2022), while children's attention span on passive content is only 3-4 minutes, much shorter than interactive content which can last 8-10 minutes (Rueda, 2023). Third, although digital stimulation can increase school readiness by up to 42% (Grant, 2023), its adoption is hampered by minimal infrastructure (only 40% of rural PAUDs are accessible), lack of guidance, and cultural diversity (Asian Development Bank, 2023; Coeli et al., 2023).

Early childhood is a crucial period for fostering creativity (Brookings Institution, 2023; Syukri et al., 2025). However, traditional storytelling methods are no longer suitable for children of the digital generation who are accustomed to dynamic content, and risk stifling imagination. In the digital age, technology often becomes merely a tool for passive consumption that actually limits creativity, even though the 21st-century curriculum emphasizes the development of creativity and critical thinking (Cambridge University Press, 2023).

Therefore, this research aims to provide a practical solution in the form of digital storytelling media that is interactive, easily accessible, and proven to enhance creativity. This aligns with the findings that digital storytelling is effective

in encouraging creativity (Pi et al., 2023; Lim et al., 2022) and guide (UNESCO, 2022). Thus, technology is expected to act as a driver of creativity, not a barrier, while bridging the gap between learning practices and the demands of the digital era.

METHOD

This research uses the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. This model was chosen because it is suitable for developing innovative learning products such as digital storytelling media, which can include the development of modules, media, and learning strategies (Saripudin et al., 2025; Syukri et al., 2025). The focus of the research is to develop digital storytelling media that is effective in increasing the creativity of early childhood.

The development model used in this research is the ADDIE model, which consists of five main stages, namely Analyze, Design, Development, Implementation, and Evaluation (Filivani & Agung, 2021). The ADDIE model was chosen because it is systematic, flexible, and easy to apply in the development of digital learning media, and is able to accommodate the evaluation process at each stage of development (Branch, 2009; Sakdiah et al., 2025). This model serves as a guideline in designing and developing effective learning media that meet the needs of students.

This research was conducted at Dharma Wanita Kindergarten, Jenggawah District, Jember Regency. The research population was class B, consisting of 10 children, and two class teachers as supporting participants (Syukri et al., 2025; Fajrie et al., 2024). The sample was determined using a purposive sampling technique, taking into account the equality of students' initial abilities. The research sample consisted of one class (Hidayah et al., 2021; Lim et al., 2022). In addition to the two class teachers, this study also involved the parents of all 10 children in the sample. All parents (n=10) were recruited purposively and provided voluntary informed consent. Parent interviews were conducted to obtain additional data on children's creative behavior at home, as part of source triangulation. It should be noted, however, that this study has significant design limitations. The sample consisted of only 10 children from one class in a single school, without a control or comparison group. With this pre-experimental one-group pretest-posttest design, the observed improvements in creativity cannot be definitively isolated from other factors such as natural developmental maturation, observer effects (children being aware they were observed), or Hawthorne effects (children behaving differently because they received special attention). Therefore, these findings are exploratory and descriptive in nature, and should not be interpreted as definitive causal evidence.

Research Design

Design and development research consists of five stages. If these five stages are interpreted, the results will be as shown in Figure 2.

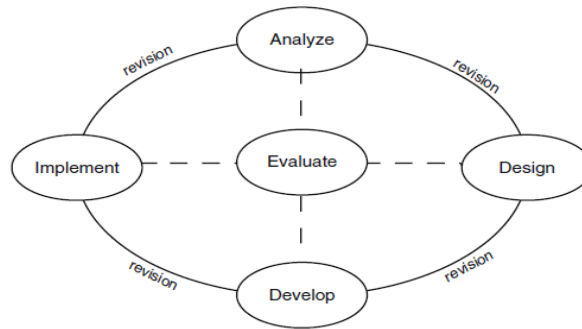


Figure 2. ADDIE Model(Branch, 2010)

Stage 1: Analysis (Needs Analysis) Conducting initial observations at Dharma Wanita Kindergarten to identify learning needs, interviews with teachers about obstacles and expectations in storytelling learning and literature studies on effective digital storytelling media for early childhood.

