

Digital Storytelling and Indonesian Cultural Narratives through AI-Generated Animations for Children English Learning

Siti Rohani – Misita Anwar – Sugeng Hariyanto – Achmad Suyono –
Farid Angga Pribadi

DOI: 10.18355/XL.2026.19.01.14

Abstract

This study investigates the design and development of an AI-assisted animated folktale platform designed to support English language learning for young learners in Indonesia. Responding to the need for culturally relevant and engaging instructional media, the research applies a Design and Development Research framework to create a digital storytelling tool rooted in Indonesian folktales. The methodology integrates needs analysis, multimedia design, iterative prototyping, expert validation, and classroom-based evaluation. Respondents of the study included 80 elementary school students, 4 teachers, and 5 parents. Instruments of data collection used were direct observation notes, questionnaires, and interview guides. The resulting platform presents English version simplified Indonesian folktales through AI-generated animations, narration, and gamified tasks. Findings indicate that the platform significantly enhances learner engagement, vocabulary recognition, and comprehension, with students demonstrating active participation, improved attention, and positive responses to multimodal input. Teachers and parents noted increased motivation and cultural awareness, while expert evaluators affirmed the platform's feasibility, usability, and alignment with contextual teaching principles. The incorporation of culturally grounded narratives activated prior knowledge, reduced anxiety, and fostered moral and ecological reflection. Technically, the tool functioned reliably across devices and provided intuitive navigation suited to primary learners. The study contributes to the growing body of research on Teaching English to Young Learners (TEYL), AI-supported learning, and digital storytelling by offering an integrated model that merges cultural narratives with interactive multimedia design. These findings highlight the potential of AI-enhanced folktale platforms as effective supplementary tools for language instruction and suggest directions for future improvements, including adaptive learning features and expanded story collections.

Key words: AI-generated animations, Indonesian folktales, English for young learners, digital storytelling, gamified language learning

Introduction

The rapid growth of digital technologies has affected the educational landscape, changed content-delivery methods, and altered how learners—particularly young children—engage with meaning through language. In English as a Foreign Language (EFL) research, more and more scholars acknowledge that early and meaningful exposure to English plays an important role in fostering long-term linguistic proficiency, cognitive development, and intercultural competence (Kusmaryati, 2022; Rozhina & Baklashova, 2018). In Indonesia, these concerns are further underscored by policy shifts. English competency is positioned as a vital for people to engage in global networks, while simultaneously promoting the preservation of local cultures and identities (Lesia et al., 2022). As the technology in information technology develop very fast, the demand for pedagogical approaches that are appropriate for students' psychological development, culturally grounded, and technologically enriched has become increasingly urgent.

Like many multilingual nations in Southeast Asia, Indonesia faces the challenges of enhancing English literacy among young learners and safeguarding its rich local cultural traditions. In this context, educators and researchers have begun to investigate the use of narratives, storytelling, and cultural contents, especially folktales, as a promising material or medium to enrich language learning experiences and improve children's sense of identity (Balabekova et al., 2022; Lwin, 2015; Lwin & Marlina, 2018; Mantra & Maba, 2018). This interest is in line with broader international trends that advocate for multimodal, contextualized instruction and culturally responsive pedagogy in language education for young learners (Balabekova et al., 2022; Godwin-Jones, 2018).

Recent curriculum reform in Indonesia stresses literacy, creativity, digital skills, and local cultures in primary education. Such emphases align with the global trends in situational, meaningful, and multimodal learning. However, persisting challenges still hamper English instruction at the primary level. Studies have reported a lack of appropriate materials for learners' particular ages, insufficient training in multimodal teaching, and low student motivation due to the perceived remoteness of target languages from children's real-life contexts (Labiste, 2019; Nufus, 2018; Satriani et al., 2012). Language textbooks are often perceived as textually loaded but culturally and visually shallow, with little relevance to local values, realities, and wisdom. As a result, learners often resist comprehending and engaging with target cultures as they feel alienated from their learning experiences. Teachers also struggle to create learning environments that incorporate communicative language, storytelling, cultural learning, and emotional relevance. Hence, even though new pedagogies are gaining interests, the EYL classroom continues to be constrained by materials that are linguistically functional, but culturally and visually limited (Hashemi & Azizinezhad, 2011; Prayatni, 2019).

Driven by such concerns, there have been recent calls to harness culturally related media, especially folktales, for English instruction. Folktales play a pivotal role in Indonesian life. Passed from one generation to the next by word of mouth, they carry moral values, social norms, cultural metaphors, and worldviews (Ramli et al., 2024). Studies show that folktales enhance children's motivation, inspire imagination, and deepen comprehension in language education (Lwin, 2015; Lwin & Marlina, 2018; Mantra & Maba, 2018). Folktales can also tap affective factors in early language learning, contributing to learners' effective uptake of linguistic input and retention of vocabulary (Balabekova et al., 2022). Despite such promise, folktales have been fragmentally integrated into English learning, often used in print-based storybooks with little visual and interactive support.

Conventional EYL resources are largely built on Western stories like Cinderella or The Little Red Riding Hood, which are fun but lack cultural resonance with Indonesian children. Local stories such as Timun Mas, Jaka Tarub, Roro Jonggrang, or even folktales from East Java are more relatable to children's sociocultural experiences. Empirical studies have shown that culturally resonant stories stimulate motivation, deepen comprehension, and build identity and cultural pride (Pertiwi et al., 2020; Wulandari et al., 2020). Children see themselves represented in such stories, which promote a sense of belonging and cultural continuity. Yet, the digital transformation of culturally contextualized content remains limited, leaving a gap between pedagogical knowledge of the culturally responsive potential of media and the actual availability of such resources in EYL practice.

Another serious gap is the lack of exciting, resources that are suitable for the learners' age and holistically integrate multiple language skills. A growing body of research highlights the benefit of repeated exposure to linguistic input embedded in meaningful contexts and multimodal cues to enrich vocabulary, spur imagination, and heighten engagement for young learners (Hashemi & Azizinezhad, 2011; Nufus, 2018). Many conventional EYL resources for young learners, however, are based on

mechanical approaches such as flashcards, drills, and isolated grammar activities, and lack narrative richness or emotional appeal. Without context, words can be merely abstract rather than meaningful. CTL claims that instruction should be connected to the worlds and sociocultural realities of learners (Johnson, 2002). Indeed, in EFL settings, CTL has been shown to enhance reading comprehension, vocabulary learning, and writing achievement by situating language in authentic situations (Godwin-Jones, 2018; Labiste, 2019; Satriani et al., 2012). Interactive and animated storytelling, especially with local folktales, can realize the principles of CTL by embedding linguistic input in concrete, culturally related contexts.

