

Interactive Online Storytelling Using AR Technology for the Familia Kreativa Community

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Submitted: December 07th 2024; Revised: February 16th 2026; Accepted: February 25th 2026

Keywords:

Children
Interactive
Online
Storytelling
Virtual literacy

Abstract Community service initiatives involving interactive online storytelling using Augmented Reality (AR) technology aim to provide a novel educational experience for children aged 6 to 9, particularly members of the Familia Kreativa community. Storytelling is a powerful tool for imparting moral values, fostering creativity, and promoting reading habits among children. However, contemporary delivery methods are necessary to meet the needs of today's generation. AR technology was selected for its capacity to deliver interactive and immersive threedimensional visual elements, which enhance participant engagement. This program comprised four phases: preparation, development of storytelling materials and modules, implementation of two online storytelling sessions, and evaluation. During the sessions, participants used smart devices to scan worksheets, which revealed AR features and objects. This activity involved direct interaction between participants and the storyteller through questions, answers, and visual exploration. The results indicate that AR technology improves participants' focus, interaction, and comprehension of the narratives. Children demonstrated better recall of story elements, while parents noted that this approach effectively reduced boredom and enhanced the learning experience. AR technology shows substantial potential for fostering creative learning and visual literacy in early childhood. Its use in this initiative aligns with the goals of quality education under SDG 4 and creates opportunities for technical innovation in the broader context of early childhood education development.

1. INTRODUCTION

Stories have long been recognized as an effective medium for conveying moral messages, instilling cultural values, and imparting life lessons to children. They provide children with examples that help them distinguish between positive and negative behaviors (Shofwan., 2022).

As fictional narratives that often incorporate imaginative elements, entertainment, and moral teachings, stories can be communicated both orally and in written form. These narratives play a crucial role in children's cognitive, emotional, and social development. In particular, storytelling enhances children's interest in reading (Pattiasina et al., 2022) and supports the development of their imagination (Mayar et al., 2022). Through fantastical

narratives, children can conceptualize diverse worlds, encounter unique characters, and engage with scenarios that are not part of their everyday experiences. This process stimulates creativity and nurtures abstract thinking skills. Furthermore, storytelling serves as an important mechanism for instilling moral and ethical values, thereby contributing to children's character development (Apriliyani et al., 2023).

One community that actively organizes public storytelling activities is Familia Kreativa (FK), a creative family community based in Bandung Regency, with approximately 300 online participants who join WhatsApp groups across Indonesia. This community frequently

ISSN 2460-9447 (print), ISSN 2541-5883 (online)

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organizes a range of activities for children aged 3 to 9 years, with parental involvement, delivered both online and on-site. On-site events typically attract around 30 active participants, primarily from Bandung and neighboring regions. The activities encompass a range of options, including drawing workshops, crafting, scientific experiments, storytelling, play, outings, and other initiatives designed to enhance children's developmental potential in accordance with their age and individual characteristics (Khasanah et al., 2012).

Although these activities have been engaging and beneficial, the community acknowledges the need for additional formats that can further develop children's creativity, knowledge, and experiences. This need reflects an intention to provide child participants with new, broader, and more relevant insights that can serve as a foundation for future learning. FK's activities have been diversified to reach participants from various regions in Indonesia while also building an active and creative family community.

A community service initiative organized by the Visual Communication Design study program at the Faculty of Creative Industries (DKV-FIK) aims to foster a creative generation through an interactive online storytelling activity that uses Augmented Reality (AR) technology for Familia Kreativa community members aged 6 to 9 years. AR technology can display virtual objects in two-dimensional and three-dimensional formats in real time (Hidayat et al., 2021), and it can deliver context-aware information about users' immediate environment by integrating immersive elements through devices such as desktops, tablets, smart glasses, and smartphones (Jalilvand & Ghasemi., 2024). This technology enables the development of visual objects that reinforce the messages being conveyed.

This interactive online storytelling activity applies AR technology to address the need for diverse activities that enhance children's learning experiences and expand their perspectives, particularly in visual literacy, storytelling, and creativity in art and design. This approach aligns with studies indicating that early literacy experiences help children develop critical thinking and analytical skills and enrich their vocabulary (Kurnianingsih et al., 2019). Children aged 6 to 9 years are also completing key developmental tasks, including developing skills needed for daily life (Jannah., 2025). The integration of visual literacy, storytelling, and creativity through interactive online storytelling using AR technology is expected to foster and strengthen children's artistic potential within the community. This training is intended to broaden children's perspectives and support their emotional development, thereby increasing motivation in their creative learning processes.

The AR-based interactive online storytelling activity also aims to measure the influence of AR on participant interaction, or engagement, during the storytelling sessions. Accordingly, the activity is designed with an engaging, enjoyable, and sustainable presentation format. For children, the interactive storytelling experience is expected to help nurture a future generation of critical and creative

thinkers.