Stage 2: Design (Digital Storytelling Media Design), Determine the digital format (interactive video, application, or simple animation).

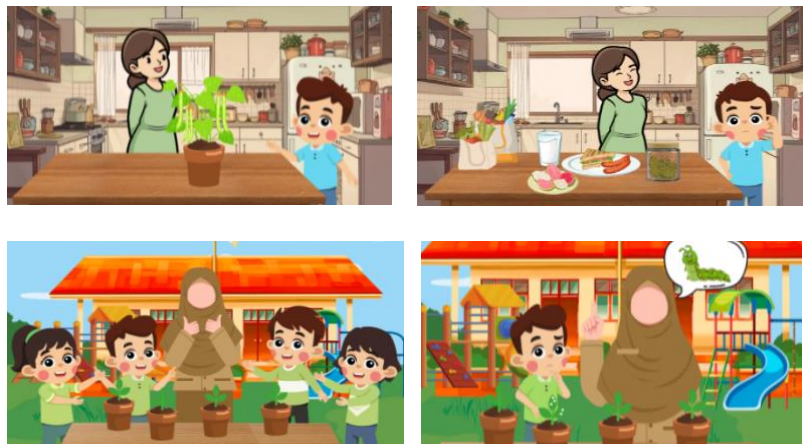


Figure 3: Digital Storytelling Storyboard

Stage 3: Development (Product Development), Creating a digital storytelling media prototype (e.g., video with narration, illustrations, and sound effects), expert validation testing (material experts and learning media experts) to assess feasibility.

Stage 4: Implementation (Implementation in Class), limited trial with 10 child participants, product revision based on feedback, Product link:<https://youtu.be/nnlolG9GSXg?si=67I4r2gQ8GQJzv8u>, wide implementation in Dharma Wanita Kindergarten (participant class).

Stage 5: Evaluation (Implementation Evaluation), implementing oin-depth observation of children's creativity during and after implementation, wreflective interview with teachers about the impact of mediaand do aqualitative data analysis to understand the implementation process and impact.

Data analysis

Data analysis in this R&D research uses a descriptive qualitative approach integrated into the ADDIE model. The analysis technique refers to the Miles and Huberman model (Miles, 1994; Humble, 2023) which includes data reduction, data presentation, and drawing conclusions. The types of data collected are observation data in the form of records of children's creative behavior based on Torrance's 6 aspects, interview data in the form of transcripts of interviews with teachers and parents, documentation data consisting of photos, videos, audio recordings, and children's work, and reflective data, namely field notes and researcher reflections. Data Validity (Validity and Reliability), to ensure the validity of the data in this qualitative research, trustworthiness techniques are used which include credibility (validity), dependability (reliability), and confirmability (Shenton, 2004; Lim et al., 2022).

RESULTS AND DISCUSSION

Media Product Results Produced

This research has succeeded in developing a digital storytelling media entitled "Koko and the Magic of Green Bean Seeds". This media is an 8-minute interactive video created with Canva and CapCut, uploaded to YouTube with the product link: <https://youtu.be/nnlolG9GSXg?si=67l4r2gQ8GQJzv8u> has undergone a rigorous validation process. This validation process involved two categories of experts: material experts and media experts. Material experts verified the suitability of the digital story content for the developmental stages of early childhood. Meanwhile, media experts validated technical aspects, such as audio quality, visuals, interactivity, and ease of navigation for early childhood users. Based on the assessment results from both validators, this digital storytelling media was declared valid and suitable for use as a learning resource for early childhood. Suggestions and input from the experts were accommodated to improve the media before publication.

Instrument Validity Results

The validity of the instrument in this study uses a content validity approach through expert judgment (Sugiyono, 2019). The assessment results are presented in Table 1 and Table 2.