At the same time, there is growing recognition of the educational benefits of multimodal storytelling and digital literacy in global educational research. Multimodal narratives have been found to enhance comprehension, sustain learner attention, and scaffold higher-order thinking, especially when they integrate visual, audio, and written text (Fiialka et al., 2024; Kirkwood & Price, 2014). Literary stories and folktales can also develop caring thinking, moral reasoning, and environmental awareness, illustrating the broader educational value of narrative-based instruction (Balabekova et al., 2022; Pintes & Borisova, 2023). Stories animated digitally present more accessible learning content to young learners, who are innately drawn to visual and auditory cues. Thus, animated folktales could convey linguistic input and provide cultural grounding while building 21st-century multiliteracies.

Technology-enhanced learning (TEL) and gamification further strengthen the case for multimedia storytelling in the EYL classroom. Research shows that interactive and game-based approaches and digital applications can boost vocabulary retention, communicative competence, and learner motivation (Bado & Franklin, 2014; Huyen & Nga, 2003; Trooster et al., 2014). Gamified elements such as touch-to-read, animated dialogues, and interactive quizzes offer ongoing feedback and playful interaction, which align with children's imitative, playful, and sensory learning behaviors (Godwin-Jones, 2014; Kirkwood & Price, 2014). TEL enables folktales to be adapted into dynamic formats that engage learners through animation, sound, interactive cues, and visual scaffolding.

The integration of AI in the development of educational media further expands these possibilities. Recent studies found that AI tools, including large learning models (LLMs), could facilitate teachers in generating explanations, simplifying texts, developing story scripts, and creating learning activities (Songsingchai et al., 2023; Wei, 2023). Fiialka et al. (2024) showed that AI-supported tools help learners overcome the writer's block, refine coherence in writing, and scaffold creativity. Studies on AI-mediated platforms report students' gains in vocabulary learning, grammatical accuracy, reading comprehension, and writing fluency. They also enhance students' motivation, confidence, and self-regulated learning (Hsu, 2013; Utami et al., 2022). Digital learning environments like MOOCs have also been found to promote collaboration, autonomy, and reflective learning when designed following socioconstructivist principles (Elomari, 2025). Studies also warned of the potential perils of using AI in learning and teaching, including overreliance on AI tools and reduction in learner autonomy and motivation, when technology is not used critically and pedagogically (Sumakul & Hamied, 2023). These findings suggest that while AI could powerfully support the creation and personalization of animated folktale media, human-guided design and intervention still play a critical role.

The other equally important strand of literature is the use of traditional oral tradition as a mechanism for intergenerational pedagogy. For example, an ethnographic study about smong—storytelling tradition in Simeulue community—reflects how stories, lullabies, and songs are used to pass on cultural memory, disaster awareness, and moral values (Ramli et al., 2024). This study demonstrates the

importance of storytelling not only as a form of entertainment but also as a means of cultural survival and identity-formation. In the Indonesian context, where plural oral traditions still play a significant role in community life, the integration of local folktales into digital English learning media can be seen as one of the ethnopedagogical principles that emphasizes local wisdom in a contemporary curriculum.

These strands of literature together show the importance of developing multimodal English learning materials for children that are linguistically accurate, culturally related, and technologically responsive. English learning for young learners involves concrete sensory inputs, repetition, predictability, and emotion (Hashemi & Azizinezhad, 2011; Nufus, 2018). Enjoyable and meaningful activities, such as songs, games, and stories, are essential for sustaining their attention and supporting their early language development. Early English learning should emphasize positive attitudes and affective engagement toward the language over linguistic mastery alone (Prayatni, 2019). Animated folktales can easily provide all these components through visually rich environments where the language occurs naturally through story characters, settings, and actions. They also allow young learners to connect vocabulary to images, actions, and feeling, which in turn provide better learning and longer retention.

Even with the theoretical and practical foundations provided by folktales, CTL, multimodal design, TEL, and AI-supported pedagogy, some research gaps still exist. First, many of the studies mention folktales, CTL, multimodal learning, gamification, or AI-supported pedagogy separately, without integrating these into a unified pedagogical system for young learners in a specific locale. Second, there is minimal development of culturally based digital media for learning, including local folktales and English learning features. Third, there is a lack of studies on the effects of AI-supported digital folktale platforms on students' vocabulary acquisition, comprehension, cultural awareness, and motivation for young Indonesian learners (Pertiwi et al., 2020; Satriani et al., 2012; Wulandari et al., 2020). As a result, teachers and schools lack practical models or frameworks for innovating and implementing such elements in their regular classroom practices.

Based on the background above, this study proposed the development and evaluation of an AI-supported animated Indonesian folktale platform for English learning for young Indonesian learners. This platform integrates local cultural stories, CTL, multimodal design, gamification, and AI-supported contents into a coherent learning platform (Godwin-Jones, 2014; Johnson, 2002; Songsiengchai et al., 2023; Wei, 2023). It seeks to fill the deficit in culturally aware and technologically-friendly learning materials by providing teachers with a digital teaching tool that is anchored in local knowledge and current language pedagogy. The novelty of the study lies in the combination of cultural local stories, digital animation, and AI-supported design. It is a theoretically informed and practically implementable model for modern English-learning classrooms. It aims to contribute to the advancement of English pedagogy, cultural preservation, and digital pedagogy in Indonesia, by studying learner engagement, vocabulary development, cultural awareness, and the platform usability.

Methodology

This section outlines the study's methodology, including the research design, participants, data collection instruments, and data analysis.

Research Design

The present study employed a Design and Development Research (DDR) framework to guide the systematic creation, refinement, and evaluation of an AI-assisted animated folktale platform for English language learning among Indonesian children.

DDR has been widely used to bridge technological innovation and pedagogical effectiveness by combining iterative product development with empirical investigation. As mentioned by Richey and Klein (2014), the design and development process includes analysis, design, development, implementation, and evaluation phases.

In line with this framework, the study integrated insights from contextual teaching and learning (CTL), AI-supported multimedia design, and culturally responsive pedagogy to produce a learning medium that reflects both technological feasibility and instructional relevance. The DDR approach is particularly appropriate for educational technology projects that require cycles of prototyping and validation, ensuring that the final product meets usability, pedagogical, and cultural criteria.

