

# Nusantara Folklore Reimagined: AR as a Tool for Bilingual Communication Development in Generation Alpha

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## Abstract

Generation Alpha, born and raised in the digital era, requires innovative solutions to become bilingual communicators. This paper aims to analyze the needs of Generation Alpha for Augmented Reality (AR)-based learning media in improving bilingual communication skills through Indonesian folklore or Nusantara folklore. Applying a quantitative descriptive approach and delivering questionnaires to 4th-6th graders and their teachers, the findings reveal high levels of interest in using AR as a method of stimulating learning and promoting language acquisition. Additionally, AR-based learning media can provide an immersive and contextual learning environment, thereby supporting the holistic development of bilingual communication skills. Based on these findings, this research recommends the development of AR-based learning media specifically designed to meet the needs of Generation Alpha, considering aspects of interactivity, personalization, and cultural context. Hopefully, the research implications can serve as a reference for developers of learning media and educators in creating educational solutions that are relevant to the digital generation's characteristics and needs.

## CCS Concepts

• Applied computing; • Education; • Interactive learning environments;

## Keywords

Augmented reality, Bilingual skills, Generation alpha, Nusantara folklore

## ACM Reference Format:

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## 1 INTRODUCTION

Generation Alpha, born from 2010 to 2025, is a generation that grew up amidst the rapid development of digital technology [1]. They have been exposed to technological devices from an early age; hence, they have unique characteristics in terms of learning styles and interactions with information [2]. This generation tends to be more interested in visual, interactive, and technology-based learning, thus demanding an innovative and relevant educational approach to the context of the times [3]. Nowadays, one of the main challenges in education is preparing Generation Alpha with 21<sup>st</sup>-century skills, including bilingual communication skills, which are crucial for navigating the era of globalization.

In today's globalized world, communication—particularly bilingual communication—is among the essential 21st-century skills, enabling individuals to function as effective global citizens in multicultural societies. In Indonesia, equipping Generation Alpha with strong bilingual (Indonesian–English) communication abilities is critical [4]. Despite the fact that they are bilingual, many Indonesians continue to cope with various struggles, such as linguistic differences remain a source of confusion [5], English is no longer mandatory in primary education under current curricula [6], and exposure to English on a daily basis is minimal [7]. These insights are consistent with systematic reviews revealing that insufficient exposure and language-specific cognitive barriers hinder English proficiency [8, 9]. Building on the critical importance of bilingual communication, particularly English–Indonesian skills, this study is highlighting the need in integrating English within students' learning through developing bilingual books of folklore.

In the current Indonesian curriculum, folklore is introduced in Grades 4–6, yet these culturally rich narratives often fail to capture students' interest [10]. This is unfortunate considering that Indonesian diverse Archipelago, from Sumatra to Papua, has a very rich repertoire of folklore, which have enriched much by the regional identities of the Nusantara [11]. Folklore is integral to cultural heritage, embodying moral, social, and spiritual values while serving as a foundational tool for early literacy development, encompassing both narrative structure and vocabulary across local and national contexts [12]. Integration of bilingual (Indonesian–English) lessons into these stories will inject new energy into interest because it will make learning language more interesting and contextually relevant. Furthermore, folklore enables holistic development of language skills according to the principles of communicative language teaching that offer natural contexts connected to the life experiences

of the students and their cultural common senses of knowledge, thereby promoting cultural awareness as well as enhancing language fluency [13].

According to Hossain [7], language learning that is culturally charged can strengthen students' identities while increasing their motivation to learn. Students not only learn language as a system but also understand the social and cultural functions of language through stories that have been part of society. Folklores are also relevant in strengthening bilingual literacy [14]. To introduce a second language (for instance, English), folklore can be translated or presented in a bilingual format to help students understand the equivalent words and sentence structures in two languages contextually [15]. This process involves emotions and cognition simultaneously because students are culturally and affectively connected to the content of the story. However, the use of folklore in language education is still limited to print and conventional media. Meanwhile, teaching bilingual communication skills often faces obstacles, such as the lack of engaging learning media that aligns with Generation Alpha's interests [16]. Conventional learning media are considered less effective in motivating and engaging students optimally; hence, more creative and technology-based solutions are needed [17]. Second-language teaching methods that do not align with the characteristics of digital-native learning tend to cause boredom and disconnection from the learning context [18]. In contrast, Generation Alpha needs language learning that is exploration-based, participatory, and fun—such as through gamification, animation, and interactive simulations [19]. On the other hand, there is great potential in applying multimodal and experience-based approaches to address these challenges.