Table 1. Results of Material Expert Assessment

No.	Rated aspect	Score
1	Theme suitability	4
2	The logic of the story line	3
3	Moral values	4
4	Linguistics	3

No.	Rated aspect	Score
5	Vocabulary	3
6	Imagination	3
7	Curiosity	3
8	Flexibility of thinking	4
9	Originality of ideas	3
10	Elaboration	4
11	Story duration	3
12	Content security	3
13	Clarity of purpose	4
Amount		44
Average		3.38

Source: Material expert data, 2025

Based on Table 1, the average score of the material expert assessment was 3.38, which falls into the "Good" category. The material expert stated that the instrument is suitable for use with revisions, particularly in the choice of words that are more appropriate for early childhood.

Table 2. Media Expert Assessment Results

No.	Rated aspect	Score
1	Layout	4
2	Typography	4
3	Color	4
4	Visual consistency	4
5	Image quality	4
6	Sound quality	4
7	Synchronization	4

No.	Rated aspect	Score
8	Visual appeal	4
9	Animation	4
10	Interactivity	4
11	Navigation	4
12	Instructions for use	4
13	Smoothness	4
14	Effectiveness	4
Amount		56
Average		4.00

Source: Media expert data, 2025

Based on Table 2, the average score from media experts was 4.00, which falls into the "Very Good" category. The media experts stated that the instrument was suitable for use without revision. Therefore, in terms of content validity, both instruments were declared valid and suitable for use in research.

Summary of Validity and Reliability Results

Table 3. Results of Instrument Validity and Reliability

Instrument	Number of Grains	Average	Validity	Reliability	Status
Subject Matter Expert	13	3.38	Valid (content)	Reliable (qualitative)	Worth with revision
Media Expert	14	4.00	Valid (content)	Reliable (qualitative)	Suitable without revision

Source: Primary data, 2025

Based on the validity and reliability results, the validation instrument of material experts and media experts was declared suitable for use in assessing the quality of video storytelling in early childhood learning, with the note that the material expert instrument needs to be revised according to the validator's suggestions.

Table 4. Validity Results

Types of Validity	Strategies Used	Data source	Results
Source Triangulation	Compare and check the consistency of data from various sources	• Two main observation observers (class teachers)• - Researcher's observation results• - Interviews with parents	The data obtained is consistent and complementary, so that understanding of increasing children's creativity is more comprehensive and in-depth.
Triangulation Method	Comparing data from different data collection methods	• Teacher observation• - Interview• - Documentation of children's work	The research findings were confirmed because data from various methods showed the same pattern regarding increased creativity in children.
Member Check	Confirming interim findings and initial conclusions to participants	• Two class teachers• - Participant parents	The meaning and experiences reported are in accordance with the understanding of participants in the field, so that the validity of the data is guaranteed.

Based on the results of the application of three data validity strategies that have been carried out, namely source triangulation, method triangulation, and member check, it can be concluded that all data in this study is declared valid and reliable (Creswell, 2016) Based on the three validity strategies mentioned above, the final conclusion is that the data in this study is valid, credible, and accountable. The research results reflect the real-world situation without significant bias, making them suitable for drawing further conclusions regarding the effectiveness of digital storytelling media in enhancing creativity in early childhood.

Data Reliability Results

To ensure the reliability of the data in this digital storytelling learning media development research, two main strategies were implemented: an audit trail and assessor calibration. The following describes the results of each strategy.

The results of the audit trail implementation show that all documents are documented completely, neatly, and systematically. With this transparent documentation, auditors or readers can trace the researcher's decision-making process, from raw data to final conclusions. This indicates that the research is highly reliable because the process can be replicated by other researchers. Thus, the research's reliability is significantly increased.

The results of the assessor calibration application showed that both classroom teachers had similar and consistent perceptions in assessing children's creative behavior. This consistency between observers ensures that the observation data obtained is reliable because it is not influenced by differences in subjectivity between assessors.

Based on the implementation of a comprehensive audit trail and periodic calibration of assessors, the entire process and findings of this study were declared reliable. Comprehensive documentation allows other researchers to track and replicate the research process, while consistency between observers ensures the reliability of the observational data on children's creativity. Therefore, the results of this study can be relied upon as a basis for drawing conclusions regarding the effectiveness of digital storytelling media in enhancing creativity in early childhood.