Context and Participants

The study was conducted in collaboration with three elementary schools in East Java, Indonesia. One school was located in the city centre of Malang city, and two other schools were located in the suburb area of Malang Regency. Participants consisted of children aged 7 to 11, representing the target user group of the animated folktale platform. Their involvement ensured that the design features, content, and interaction patterns aligned with young learners' needs and abilities.

In addition to child participants, teachers, technology experts, language education specialists, and parents contributed as evaluators at various stages of development. Engaging multiple stakeholder groups was intentional, as their perspectives strengthened the contextual relevance, usability, and adoption potential of the platform. All participants were informed of the study's aims and procedures, and data collection followed ethical guidelines for research involving minors.

Materials

The core materials for this study consisted of a corpus of Indonesian folktales selected and adapted into simplified English to suit the linguistic level of young learners. Each folktale was converted into a storyboard and subsequently transformed into animated scenes using AI-assisted generation tools. Voiceovers, illustrations, and visual effects were included to ensure multimodal engagement, or multimedia learning theory, which emphasizes the importance of integrating audio, text, and visuals to support comprehension. The application prototype was developed for both mobile and web platforms to ensure accessibility.

Procedure

The study followed the five-stage DDR sequence, beginning with the analysis phase, which identified learner needs through interviews and classroom observations. Insights from this stage informed the design of an instructional blueprint that outlined objectives, narrative elements, and basic UX guidelines. In the development phase, AI-assisted tools were used to create animations and prototype features, which were refined based on formative feedback from teachers and experts. The implementation phase consisted of classroom-based trials where students interacted with the prototype individually and in small groups. The last phase, evaluation, involved both qualitative and quantitative measures, including user satisfaction surveys, expert validation checklists, and comprehension quizzes related to the folktale content.

This streamlined yet systematic process allowed the research team to iteratively improve both the pedagogical and technical components of the animated folktale platform. Continuous input from educators and learners enhanced the product's relevance, usability, and alignment with the goals of English language learning in Indonesian elementary contexts.

Instruments of Data Collection

Several instruments were used to collect data throughout the research process. The expert validation form assessed aspects such as material feasibility, linguistic appropriateness, visual quality, cultural accuracy, and alignment with CTL principles, following criteria adapted from Borg and Gall's (1983) development standards. Student feedback was gathered through child-friendly questionnaires focusing on enjoyment, clarity, and perceived learning support. Classroom observation sheets captured behavioral indicators of engagement, such as attention span, interaction with peers, and responsiveness to prompts. Comprehension quizzes were designed based on the folktale narrative and vocabulary targets to measure learning outcomes. Together, these instruments ensured triangulation and strengthened the validity of the study's findings.

Data Analysis

Data analysis followed a mixed qualitative–quantitative approach, consistent with recommendations for DDR. Qualitative data from observations and interviews were transcribed and coded thematically to identify patterns in learner engagement, user experiences, and contextual considerations. The coding process used an inductive approach, allowing categories to emerge naturally from the data while also being informed by theoretical frameworks such as CTL and multimodal learning theory. Quantitative data from students' responses on the questionnaires at the analysis and evaluation phases, as well as expert validation scores, were analyzed descriptively to assess product feasibility and learning effectiveness.

The combination of qualitative and quantitative analyses ensured robust interpretation of the platform's strengths, limitations, and areas for improvement. The triangulated findings contributed to refining the final version of the animated folktale application and informed the study's discussion and implications.

Ethical Considerations

Given the involvement of children as primary users, ethical considerations were a central component of the study. Parental consent and child assent were obtained before participation. All animations and folktale adaptations were created with cultural sensitivity to avoid misrepresentation of Indonesian heritage. Data were anonymized to protect participant confidentiality. The study adhered to ethical guidelines for educational technology research involving minors and ensured that participation posed no risk to well-being.

Findings

Overview of Development Outcomes

The development of the AI-assisted animated folktale application produced a functional prototype consisting of digitized Indonesian folktales presented through animated storytelling and gamified language tasks. Following the Design and Development Research (DDR) process, the platform evolved through iterative refinement informed by expert evaluation, user trials, and pedagogical alignment checks. The resulting application integrates contextual learning principles, multimodal input, AI-generated animations, and interactive comprehension activities. This section presents the results of the analysis, development, implementation, and evaluation stages, following the two-level structure of the research design. The findings highlight improvements in usability, learner engagement, linguistic comprehension, and cultural understanding.

Analysis Phase Results

The analysis phase produced a detailed needs assessment based on teacher interviews, classroom observations, and learner profiling. Teachers reported persistent challenges in maintaining motivation during English lessons, especially when using traditional textbooks lacking visual and contextual features.

Class observation was done in two different settings of elementary schools. The first observation was done in a private school located in the centre of Malang city. The second setting was two public elementary schools located in a suburb area. Data gathered from two schools were quite different, showing . using observation checklist whose result is presented in Table 1.

Table 1. Classroom Observation Result from a City School

| No | Data Observed | 1 | 2 | 3 | 4 |
|----|--|---|---|---|---|
| 1 | Students were enthusiastic learning English in class. | | | | ✓ |
| 2 | Students were active participating in class-activities. | | | ✓ | |
| 3 | The teacher taught interactively. | | | | ✓ |
| 4 | The teacher could manage positive learning atmosphere. | | | | ✓ |
| 5 | The teacher used learning media. | | ✓ | | |
| 6 | The teacher explained the material clearly. | | | | ✓ |
| 7 | The teacher asked questions to students to trigger their active participation. | | | | ✓ |
| 8 | Students were easily managed. | | | ✓ | |

As presented in Table 1, in terms of participation, students were actively involved in class activities. They responded to the teacher's instructions, engaged in tasks, and showed willingness to contribute during the lesson. This active participation suggests that students felt comfortable and motivated to learn.

The teacher played a significant role in creating this dynamic learning environment. The teaching process was conducted interactively, allowing students to take part in discussions and respond to prompts. The teacher successfully maintained a positive learning atmosphere throughout the lesson. This was supported by effective classroom management, as students were easily guided and remained on task. The teacher's explanation of the material was clear, contributing to students' ability to follow the lesson effectively. Additionally, the teacher used questions strategically to prompt student participation and encourage critical thinking. This questioning technique helped stimulate student interaction and maintained an active classroom flow.

However, learning media were not optimally utilized in this classroom, indicating less variation in teaching resources. This part needs to be highlighted, that there should be improved facilitation of teaching resources in order to improve students' active engagement in class activities.

The results of the classroom observation and teacher interview done in a different setting in a suburb area of Malang Regency reveal several important aspects related to teaching practices, student engagement, learning challenges, and classroom conditions. The teacher primarily uses books as the main instructional media during English lessons. This reliance on textbooks indicates a more traditional approach to teaching, with limited use of supplementary or digital resources.