In the digital era, folklore needs to be adapted into a more interactive format to suit the learning style of the digital generation, such as Generation Alpha [20]. A study by Höfrová, Balidemaj & Small [21] revealed that Generation Alpha tends to be less interested in conventional folklore because it is considered irrelevant to their digital lifestyle. It emphasizes the need to recontextualize traditional stories through a medium that aligns with the preferences of the digital generation. Therefore, reimagining folklore using technology such as Augmented Reality (AR) potentially enriches the contextual, visual, and meaningful language learning experience. Thus, Nusantara folklore is not only a cultural heritage but also a rich pedagogical source for developing language skills, especially in the context of bilingual and technology-based learning.

Several studies have demonstrated that the use of immersive technology, such as Augmented Reality (AR), can enhance learning motivation, improve vocabulary comprehension, and facilitate second language acquisition in a contextually and naturally engaging manner [22]. Thus, the use of folklore-based media, which children have been familiar with since an early age, combined with visual technology such as AR, can be an innovative solution for teaching bilingualism to Generation Alpha. This approach not only provides space for children to learn language actively and visually but also emphasizes deep emotional engagement through familiar narratives. Therefore, understanding the unique characteristics of Generation Alpha needs to be used as a basis for designing bilingual learning strategies that are not only cognitive but also affective and social.

Augmented Reality (AR) has emerged as one of the potential technologies that can be utilized in education. AR combines digital elements with real environments, creating immersive and interactive learning experiences [23]. Several studies have shown that AR can increase students' motivation, engagement, and understanding of the learning process [24]. However, the use of AR in the context of developing bilingual communication skills, especially for Generation Alpha, has not been widely explored. Based on this background, this research aims to analyze the needs of Generation Alpha for AR-based learning media in developing bilingual communication skills. Through a needs analysis, the research attempts to provide an in-depth understanding of the preferences, challenges, and expectations of Generation Alpha and teachers regarding the use of AR as a learning medium. The research results are expected to serve as the basis for developing innovative learning media that align with the characteristics and needs of the digital generation.

## 2 METHODS

This research is a needs analysis study employing a quantitative descriptive approach to identify the educational, technological, and cultural needs in the development of Nusantara folklore books utilizing Augmented Reality (AR). The research participants consisted of 100 students (Grade 4-6) and 50 elementary school teachers. The selection of participants aims to ensure a representative sample that aligns with the research focus. Data collection was carried out through a structured questionnaire designed to explore teachers' and students' perceptions regarding bilingual learning needs, technological readiness, and the relevance of folklore as an educational medium. The quantitative data obtained were then analyzed using descriptive statistics [25], including percentage and mean calculations, to identify dominant patterns and gaps in the three aspects studied.

## 3 RESULTS AND DISCUSSION

### Generation Alpha and the Challenges of Bilingual Learning

Based on the data collected, Figure 1 outlines student responses regarding their preferences, providing a clear overview of how modern learning styles are influenced by the adaptation of digital technology and the need for a culturally relevant approach.

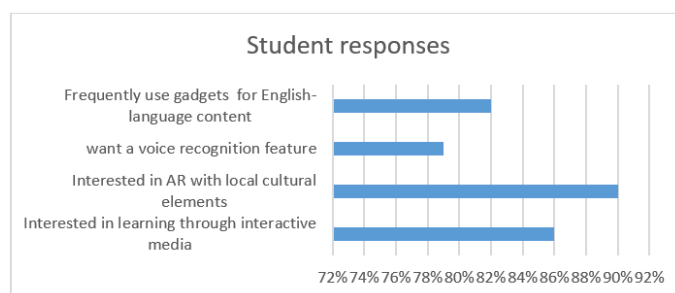


Figure 1: Students' Responses

As many as 86% of students expressed a high interest in interactive learning media. It aligns with the characteristics of Generation Alpha, who are digital natives familiar with technology

from an early age [26]. Interactive media, such as simulations or educational games, create active participation, increase motivation, and strengthen information retention [27]. In the context of bilingual learning, interactivity can be designed to train bilingual skills through dialogue, conversation scenarios, or adaptive quizzes [28]. In addition, it aligns with Vygotsky's constructivist theory, which emphasizes the role of independent exploration and scaffolding in the learning process. Interactive media facilitates the zone of proximal development (ZPD), where students can develop understanding through interaction with challenging but structured content. Research by Hartt, Hosseini & Mostafapour [29] in *Computers & Education* reinforced that game-based methods increased learning motivation and information retention compared to conventional approaches. Thus, interactive media was not only in line with Generation Alpha's characteristics as digital natives but also encouraged student-centered learning.