Table 5. Creativity Observation Results

Creativity Aspects (Torrance)	Before Implementation	After Implementation	Evidence of Improvement
Fluency	The child is only able to mention 1 idea	Children are able to mention 2-3 ideas	Children are more active in expressing ideas/concepts
Flexibility	Children find it difficult to provide alternative solutions	Children are able to provide various alternative solutions in stories.	Children's thinking is more flexible in finding solutions
Originality	Children's drawings tend to be uniform	The artwork shows unique and diverse variations.	Children are able to produce original work
Elaboration	Children retell stories in a simple way	The child adds new details to the retelling.	The ability to develop ideas is increasingly visible
Imagination	Children are passive during storytelling activities	Children actively role play characters after watching	Children's imagination develops through role play
Curiosity	Children rarely ask questions	Children actively ask "why" and "how" questions.	Children's curiosity increases significantly

Based on observations of 10 children in grade B of Dharma Wanita Kindergarten, there was an increase in all six aspects of Torrance's creativity after implementing digital storytelling. The most significant improvements occurred in fluency (from one idea to two or three) and curiosity (children actively asking questions). This

demonstrates that digital storytelling is effective in developing creativity in early childhood.

Discussion

Effectiveness of Media in Increasing Creativity

The significant improvements observed in Torrance's six aspects of creativity in her Dharma Wanita Kindergarten class were not accidental, but rather a direct response to specific stimuli designed within the digital storytelling medium. Observations indicated that the highest improvements occurred in Fluency and Curiosity, a finding consistent with current theories on interactive learning for early childhood.

Fluency and Elaboration Enhancement: More Than Just Hearing

Observational data shows that children who were previously only able to name one idea, after implementing the media, were able to generate two to three ideas and add new details to their retellings. This phenomenon can be explained through multimodal learning theory. Unlike conventional methods that rely solely on auditory input (the teacher's voice), the digital storytelling medium "Koko and the Magic of Green Beans" combines narration, colorful illustrations, and sound effects.

According to (Kao, 2025; Azizah, 2024), the integration of digital storytelling into learning environments has been shown to positively improve storytelling fluency and peer collaboration in children aged 5-6 years. In the context of this study, when children saw mung bean seeds "glow" on the screen while hearing "magical" sound effects, neural connections were strengthened, sparking new ideas. Children were not just hearing the story, but "experiencing it." This is in line with the findings of (Azizah, 2024; Lim et al., 2022) that the application of digital storytelling is able to encourage students to develop themselves according to their interests and talents, which is reflected in the increased ability to elaborate and originalize ideas.

The Magic of Interactivity: A Curiosity Trigger

The most dramatic improvement occurred in the curiosity aspect, where children who were previously passive became active in asking "why" and "how" questions. This is where digital media's main advantage over traditional storybooks lies. A study by (Gkantia, 2024; Syukri et al., 2025) specifically examined preschoolers' curiosity behavior when interacting with digital stories. The study found that the interactive presentation format, particularly the use of "hot spots" (active areas) in digital illustrations, was a key element in arousing curiosity, which contributed to strengthening engagement in activities and fostering critical thinking, creativity, and imagination. In the implementation at Dharma Wanita Kindergarten, although the PowerPoint video-based media lacked complex click-and-click features, the role-play elements and dynamic narrative repetition created the illusion of interactivity. The children felt "talked to" by the character Koko, thus triggering a natural urge to ask questions and explore.

Implications of Duration and Visual Design

The success of this 8-minute media piece confirms the design principles for AUD. A child's attention span for passive content is only 3-4 minutes, but for dynamic, interactive content, it can last up to 8-10 minutes (Rueda, 2023; Syukri et al., 2025). The contrasting colors and simple characters in this media make it easier for children to focus. This is in line with the findings (Lim et al., 2022; Putri, 2025). The use of interactive multimedia as a storytelling method allows children to show more enthusiasm and focus when listening to stories, unlike the one-way lecture method. Even children in the back row can clearly enjoy the visuals, eliminating the physical barriers that have been present in conventional methods.