In delivering the lesson, the teacher uses a combination of English, Indonesian, and Javanese. Although English is incorporated, Indonesian—supported occasionally by Javanese—remains the dominant language used to ensure

comprehension. This multilingual approach reflects an adaptation to students' linguistic backgrounds; however, it may also reduce students' exposure to English as the target language.

During vocabulary activities, the teacher consistently asks students to read English words one by one. This practice aims to reinforce pronunciation and recognition. Despite this routine, students still frequently make spelling errors, such as writing 'shopping' as 'shoping' and 'carrot' as 'karot'. These errors suggest that students require more structured vocabulary reinforcement and phonics-based instruction. The teacher regularly assigns homework to strengthen students' understanding and retention of the material. However, the limited lesson duration—only 40 minutes per session—poses a challenge in covering content thoroughly while maintaining student engagement.

Student participation during lessons varies. Only a small number of students actively respond to the teacher's questions, while most remain passive. This uneven engagement indicates a need for strategies that promote more inclusive participation and interactive learning. Based on student assessment results, most students achieve scores between 80 and 100. Despite these relatively high scores, errors are commonly found in questions requiring students to interpret word meanings. This suggests that while students may perform adequately in structured tasks, their vocabulary mastery and comprehension remain areas for improvement.

Overall, observational findings from the two different school settings highlight the need for enhanced instructional strategies, diverse media use, and more targeted vocabulary learning approaches to support students' English language development.

Questionnaires were distributed to students, with the researchers and the teachers assisted the filling-out of the questionnaires. Results of the questionnaire distribution to students is presented in Table 2.

Table 2. Students' Responses on the Questionnaire (N=80)

| No | Questions | Responses | | | | Ave. |
|----|---|-----------|-------|-------|-------|------|
| | | 1 | 2 | 3 | 4 | |
| 1. | Are you interested to learn English? | 3.1% | 0% | 37.5% | 59.4% | 3.53 |
| 2. | Do you think English is important to master? | 0% | 0% | 40.6% | 59.4% | 3.59 |
| 3. | Is time allotment of English lesson in class sufficient? | 3.1% | 9.4% | 53.1% | 34.4% | 3.19 |
| 4. | Are English materials taught at schools interesting? | 0% | 3.1% | 46.9% | 50% | 3.47 |
| 5. | Does English lesson at school teach you to communicate in English? | 0% | 3.1% | 34.4% | 62.5% | 3.59 |
| 6. | Is English hard to learn? | 21.9% | 59.4% | 15.6% | 3.1% | 2 |
| 7. | Are you interested to learn English using application with the content of Indonesian folktales? | 0% | 15.6% | 53.1% | 31.3% | 3.16 |

As shown in Table 2, it can be seen that most students show a strong interest in learning English. Students also believe that English is important. However, when asked whether the English lesson time at school is enough, the response was more mixed. Only 34.4% felt very positive, while 53.1% chose a neutral option, giving an

average score of 3.19. This shows that many students think the lesson duration may not be sufficient.

Regarding the English learning material, the majority find it interesting. Students also thought that English lessons helped them communicate better. In contrast, many students think English is difficult, showing that many students were struggling with English.

Finally, students were asked whether they would be interested in an English-learning application using Indonesian folktales. Over half (53.1%) showed interest, and 31.3% showed strong interest. The mean score of 3.16 indicates that most students are open to using such an application.

Further questions were raised in the questionnaire distributed to students regarding students' preferred learning media, English skills to master and improve, as well as features expected to be available in the application. The questionnaire results show several important insights about students' learning needs and preferences. First, students rated Reading as the most difficult English skill to master, while Pronunciation was considered the easiest. This indicates that future learning materials should provide stronger support for reading comprehension skills, without ignoring the other language components.

Regarding preferred learning media, students showed a clear preference for using mobile phones or tablets as their main tools for learning English outside the classroom. This makes smartphones and tablets the most effective platforms for developing a digital learning application, as they are easily accessible and familiar to students.

Students also provided input about the features they hope to see in the upcoming English learning application. The most highly expected features include Games and Interactive Animation, showing that students enjoy fun, engaging, and visually appealing learning environments. Additional preferences include conversation practice, vocabulary builders, and other animated elements. Animation appears to be a key feature that students value, as it increases engagement and helps them understand the content more easily.

In short, the findings suggest that the application should focus on enhancing Reading and Listening skills while still integrating Vocabulary and Pronunciation. The learning media must be mobile-friendly, and the application should include interactive elements such as games, animations, and quizzes.

Design Phase Results

In the Design stage, the research team engaged in extensive discussion and coordination to develop the application titled "Animated Indonesian Folktales as English Learning Media." The team agreed to create an English-language version of 50 folktales from five regions of Indonesia: Central Java, West Java, Papua, Lombok, and East Nusa Tenggara. Ten folktales were selected from each region, resulting in a total of 50 stories to be adapted for learning materials.

All folktales would be translated into simplified English using the first 1,000 high-frequency vocabulary items essential for beginner learners of English as a Foreign Language (EFL). The selection of the 1,000-word list follows Nation's recommended vocabulary framework.

Next, the team determined the appropriate software tools for generating and animating the illustrations. Chat-GPT 4.0 was selected to produce the visual illustrations based on paragraph inputs from each folktale. These illustrations will then be transformed into animations using Runway. The voice-over recordings were produced using AI technology, specifically Typecast.

The overall application is being developed by the IT team, with the main content—videos and voice-overs—prepared by the English language team. The English team is

also responsible for designing the interactive gamification materials, while the IT team handles the technical implementation of the gamification features and user interactivity.

Development Phase Results

The development phase was done through several steps as illustrated in Figure 1.