Furthermore, approximately 90% of students are interested in AR that integrates local cultural elements. This preference reflects the need for media that is not only innovative but also culturally relevant. AR can present interactive visualizations (e.g., traditional dances, folklore, or historical sites) that enrich students' understanding of their own culture [30]. The integration of local culture in bilingual content (e.g., stories in English and mother tongue) can facilitate contextual language learning while preserving cultural identity [31]. The integration of local culture in AR can create emotional and cognitive relevance, enabling students not only to understand the material but also to feel connected to their identity. Research by Harnchanchai & Saeheaw [32] demonstrated that the use of culture-based AR increased student engagement and enhanced conceptual understanding, as the content presented was more easily mapped to their prior knowledge. Pérez-López & Contero's research [33] showed that AR-based learning with cultural context increased information retention compared to traditional text methods. Bilingual integration (English and mother tongue) in AR content is also relevant to the Leung & Valdés's study [34] which asserts that contextualized language learning—linked to culture and daily life—strengthens multilingual competence. In addition, Maragos, Gros, Katsamanis & Papandreou [35] explains that the combination of text, audio, visuals, and interactivity in AR maximizes the brain's information processing. Furthermore, Takacs, Swart, & Bus research [36] demonstrates that interactive multimedia, such as AR, enhances the understanding of abstract concepts compared to static media.

Based on student responses, the demand for speech recognition features attained 79%, emphasizing the importance of direct practice in language learning. This technology enables students to practice pronunciation and conversation in the target language with instant feedback, which is essential for refining their speaking skills. In a bilingual context, this feature can be developed to recognize two languages so that students are accustomed to code-switching naturally [37]. In addition, speech recognition supports the personalization of learning, such as adjusting the level of difficulty based on the user's ability. Ngo, Chen, & Lai's study [38] revealed that the integration of this feature accelerated the improvement of students' pronunciation accuracy compared to traditional methods. This mechanism not only corrects phonetic errors in real-time but also builds user confidence through measurable, repetitive practice.

In the context of bilingual learning, the development of a speech recognition system capable of processing two languages opens up unique pedagogical opportunities. Research by Betts, Binsted & Jorgensen [39] proved that speech recognition-based platforms can analyze user-specific error patterns and then automatically adjust the difficulty level and type of exercises. This adaptability not only maximizes the efficiency of learning time but also serves as dynamic scaffolding that responds to individual needs.

Ultimately, data revealed that 82% of students often used gadgets to access English-language content, such as videos, games, or educational applications. This habit showed that gadget-based learning media has become part of their routine. The development of AR that combines English content with an intuitive interface can capitalize on this habit to increase foreign language exposure [40]. For instance, AR can display bilingual labels on virtual objects or provide bilingual narratives in interactive simulations. In a bilingual context, Fan, Antle & Warren [41] revealed that AR simulations with bilingual narratives increased conceptual understanding, as it reduced cognitive load through immersive experiences. Wen's research [42] acknowledged that this technology could increase language learning engagement. AR enhances language learning engagement by transforming passive lessons into dynamic real-world interactions; this correlation was directly quantified through elevated student participation levels and extended time-on-task metrics in AR-enhanced classrooms.

### Integration of AR and Folklore for Bilingual Communication Development

Based on the collected teacher response data, several key points can be concluded in Figure 2

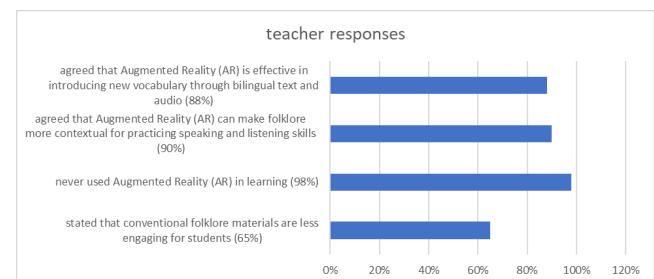


Figure 2: Teachers' Responses

Approximately 65% of teachers stated that conventional folklore materials were less interesting to students. This disinterest is a warning that cultural stories are at risk of being forgotten if they are not adapted into formats that are relevant to the current context. It was due to the habits of Generation Alpha, who grew up in a digital environment where interactive media is more dominant than static text or oral stories. This finding aligns with Li's research [43] which emphasizes the importance of multimodal learning tools in maintaining student interest in the digital era. This finding was in line with Efendi, Sujarwati & Harahap [44] research on Digital Storytelling and Multimodal Literacy, which emphasized that Generation Alpha's interest depended on the integration of multimodality (visual-audio-kinesthetic). Conventional folklore that relies on teacher monologues or passive reading violates this principle, creating a cognitive gap that reduces engagement. Lack of