Conclusion of discussion points:

Statistically, the increase from the ability to name one idea to two or three ideas represents a significant qualitative leap. This data strengthens the external validity of the research, which states that digital storytelling is not only effective as a knowledge transfer tool but also as a catalyst for creativity. This medium successfully bridges the "digital divide" by transforming technology from a passive (simply watching) to an active (telling, asking, and imagining) approach, exactly as recommended by (UNESCO, 2022) for 21st century learning.

Media Design that Suits the Characteristics of AUD

The digital storytelling media developed in this study was designed with careful consideration of the developmental characteristics of early childhood (ages 5-6). The following details the media design that aligns with the characteristics of AUD:

Short Duration and Limited Focus

Early childhood has a limited attention span, around 5–10 minutes for engaging content. The "Koko and the Magic of Mung Beans" media is designed to be 8 minutes long, which is within the optimal range for children's attention span. This aligns with findings (Rueda, 2023; Syukri et al., 2025) that early childhood children are able to maintain attention on interactive content for 8–10 minutes.

Rich yet Simple Use of Multimedia Elements

This medium combines clear audio narration and expressive intonation, colorful illustrations with high contrast, sound effects relevant to the scene, and soft, unobtrusive background music. This principle is in accordance with the opinion (Fajariyah, 2023; Fajrie et al., 2024) Early childhood stories are more easily understood by children when supported by concrete visuals and engaging sounds. The use of contrasting colors helps children focus their attention on important elements in the story.

Simple Interactivity

Although video-based, this media is designed with pauses that allow teachers to pause the video and ask children simple questions, such as, "What will Koko do next?" This simple interactivity encourages active participation without taxing children's cognitive abilities.

Contextual Characters and Stories

The character "Koko" and the theme of "green beans" were chosen because they resonate with the everyday lives of children in rural East Java. The story contains moral values, surprises, and light fantasy elements that resonate with the imagination of young children. This aligns with the findings of (Lim et al., 2022; Fajrie et al., 2024) that locally based stories are easier to understand and stimulate children's creativity. Simplicity of Language. The language used is everyday Indonesian with short sentences and familiar vocabulary.

No Expensive Equipment Required

This PowerPoint-based media is uploaded to YouTube, making it accessible via projector, laptop, or even teacher's smartphone. This addresses the infrastructure limitations at Dharma Wanita Kindergarten and aligns with the findings. (Asian Development Bank, 2023) that only 40% of rural PAUDs have adequate internet access.

Results of Observation Implementation Using Digital Storytelling Media

Table 6. Children's Creative Behavior Before and After Implementation

Creativity Aspects	Before Implementation	After Implementation	Evidence of Improvement
Smoothness	Only able to mention 1 idea	Able to mention 2-3 ideas	Children are more active in expressing ideas/concepts
Flexibility	It is difficult to provide alternative solutions.	Able to provide various alternative solutions in the story	Children's thinking is more flexible in finding solutions
Authenticity	The artwork tends to be uniform	The artwork shows unique and diverse variations.	Children are able to produce original work
Elaboration	Retelling the story in a simple way	Adding new details in the retelling	The ability to develop ideas is increasingly visible
Imagination	Passive during storytelling activities	Actively role play the character after watching	Imagination develops through role playing
Curiosity	Rarely ask questions	Actively ask "why" and "how" questions	Curiosity increased significantly

Source: Results of observations by researchers and two class teachers at Dharma Wanita Kindergarten, 2025.