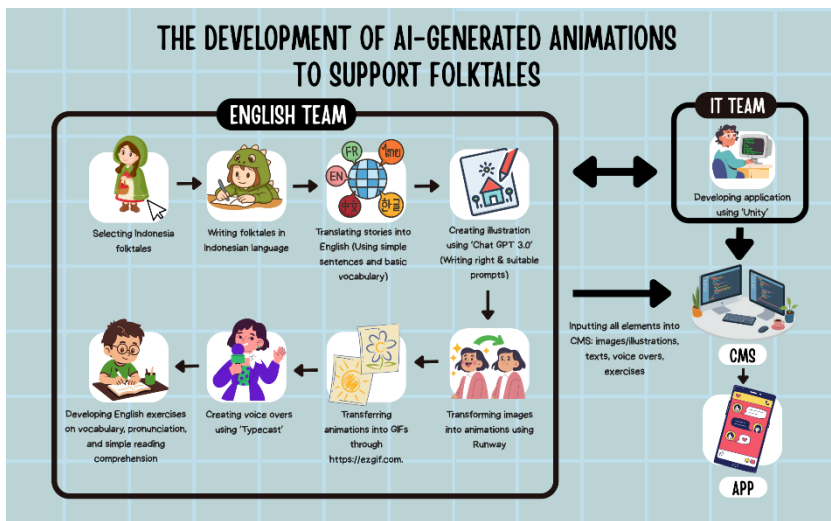


Figure 1. Procedures of Development of the Application

The initial stage of application development involved locating and selecting suitable folktales. Information was collected from a range of sources, including printed cultural books, local cultural experts, and online cultural archives. Each story was first written in Indonesian to preserve the authenticity of its cultural elements. The folktales were crafted using simple sentence structures and vocabulary to ensure they were accessible for young learners, particularly children in elementary school.

The translation process focused on both cultural and linguistic relevance. A free-translation approach was adopted to retain the distinctive style and engaging nature of the stories, making them appealing to young readers.

Visual illustrations were produced using ChatGPT's image-generation tools, while audio narration was created with the Typecast program. A major challenge in generating illustrations with Chat-GPT 4.0 was developing precise prompts that resulted in the expected images. This difficulty increased when multiple illustrations for a single story needed consistent characters; often the tool failed to maintain character uniformity across a series. As a result, prompts had to be rewritten repeatedly, which required significant time and effort. Producing culturally accurate visuals added another layer of complexity, as the project specifically aimed to create culturally grounded illustrated folktales.

The following stage involved converting the generated illustrations into animated sequences using the Runway program. Crafting accurate prompts was essential to produce animations that aligned with the intended visual output. Once the animations were successfully generated, they were converted into GIF files to reduce their large file sizes. Typically, a 30-second animation would be compressed into approximately 50 individual GIFs.

Voiceovers were produced using human narration combined with the Typecast application. One of the most challenging aspects was ensuring accurate pronunciation

of non-English words and Indonesian names. To address this, the spelling of input words in Typecast was adjusted to match their correct pronunciation.

After each folktale, English learning exercises were provided. Objective-style questions were intentionally chosen to allow for automatic scoring within the system. Three types of exercises were included: matching pictures with the correct words, true/false questions, and multiple-choice comprehension items. Gamification elements were incorporated by awarding points for completed exercises, helping to motivate learners.

The integration of illustrations, story text, audio narration, and gamified exercises was carried out through a content management system (CMS) built using Unity. While the IT team developed the application framework, the English team was responsible for uploading and organizing all components—animations, texts, audios, and exercises—within the CMS.

Implementation Phase Results

Classroom trials revealed strong learner engagement with the animated folktale platform. Children demonstrated prolonged attention spans during story viewing and high enthusiasm during interactive segments. Teachers reported that students asked questions about story events, characters, and vocabulary, indicating meaningful cognitive processing.

Learners responded favorably to the gamified quizzes embedded after each story segment. The quizzes measured vocabulary recognition, sentence comprehension, and basic inference skills. Participants achieved consistently high scores, demonstrating that the combination of visual cues, narrated input, and contextualized storylines facilitated comprehension.

Evaluation Phase Results

Evaluation phase was done after receiving responses from the developed application users, including students and teachers. Students filled out questionnaires, and Table 3 presents their responses.

Table 3. Students' Responses at the Evaluation Phase

| No | Questions | Responses | | | | | Ave. |
|----|---|-----------|---|-------|-------|-------|------|
| | | 1 | 2 | 3 | 4 | 5 | |
| 1. | The application is easy to use. | | | 9.4% | 21.9% | 68.8% | 4.6 |
| 2. | The application interface display is attractive. | | | | 34.4% | 65.6% | 4.7 |
| 3. | Stories are easy to understand. | | | 9.4% | 25% | 65.6% | 4.6 |
| 4. | English use in the stories is easy to understand. | | | 12.5% | 18.8% | 68.8% | 4.6 |
| 5. | Audio in the application is clear. | | | 3.1% | 18.8% | 78.1% | 4.7 |
| 6. | Animations in the application is interesting. | | | | 25% | 75% | 4.8 |
| 7. | Animations support the stories. | | | | 37.5% | 62.5% | 4.6 |
| 8. | Tasks and gamification are suitable for children. | | | 3.1% | 28.1% | 68.8% | 4.7 |

| | | | | | | | |
|-----|---|--|--|-------|-------|-------|-----|
| 9. | Narations plus voice overs is interesting. | | | 6.3% | 25% | 68.8% | 4.6 |
| 10. | Exercises and games after the stories help students understand the stories. | | | 6.3% | 28.1% | 65.6% | 4.6 |
| 11. | The application help students understand local cultures of Indonesia. | | | 12.5% | 21.9% | 65.6% | 4.5 |

The evaluation phase involved 80 elementary school students who assessed the usability, content quality, and learning effectiveness of the developed English learning application. Overall, the results show very positive responses across all indicators, with average scores ranging from 4.5 to 4.8 on a 5-point scale.

Students found the application easy to use, indicated by a high average score of 4.6, with most respondents selecting the two highest rating categories. The visual design of the interface was also rated very positively, obtaining an average of 4.7, showing that the layout and appearance of the application were appealing to young users.

Regarding content comprehension, students agreed that the stories were easy to understand (4.6) and that the English used in the stories was clear and accessible (4.6). This suggests that the simplified English version of the folktales successfully supported young readers' comprehension levels.

The audio quality received high appreciation, with a score of 4.7, while animations were considered highly interesting, earning the highest average score (4.8). Students also agreed that the animations effectively supported the storytelling process, scoring 4.6.

In terms of learning activities, students believed that the tasks and gamification elements were appropriate for children, as reflected in a 4.7 rating. They also found the combination of narration and voice-over engaging (4.6) and stated that the exercises and games helped them understand the stories better, also scoring 4.6.

Finally, students recognized that the application helped them learn about Indonesian local cultures, giving this aspect an average score of 4.5, showing that the cultural objectives of the application were well received.

Observational Data at the Evaluation Phase

In-depth analysis of learner engagement revealed that multimodal storytelling successfully held students' attention and encouraged active participation. Students interacted with the platform by tapping characters, exploring vocabulary pop-ups, and replaying animated scenes. Teachers observed increased willingness to read aloud, attempt pronunciation, and discuss characters' decisions. The interactive design elements supported learner autonomy, as students navigated the stories independently and at their own pace.