Interactive online storytelling using AR technology offers a novel experience because the storyteller narrates a story while incorporating interactive elements that can be accessed through a video conferencing application. This process enables images or videos to appear more lifelike and provides a more engaging visual experience for participants. Interaction is facilitated through digital activity sheets integrated with AR technology. These activity sheets contain codes that can be scanned using participants' device cameras to display additional images or videos related to the narrative. Participants can also interact with these images or videos, for example by commenting or answering questions posed by the storyteller.

This community service initiative supports SDG Goal 4, quality education. Through interactive online storytelling using AR technology, faculty members and students from Telkom University will share knowledge, skills, and techniques in visual arts. It is expected that the process facilitated by this community service activity will encourage participants to be more motivated to pursue and acquire knowledge in higher education, thereby contributing to improved educational quality.

Previous research on AR has reported a variety of applications. Some studies focus on AR in educational systems (Asif et al., 2020). This work emphasizes education using smart technology for children with special needs, such as autism, and argues that children with autism have the same right to receive formal education, despite having special needs, with this condition affecting 1 in 160 children globally. Children with autism may face difficulties ranging from following the curriculum in inclusive classrooms, due to variability in IQ and autism levels, to unpredictable behaviors. The study further explores the use of more advanced audio-visual tools to capture attention. The method combines AR and machine learning, with language settings in English and Arabic. The system uses three-dimensional Kinect cameras to improve visual recognition for children with autism. The authors report that the system helps children learn more efficiently and interactively by projecting real-world objects based on children's drawings in a sandbox, supported by emotion-detection algorithms.

Another study highlights an AR-based interactive game to support children's learning development. This research presents an AR-based game, ChildAR. Although the ChildAR concept is not described in detail, the study appears to address the importance of time management for children. In addition, the tool is designed to be interactive, enabling children to learn to identify everyday problems and develop technical solutions (Hassan et al., 2022)

2. METHOD

The implementation of this community service program consisted of four main phases. The first phase was preparation, which included interviews conducted through interpersonal communication in the form of question-and-answer sessions with the partner (Hidayat et al., 2021).

An initial survey was also conducted concurrently with the interview process. In this phase, the Familia Kreativa community was surveyed to explore potential collaboration, identify the community's needs, and ensure that the designed program aligned with the target requirements. After alignment was confirmed, the implementation team drafted the program proposal as a planning document. This proposal process was followed by obtaining the necessary permits and completing administrative preparations.

The second phase involved the development of storytelling materials and modules. Module development was essential because modules function as learning media that present information, stimulate discussion, and serve as tools for exercises and assessments (Rejeki et al., 2021). This process involved collaboration between faculty members and students. In this phase, the narrative content, visual elements, and AR technology integration were designed using the Assemblr application and were subjected to a trial run. This step was conducted to ensure that the storytelling activity was engaging, interactive, and aligned with the program's objectives.

The third phase was execution of the main activity, which consisted of interactive storytelling sessions conducted online via the Zoom platform. The activity was delivered in two sessions held on April 8, 2023, and April 16, 2023, with a total of 20 community members participating in each session.

The final phase was evaluation, which took place after the activity concluded. The evaluation aimed to assess the program's achievements, identify challenges encountered, and gather feedback from participants. Based on the evaluation results, the implementation team prepared recommendations for follow-up programs. All processes and findings during the program's implementation were documented in the final report as evidence and as a reference for future activities.

3. RESULT AND DISCUSSION

3.1 Implementation results

The community service activity, delivered as an interactive online storytelling session using AR technology, was conducted in two meetings, with each session lasting 60 minutes. Each session comprised an opening and introduction, storytelling while interacting with worksheets to display AR content, exploration and question-and-answer activities, and a closing. In each session, approximately 17 to 20 participants attended, as shown in Figure 1. Each participant was accompanied by a parent who had prepared the worksheet to be scanned to trigger the AR visual display.

The story presented during this activity was an Islamic religious narrative because the event coincided with the holy month of Ramadan. This timing also enabled participants and accompanying parents to use the session as an activity while waiting for iftar (breaking the fast).

The storyteller initiated the session by asking participants whether they were ready to engage in the

activity and by inviting them to share their names and places of residence. The storytelling continued for approximately 15 minutes and focused on the theme of the wonders of the solar system's creation. The session then transitioned to interactive participation, in which participants were encouraged to use their smartphones to scan images on the worksheets to reveal AR objects. Participants completed this task smoothly with parental assistance, enabling each child to view the AR objects, including planets and astronauts, as shown in Figure 2. While exploring the AR objects, participants were encouraged to ask questions and share their thoughts about the emerging AR features, which were a first-time experience for some. During the session, several children expressed their impressions in simple terms and took turns speaking. The activity concluded with a moral message and a group photo.