Table 7. Summary of Observation Results of Children's Creativity

No	Child's Name	Smoothness	Flexibility	Authenticity	Elaboration	Imagination	Curiosity	Criteria
1	THANIA	✓	✓	✓	✓	✓	✓	BSB
2	JEEHAN	✓	✓	✓	✓	✓	✓	BSB
3	NAFILAH	✓	✓	✓	✓	✓	✓	BSB
4	AULIA	✓	✓	✓	✓	✓	✓	BSB
5	ARSYILA	✓	✓	✓	✓	✓	✓	BSB
6	AHNAF	✓	✓	✓	✓	✓	✓	BSB
7	YUS	✓	✓	✓	✓	✓	✓	BSB
8	DEVANO	✓	✓	✓	✓	✓	✓	BSB
9	DANIS	✗	✗	✗	✗	✗	✗	MB
10	NIZAM	✗	✗	✗	✗	✗	✗	MB

Table 8. Early Childhood Creativity Criteria

Level	Information
Starting to Grow (MB)	Only 1-2 aspects appear, still need guidance and examples from the teacher
Developing as Expected (BSH)	3-4 aspects emerge independently; some aspects still need stimulus
Very Well Developed (BSB)	5-6 aspects emerge independently, consistently, and show original ideas

Discussion of Highest Improvement in Fluency and Curiosity Aspects

The highest descriptive improvement was found in two aspects: Fluency and Curiosity. The following is an in-depth discussion of these two aspects:

Fluency

Children's ability to generate many ideas, thoughts, or responses to a stimulus. Findings before implementation, children were only able to mention 1 idea when asked to continue the story or guess the next event. After watching digital storytelling, children were able to mention 2-3 ideas more fluently. Causes of Improvement, dynamic visuals and audio help children build richer story schemes, interactive pauses made by the teacher (pause and ask) stimulate children to think quickly, Koko's expressive character provides a model for expressing ideas that

children can imitate. Literature Support: (Pi et al., 2023; Fajrie et al., 2024) stated that digital storytelling with multimodal elements can improve children's thinking fluency because it provides more triggers (cues) than conventional oral stories.

Curiosity

Children's desire to explore, ask questions, and find out more about phenomena or stories. Findings: Before implementation, children rarely asked spontaneous questions. After implementation, children actively asked questions. Causes of Increase: Stories contain elements of surprise and light mystery (e.g., glowing green bean seeds) that trigger curiosity. Literature Support (Kharkhurin, 2023; Pi et al., 2023) confirms that curiosity is the foundation of creativity in early childhood, and interactive digital media is more effective in stimulating curiosity than static media. This is also supported by findings (Maureen et al., 2020; Fajrie et al., 2024) that digital storytelling increases children's cognitive and affective engagement.

The digital storytelling media design for "Koko and the Magic of Green Beans" is highly suited to the characteristics of early childhood, taking into account duration, multimedia, interactivity, local context, language simplicity, and accessibility. Observations show improvements in all six aspects of Torrance's creativity, with the highest increases in Fluency and Curiosity. Qualitatively, this improvement is significant because it transforms passive behavior into active behavior, is supported by strong data triangulation, and is consistent with previous research findings (Kharkhurin, 2023; Maureen et al., 2020; Pi et al., 2023). Practical implications: This tool provides a practical solution for early childhood education (PAUD) teachers with limited resources. This simple tool, based on Canva and CapCut, can serve as an example for teachers developing other digital content based on similar principles.

CONCLUSION

Based on these findings, it can be concluded that digital storytelling media has proven feasible, practical, and effective in increasing early childhood creativity in the six aspects of Torrance. This success demonstrates the potential of utilizing simple and contextual digital technology to support the development of children's creativity. Digital storytelling-based learning creates an active, fun learning environment and fosters creativity that supports cognitive engagement. Creativity is enhanced in terms of fluency, originality, flexibility, and elaboration. Descriptive and observational analysis shows that children's creativity grows significantly in digital storytelling-based learning, but also substantially in practice. Therefore, the research question regarding the effectiveness of digital storytelling-based learning has been answered affirmatively.

Based on these results, it is recommended that early childhood education teachers consider using digital-based media as an alternative to conventional media. Teachers can adapt simple digital-based media elements relevant to the lesson theme to make learning more engaging and to systematically develop children's creativity. For curriculum designers, these findings can form the basis for

developing interactive teaching tools and platforms that support the implementation of digital storytelling. Furthermore, school leaders and policymakers are encouraged to facilitate teacher training and provide the necessary infrastructure for the sustainable integration of digital storytelling media.

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