A key outcome was the development of cultural and moral understanding. Students recognized traditional Indonesian values embedded in the stories, such as respect, honesty, and environmental harmony. The familiarity of characters, settings, and plotlines enhanced learning by activating learners' prior knowledge, supporting contextual learning principles highlighted in CTL-based research.

Parents and teachers reported that the platform stimulated conversations about culture and ethics at home and in the classroom. This demonstrates the capacity of digital folktales to extend learning beyond the school environment, reinforcing the role of stories in transmitting cultural heritage.

The prototype functioned effectively across mobile and desktop platforms. Users experienced minimal loading delays, and all interactive elements operated as intended. Teachers noted that the interface was intuitive and child-friendly, with clear navigation prompts and appropriately sized icons. These results demonstrate that the

technological design achieved usability standards consistent with contemporary digital literacy research.

Feedback also indicated suggestions for future refinement, such as adding adaptive difficulty levels, including more stories, and embedding pronunciation assistance. These suggestions align with emerging literature advocating for personalization in AI-supported learning tools.

The Developed Application

The application containing the animated folktales have been screen-recorded and can be accessed in the Youtube links below:

- a. Aji Saka https://youtu.be/eZOcIc64W_M?si=q6l-bSjUbbCMNSEy
- b. Tampomas https://youtu.be/83_XBOuS0zw?si=OamKFHvyXR06t7MT
- c. Sangkuriang https://youtu.be/BOgP_nGLcYg?si=lrHupTFiJIFCP778
- d. Amerta Sumberawan
<https://youtu.be/RnwfxNyuWbA?si=PwxjBq5SbUJD2i0r>

Discussion

Interpretation of Development Outcomes

The findings from the AI-assisted animated folktale platform development indicate the viability of integrating culturally grounded narrative forms with digital learning tools. A pedagogically coherent and technologically feasible prototype that adequately caters to the motivational and linguistic needs of young learners can be achieved through iterative DDR process. The high level learner involvement during implementation is in line with Mayer's (2024) multimedia learning theory which posits that integrating words and images enhances cognitive processing and allows learners to direct attention more effectively. Animated storytelling and simplified narration coupled with multimodal cues seems to reduce cognitive load of beginners and facilitate effective processing of linguistic input. This finding further support Rozhina's (2018) observation result that children respond positively to tasks that combine narrative structure, visual elements and playful interaction and helps in better retention and comprehension.

Culturally embedded platform design reinforces the study's grounding in the principles of contextual teaching and learning (CTL). CTL places strong emphasis on connecting learning content to learners' everyday experiences. This idea is shown in recent ethnopedagogy research (Balabekova et al., 2022), affirming that stories rooted in local identity are more easily understood and emotionally received. So, folktales in this study resonated with learners who not only followed and enjoyed the linguistic elements, but also appreciated the moral and ecological messages of the stories. These findings are consistent with Pintes and Borisova (2023), who affirm that philosophical and ecological stories enhance reflective thinking and develop more mature moral reasoning, creating a fertile ground for language-mediated sense-making.

Alignment with Learning Engagement and Interaction Findings

Learner engagement in the implementation stage evidenced that multimodal storytelling and gamified comprehension tasks resulted in active involvement, peer collaboration, and voluntary interaction. The behaviors of students (such as replaying story segments, discussing character motivations, and pronouncing words without prompting) reflect interactive characteristics of digital learning environments. These behaviors align with Elomari's (2025) results, stating that socioconstructivist digital settings promoted collaborative meaning-making and learner autonomy when tasks encouraged co-construction. The animated folktales created a low-anxiety

environment where students felt free to test out vocabulary and pronunciation, echoing Yildirim & Torun's (2014) earlier findings that animated stories reduce affective barriers for young learners by presenting material in a familiar, engaging format.

Spontaneous peer collaboration throughout the classroom during platform use similarly supports the Vygotskian sociocultural theory underpinning much of language learning interactionism. Vygotsky and Cole (1978) suggest that children construct knowledge through scaffolding within their zone of proximal development, and the animated folktale platform provided that scaffold with visual cues and contextualized linguistic input that students used to support their peers' comprehension. The increased participation of typically quieter students suggests the environment provided sufficient psychological safety that aligns with Nappu et al. (2025) on the role of digital peer collaboration in elevating student voice. Taken collectively, these results indicate that animated folktales can serve as mediational tools for supporting both linguistic and social engagement.

Discussion of Cultural and Moral Learning Dimensions

The cultural and moral learning that occurred in this study likewise extends an emerging corpus of literature on the educational potential of oral traditions and narrative-based learning. Children's recognition of moral lessons, identification of traditional values, and articulation of cause-effect relationships within stories suggests that the platform preserved the cultural essence of Indonesian folktales. These results echo Ramli's (2024) analysis of smong oral traditions, which show that culturally meaningful stories play crucial roles in intergenerational knowledge transmission and community resilience. Alignment with the principles of CTL is also apparent: by situating linguistic instruction in culturally familiar contexts, the platform activated learners' prior knowledge and reduced linguistic anxiety associated with more meaningful comprehension.

The ecological and moral themes integrated within the stories also align with the ecological literacy arguments made by Pintes and Borisova (2023) and Fatmawati and Hani'ah (2025), who maintain that stories with environmental and ethical dimensions help young learners make real-world connections as they learn a language. Through the animated narratives, students engaged emotionally with nature, community, and moral dilemmas, suggesting that AI-assisted folktales can serve as multimodal conduits for building language skills and cultural awareness.

Interpretation of Technical and Usability Findings

Technical reliability and usability of the prototype arose as core strengths. Teachers and students stated that the interface was intuitive, navigation seamless, and animations loaded quickly across different devices. These results indicate that the platform meets key technical benchmarks for digital literacy outlined in current research. They align with research in mobile-assisted language learning (MALL), particularly the insights from the study done by Kacetl and Klímová (2019), who emphasize that digital platforms must be accessible, stable, and supportive of individual learning pathways. Though this study did not focus on mobile apps exclusively, cross-device compatibility positions it within broader trends toward ubiquitous, flexible learning environments.

In addition, suggestions for adaptive difficulty levels, expanded story libraries, and integrated pronunciation tools reflect the need for ongoing refinement. These recommendations align with adaptive learning principles outlined by Zhang et al. (2016) as well as Kacetl and Klímová (2019), who argue for personalized learning trajectories through automated feedback. The incorporation of such adaptive elements could further support the platform's ability to meet learners' needs.