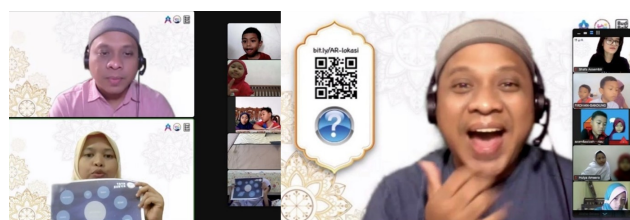


Figure 1 . Interactive online storytelling session on Zoom

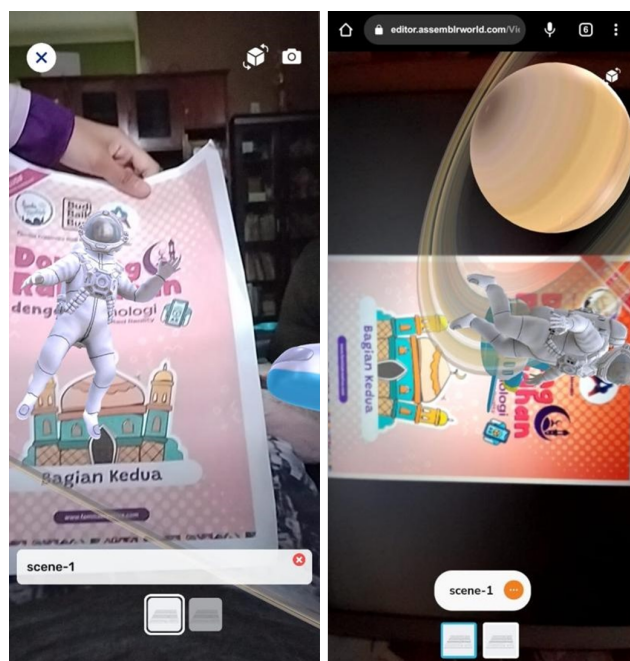


Figure 2 . Results of AR technology implementation

Based on direct observations and follow-up interviews with parents and participants after the event, responses indicated that the use of AR technology in the interactive storytelling session enhanced interaction and participant engagement. Through direct feedback evaluation, participants responded enthusiastically and showed strong interest in the story presented with AR elements. They were eager to share their experiences and express their feelings. Several parents who accompanied the participants also shared their perspectives, noting that the children were more

focused while listening and displayed greater interest in the story content, particularly when the AR objects appeared, as shown in Figure 2.

3.2 Discussion

The interactive online storytelling activity was well received by participating children. In addition to being entertaining and inspiring, the activity provided a novel experience by incorporating AR technology. The activity emphasized the use and implementation of AR as a tool for online, interactive storytelling. The objective was to evaluate the influence of AR technology on participant interaction and engagement during the storytelling session. Based on the outcomes, participants demonstrated improved understanding of the story content. In addition to listening to the storyteller, participants could directly observe objects described in the story, such as planets in the solar system and astronauts. They recalled story details more effectively and showed stronger comprehension of the presented content, as reflected in comprehension checks conducted through question-and-answer sessions after the storytelling.

Parents who accompanied participants also provided positive feedback regarding the use of AR technology in the storytelling session. They observed that the children appeared more interested in engaging with the interactive activities during the session. Parents further noted that AR technology seemed to reduce children's boredom, and they suggested that if applied to learning activities, it could similarly help alleviate boredom during remote learning.

Overall, the activity demonstrated that AR technology can support an interactive and immersive storytelling experience. The three-dimensional visualizations and animations embedded in the stories helped children understand and engage with the narrative. AR also encouraged active participation because children could directly interact with story elements, including scanning objects or characters using their devices. The results of this activity provide a foundation for further development of similar initiatives that incorporate other innovative technologies in early childhood education.

4. CONCLUSION

The community service program, delivered as interactive online storytelling using AR technology, successfully provided an innovative and engaging experience for child participants. Through appealing three-dimensional visualizations and animated elements, participants were not only entertained but also able to comprehend the stories more effectively. The use of AR technology was effective in enhancing participant engagement, strengthening participants' recall of the material, and fostering deeper understanding of the story content.

Parents also provided positive feedback, noting that AR technology could help improve children's focus and reduce boredom, both in storytelling activities and in remote learning contexts. Evaluation results indicated that this program had a positive influence on children's visual

literacy, creativity, and interaction skills.

This activity aligns with the goals of Sustainable Development Goal 4 on quality education and creates opportunities to develop similar programs that incorporate other innovative technologies. The experience also supports broader application of AR technology in early childhood education by contributing to the development of a generation that is critical, creative, and well prepared to face future challenges.

ACKNOWLEDGMENT

We thank the Directorate of Research and Community Service, Telkom University, for supporting the implementation of this program and the preparation of this article. We also thank the Familia Kreativa community for its collaboration as the program partner.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this article. The funding body and partner community had no role in the study design, data collection, analysis, interpretation, or the decision to publish the results.

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