student interest is not only a pedagogical problem but also a serious threat to the preservation of intangible cultural heritage. UNESCO (2003) explicitly includes folklore in the list of cultural assets that are vulnerable to extinction without adaptation to contemporary media [45]. The threat of folklore extinction due to a lack of student interest becomes a cultural emergency that requires an immediate technological pedagogical response, considering that oral traditions are perishable and depend on intergenerational regeneration. Digital transformation—such as adaptation to Augmented Reality (AR) or metaverse experiences—is not a replacement for oral tradition but rather an evolutionary bridge that performs three critical functions: (1) preservation through the digitization of narratives and rituals that are almost extinct [30], (2) regeneration by providing a medium that is in line with the neurology [46], and (3) innovation that makes folklore alive in new forms (digital storytelling, gamification of local wisdom) [47]. In Boboc, Băutu, Gîrbacia, Popovici & Popovici framework [30], this process is referred to as cultural transmediation, which involves transferring the essence of tradition to a new format without losing its cultural DNA. Thus, cultural heritage is not only preserved but also evolves in response to the times while maintaining the continuity of civilization.

Furthermore, around 98% of teachers admit that they have never used augmented reality (AR) in their learning. It reflects systemic challenges, such as limited access to technology, inadequate training, or a lack of AR content that is relevant to the local cultural context. AR has been shown to increase student engagement in various global studies [48]. This gap highlights the need for institutional support, including the provision of infrastructure and teacher training, to effectively integrate AR into the curriculum. The implementation of AR is not just a modernization of teaching tools but a strategy for aligning pedagogy and culture in the digital era. Veber, Pesek & Aberšek [49] emphasizes that AR must function as a cultural amplifier – maintaining traditional values while responding to Generation Alpha’s neuroscience needs to think visually and spatially. With policy support, teacher capacity building, and contextual content, AR can serve as an evolutionary bridge, connecting past cultural treasures with future digital literacy.

In addition, around 90% of teachers agreed that AR could make folklore more contextual, thereby enhancing the practice of speaking and listening skills. By creating an immersive environment, AR connects abstract stories with real situations. AR’s immersive environment simulation—such as a replica of traditional village life—not only connects abstract narratives with concrete reality but also creates experiential learning scaffolding [50]. Through role-play in a culturally contextualized environment visualized by AR, students engage in authentic sociolinguistic interactions that naturally hone their communicative competence [51]. This approach is in line with Vygotsky’s (1978) theory of the Zone of Proximal Development (ZPD), where language learning develops optimally through collaboration in meaningful contexts. Furthermore, research by Yuendita, Dwiarni & Dina [52] proved that local culture-based AR increased students’ motivation and conceptual understanding of learning literature while reducing the cognitive load by visualizing abstract elements. Thus, AR integration not only modernizes learning but revitalizes cultural heritage through a contextual and constructivist pedagogical approach.

Lastly, 88% of teachers agreed that AR is effective in introducing new vocabulary through bilingual text and audio in stories. The combination of bilingual narratives, interactive visuals, and audio elements in AR facilitates multisensory learning, reinforcing vocabulary comprehension through contextual repetition. It supports Choi & Kim’s research [53], which states that simultaneous visual and verbal stimulation enhances language processing. Research by Desierto, Recina, Arroyo & Delima [54] proved that the use of AR in bilingual storytelling could improve children’s understanding of the storyline, enrich vocabulary in two languages, and strengthen listening and speaking skills. The integration of Augmented Reality (AR) technology and local folklore is an innovative approach that bridges traditional wisdom and modern learning needs, especially in the context of developing bilingual communication in children. Folklore, rich in moral values, cultural symbols, and simple narratives, is an ideal medium for language learning, especially when presented visually and interactively through AR technology [55]. In language learning, bilingual communication skills include the ability to understand and use two languages alternately or simultaneously in meaningful social contexts [56]. The development of these skills significantly requires authentic and engaging contexts for children, especially Generation Alpha, who are accustomed to visual and digital stimuli [1]. Folklores provide a familiar cultural context, while AR presents that context visually and dynamically, strengthening the relationship between language form, meaning, and use. In other words, an immersive experience through AR-formatted folklore creates learning that is not only fun but also meaningful and linguistically effective.

## 4 CONCLUSION

Based on the responses from both students and teachers, integrating Augmented Reality (AR) with Nusantara folklore has the potential to transform bilingual learning into a more engaging, interactive, and meaningful experience for Generation Alpha. This strategy is not only supportive of language learning in Indonesian and English but also essential in safeguarding as well as fostering the rich cultural heritage of Indonesia. It combines conventional storytelling with contemporary technology, serving as a conduit between the past and the future, bringing a sense of cultural pride to go alongside with pacing with the current learning styles of modern students that are digitally inclined. Besides, the results emphasize the necessity not only to spread the use of this method more widely in educational contexts but also to conduct further research to better understand its pedagogical potential. These findings will set the foundation for the researchers to create AR-based Nusantara folklore bilingual books that are specially designed to cater to the learning preferences and cultural needs of Generation Alpha.

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