Comparison with Previous Studies on Animation and Language Learning

Findings in the current study support existing evidence that animated storytelling helps vocabulary incidental acquisition and comprehension. Singer (2022) showed that exposure to animated cartoons supports vocabulary uptake through repeated visual and auditory cues, while Huang (2023) demonstrated that English learning animations accelerate L2 acquisition by presenting language in meaningful narrative contexts. The present findings underline these claims, indicating that Indonesian children benefited from multimodal reinforcement provided by AI-generated animations combined with simplified English narration.

In addition, the results of this study also align with Yildirim and Torun's (2014) work in demonstrating that animated stories capture young learners' attention, enhance enjoyment, and foster the desire to communicate. Gamification elements built into the platform also align with Fiialka's (2024) findings that AI-supported creative tools amplify learner motivation and reduce cognitive hurdles in writing and reading tasks. By combining animated storytelling with gamified interactions, the current study confirms the synergistic potential of integrating narrative, visual, and interactive elements in supporting TEYL.

Conclusion

This study has shown that AI-assisted animated folktales as an English learning medium was a powerful and contextually sound medium for young learners in Indonesia. The implementation of multimodal design, based on familiar folktales and underpinned by principles of contextual teaching and learning was appropriate to attract, engage, and embrace young learners. The process of iterative development that involved expert validation and classroom trials produced a pedagogically sound and technically reliable learning medium. Findings showed that the addition of animation and gamified comprehension tasks supported vocabulary acquisition, inferential understanding, and motivation. It also helped learners to interact meaningfully, collaborate, and reflect morally and ecologically through storyboarding. The findings also contribute to the field of digital storytelling, AI-assisted pedagogy, and TEYL by presenting a model of integrated and balanced narrative learning and emerging AI technology. Future studies may explore personalization features, long-term literacy, and a wider cultural story dataset. The study presents a new and responsive model of AI-assisted learning medium incorporating folktales that bridges technological development and child-oriented English learning.

Acknowledgment

This journal article is one of the outputs of research (under the scheme of 'Penelitian Kerjasama Luar Negeri') funded by BIPA Politeknik Negeri Malang granted in 2024, number SP DIPA – 023.18.2.677606/2024.

Declaration of AI use

Artificial intelligence (AI) tools were used during the language editing stage of this manuscript. We used grammar checking software to support grammar, spelling, punctuation, and readability improvements, and we used ChatGPT for limited paraphrasing and rephrasing of sentences to improve clarity and academic tone. All AI suggestions were reviewed, critically evaluated, and edited by the authors, who remain fully responsible for the final content.

Bibliographic references

Bado, N., & Franklin, T. (2014). Cooperative Game-based Learning in the English as a Foreign Language Classroom. 2(2).

- Balabekova, K., Otarbekova, Z., Shoibekova, G., Orazbay, S., & Ermers, R. (2022). Concepts in folktales – Manifestations of embodied worldviews. *XLinguae*, 15(4), 18-27. <https://doi.org/10.18355/xl.2022.15.04.02>
- Elomari, D. (2025). The Development of the Online Collaboration Competency in a MOOC of Teaching French as a Foreign Language: a Case Study in a Moroccan School of Business and Management. *XLinguae*, 18(1), 21-31. <https://doi.org/10.18355/xl.2025.18.01.02>
- Fatmawati, I., & Hani'ah. (2025). Developing a Creative Writing Approach to Multilingual Literacy in Language Learning: Insights from Indonesia. *XLinguae*, 18(4), 3-18. <https://doi.org/10.18355/xl.2025.18.04.01>
- Fiialka, S., Kornieva, Z., & Honcharuk, T. (2024). The use of ChatGPT in creative writing assistance. *XLinguae*, 17(1), 3-19. <https://doi.org/10.18355/xl.2024.17.01.01>
- Godwin-Jones, R. (2014). Games in language learning: Opportunities and challenges *Language Learning & Technology*, 18(2), 9-19. <http://llt.msu.edu/issues/june2014/emerging.pdf>
- Godwin-Jones, R. (2018). Contextualized vocabulary learning. *Language Learning & Technology*, 22(3), 1-19.
- Hashemi, M., & Azizinezhad, M. (2011). Teaching English To Children: A Unique, Challenging Experience For Teachers, Effective Teaching Ideas. *Procedia - Social and Behavioral Sciences*, 30, 2083-2087. <https://doi.org/10.1016/j.sbspro.2011.10.405>
- Hsu, L. (2013). English as a foreign language learners' perception of mobile assisted language learning: a cross-national study. *Computer Assisted Language Learning*, 26(3), 197-213. <https://doi.org/10.1080/09588221.2011.649485>
- Huang, L. (2023). The Magic of Cartoons: How English-Learning Animations Enhance Child L2 Acquisition
- Huyen, N. T. T., & Nga, K. T. T. (2003). Learning vocabulary through games. *Asian EFL Journal*, 5(4), 90-105.
- Johnson, E. B. (2002). Contextual teaching and learning: What it is and why it's here to stay. Corwin Press.
- Kacetyl, J., & Klímová, B. (2019). Use of Smartphone Applications in English Language Learning—A Challenge for Foreign Language Education. *Education Sciences*, 9(3), 179. <https://www.mdpi.com/2227-7102/9/3/179>
- Kirkwood, A., & Price, L. (2014). Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review. *Learning, Media and Technology*, 39(1), 6-36. <https://doi.org/10.1080/17439884.2013.770404>
- Kusmaryati, S. E. (2022). Teachers' Perspectives Of Teaching English To Young Learners (A Descriptive Study At Primary Schools In Kudus). *ELT Worldwide*, 7(2), 94-103. <https://doi.org/https://dx.doi.org/10.26858/eltww.v7i2.9723>
- Labiste, J. (2019). Contextualization in English language education: Navigating the place of maritime culture in Philippine English language teaching. *Asian EFL Journal*, 23(6.2), 83-108.
- Lesia, E. S., Petrus, I., & Eryansyah, E. (2022). Teaching English for Young Learners in Elementary School: Perceptions and Strategies. *International Journal of Elementary Education*, 6(1), 142-148. <https://doi.org/https://doi.org/10.23887/ijee.v6i1.42013>
- Lwin, S. M. (2015). Using Folktales for Language Teaching. *The English Teacher*, XLIV(2), 74-83.
- Lwin, S. M., & Marlina, R. (2018). Using folktales as a way to operationalise the paradigm of teaching English as an international language. *Asian Englishes*, 20(3), 206-219. <https://doi.org/10.1080/13488678.2018.1440279>
- Mantra, N. I. B., & Maba, W. (2018). Enhancing The EFL Learners' Speaking Skill Through Folktales Based Instruction. *SHS Web Conf.*, 42, 00017. <https://doi.org/10.1051/shsconf/20184200017>

- Mayer, R. E. (2024). The past, present, and future of the cognitive theory of multimedia learning. *Educational Psychology Review*, 36(1), 8. <https://doi.org/https://doi.org/10.1007/s10648-023-09842-1>
- Nappu, S., Muhayyang, M., Dewi, R., & Hamid, R. (2025). Peer Feedback on EFL Students' Essay Writing through Google Classroom: A Multilingualism Study. *XLinguae*, 18(4), 115-133. <https://doi.org/10.18355/xl.2025.18.04.08>
- Nufus, T. Z. (2018). Teaching English to Young Learners in Indonesia (Pros and Cons) *English Language in Focus*, 1(1), 65 - 70. <https://jurnal.umj.ac.id/index.php/ELIF>
- Pertiwi, R. S., Salabiyati, I., Damara, D., & Pratolo, B. W. (2020). The Teacher's Perspectives about Challenges of Teaching English for Young Learners: A Case Study at English Course for Young Learners. 3rd International Conference on Learning Innovation and Quality Education (ICLIQE 2019),
- Pintes, G., & Borisova, S. (2023). Categories of caring thinking in philosophical, literary stories in connection with the formation of awareness of nature protection and sustainable life. *XLinguae*, 16(3), 35-47. <https://doi.org/10.18355/xl.2023.16.03.04>
- Prayatni. (2019). Teaching English for Young Learners. *Jurnal Ilmiah Profesi Pendidikan*, 4(2), 106-110. <https://doi.org/https://doi.org/10.29303/jipp.v4i2.90>
- Ramli, R., Gadeng, A. N., Azis, D., Yusuf, Y. Q., & Razali, R. (2024). The role of oral traditions in internalizing smong wisdom: Perspectives from the Simeulue community. *Indonesian Journal of Applied Linguistics*, 14(2), 229-239. <https://doi.org/https://doi.org/10.17509/ijal.v14i2.74903>
- Rozhina, V. A., & Baklashova, T. A. (2018). Teaching English language to young school-age children while making projects, playing games and using robotics. *XLinguae*, 11(1), 102-113. <https://doi.org/10.18355/xl.2018.11.01.10>
- Satriani, I., Emilia, E., & Gunawan, M. H. (2012). Contextual teaching and learning approach to teaching writing. *Indonesian Journal of Applied Linguistics*, 2(1), 10-22. <https://doi.org/https://doi.org/10.17509/ijal.v2i1>
- Singer, N. (2022). Cartoons as the Incidental Vocabulary Acquisition Tool for English Language Learners. *Arab World English Journal*, 13(1), 330-341. <https://doi.org/https://dx.doi.org/10.24093/awej/vol13no1.21>
- Songsingchai, S., Bang-on, S., & Wirot, W. (2023). Leveraging Artificial Intelligence (AI): Chat GPT for Effective English Language Learning among Thai Students. *English Language Teaching*, 16, 68-68. <https://doi.org/10.5539/elt.v16n11p68>
- Sumakul, D. T. Y., & Hamied, F. A. (2023). Amotivation in AI injected EFL classrooms: Implications for teachers. *Indonesian Journal of Applied Linguistics*, 13(1), 26-34. <https://doi.org/https://doi.org/10.17509/ijal.v13i1.58254>
- Trooster, W., Goei, S. L., Ticheloven, A., Oprins, E., Visschedijk, G., Corbalan, G., & van Schaik, M. (2014). The game LINGO Online: a Serious Game for English Pronunciation. Is it Effective, Why does it Work and How to Establish this? E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2014, New Orleans, LA, USA. <https://www.learntechlib.org/p/148785>
- Utami, N., Yahrif, M., Rosmayanti, V., & Siradjuddin, S. (2022). The Effectiveness of Contextual Teaching and Learning in Improving Students' Reading Comprehension. *Journal of Languages and Language Teaching*, 11(1), 83-93. <https://doi.org/10.33394/jollt.v%vi%i.6732>
- Vygotsky, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wei, L. (2023). Artificial intelligence in language instruction: impact on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in psychology*, 14, 1261955.

<https://doi.org/https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1261955/full>

Wulandari, N. L. P. T., Ratminingsih, N. M., & Ramendra, D. P. (2020). Strategies implemented in teaching English for young learners in primary school. *Journal of Education Research and Evaluation*, 4(3), 227-233.

<https://doi.org/https://doi.org/10.23887/jere.v4i3.26228>

Yildirim, R., & Torun, F. P. (2014). Exploring the Value of Animated Stories with Young English Language Learners. *Turkish Online Journal of Educational Technology-TOJET*, 13(4), 47-60.

Zhang, X., Cao, L., & Yin, Y. (2016). Individualized learning through MOOC Proceedings of the 2016 International Conference on Intelligent Information Processing - ICIP '16,

Words: 8117

Characters: 60 753(34 standard pages)

Siti Rohani, S.Pd., M.Pd., Ph.D.
English for Business and Professional Communication
State Polytechnic of Malang, Indonesia
Jl. Soekarno Hatta no 9 Malang, 65141
Indonesia
siti.rohani@polinema.ac.id
ORCID: 0000-0001-5627-6223

Dr. Misita Anwar (Corresponding Author)
Department of Business Technology and Entrepreneurships
Swinburne University of Technology, Melbourne, Victoria 3122
Australia
misita.anwar@swin.edu.au
ORCID: 0000-0003-3979-1746

Dr. Sugeng Hariyanto, S.Pd., M.Pd.
English for Tourism Industry
State Polytechnic of Malang, Indonesia
Jl. Soekarno Hatta no 9 Malang, 65141
Indonesia
sugeng.hariyanto@polinema.ac.id
ORCID: 0000-0001-7492-8096

Achmad Suyono, S.Pd., MS.
English for Tourism Industry
State Polytechnic of Malang, Indonesia
Jl. Soekarno Hatta no 9 Malang, 65141
Indonesia
achmad.suyono@gmail.com
ORCID: 0000-0002-6170-869X

Farid Angga Pribadi, S.Kom., M.Kom.
Department of Information Technology
State Polytechnic of Malang, Indonesia
Jl. Soekarno Hatta no 9 Malang, 65141
Indonesia
faridangga@polinema.ac.id
ORCID: 0000-0001-5627-6223