

Developing Augmented Reality E-Comic Based on Baduy Folklore for English Literacy Enhancement

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Abstract

In the context of education, literacy is no longer understood merely as the ability to read and write. It also includes the capacity to understand texts, interpret meaning, evaluate information critically, communicate ideas effectively, and apply knowledge to solve real-life problems. Therefore, this study aims to develop an Augmented Reality (AR)-based E-Comic by integrating Baduy folklore, meeting the criteria of validity, practicality, and effectiveness in optimizing English literacy skills. This study employs Research and Development (R&D) approached to create and evaluate an educational product. It follows the ADDIE model, which consists of five systematic stages: Analyze, Design, Development, Implementation, and Evaluation. The development of this E-Comic is designed to provide a contextual learning experience supported by dynamic and interactive 3D visualizations, thereby enhancing students' literacy skills, particularly in English. The findings indicate that the developed AR-based e-comic was positively received by students and is suitable for use as teaching material in English language learning. This is consistent with other studies indicating that e-comics improve learning comprehension and are highly relevant as teaching media. This is also consistent with the results from utilizing digital teaching materials as an alternative for English classes. The average score from media experts reached 91.3%, while student responses averaged 84%, both categorized as highly feasible. Therefore, the product can be effectively implemented as a teaching material for English language learning.

Keywords: E-Comic; Augmented reality; English literacy; Baduy folklores; Teaching materials

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INTRODUCTION

Literacy is a fundamental competency that students must possess in order to participate actively and meaningfully in academic, social, and everyday life. In the context of education, literacy is no longer understood merely as the ability to read and write. It also includes the capacity to understand texts, interpret meaning, evaluate information critically, communicate ideas effectively, and apply knowledge to solve real-life problems (Asykur et al., 2022). Students with good literacy skills are expected to be able to process information from various sources, distinguish facts from opinions, construct arguments, and make informed decisions. Therefore, literacy plays a central role in developing

students' higher-order thinking skills and preparing them to face the demands of the twenty-first century (Anwas et al., 2022; Siregar et al., 2025).

However, the literacy achievement of Indonesian students remains a serious educational concern. Several studies indicate that students' literacy levels are still relatively low compared with expected standards (Khairunnisa, 2024; Baugher & Singleton, 2021). This issue is also reflected in international assessment results. According to the 2022 PISA results, 74.5% of Indonesian students' literacy proficiency is still at Level 1, which is categorized as lower-order thinking skills (Ismawati et al., 2023). This condition shows that many students are only able to understand simple information, identify explicit meanings, and respond to basic questions. They still face difficulties in interpreting complex texts, making inferences, evaluating arguments, and connecting reading materials with broader contexts.

The low literacy performance of students is influenced by various factors. One significant factor is the continued use of conventional teaching materials in classroom instruction. Many learning resources used by teachers are still dominated by standard textbooks, worksheets, and printed materials that tend to be monotonous and less attractive to students. These materials often present information in a rigid format, with limited visual support and minimal connection to students' lived experiences. As a result, students may perceive reading activities as passive, repetitive, and unengaging. When teaching materials fail to stimulate curiosity or relate to students' cultural and social contexts, literacy learning becomes less meaningful (Nurcahyoko et al., 2024; Rohman et al., 2023).

In many classrooms, teachers still depend heavily on textbooks as the main source of learning. Although textbooks are useful, they often do not provide sufficient opportunities for students to interact with texts creatively or critically. The lack of innovation in teaching materials can reduce students' motivation to read, especially in English literacy learning, where students may already face challenges related to vocabulary, grammar, pronunciation, and comprehension (Dika & Bektinningsih, 2023; Ardianto & Subekhi, 2024). Therefore, there is a need to develop teaching materials that are not only informative but also visually appealing, interactive, contextual, and relevant to students' daily lives. One possible solution is the development of digital comics or e-comics that integrate local folklore as learning content.

E-comics are digital learning media that present educational material through the combination of visual images, narrative text, dialogue, characters, and storylines (Widyasari & Nurcahyani, 2021; Fadilah, 2021). This format has strong potential to support literacy learning because it combines reading activities with visual interpretation. The use of illustrations can help students understand the meaning of texts, follow the sequence of events, identify characters, and interpret emotions or actions. For students who struggle with long written texts, e-comics can make reading more accessible and enjoyable. In addition, the narrative structure of comics encourages students to engage with stories, predict outcomes, and connect ideas across panels.

The integration of folklore into e-comics provides an additional educational value. Folklore contains cultural knowledge, moral values, local wisdom, and social norms that can enrich students' learning experiences. When students read stories rooted in their own cultural environment, they are more likely to find the learning material meaningful and relatable (Dika & Bektinningsih, 2023; Ardianto & Subekhi, 2024). Previous studies have shown that folklore-based e-comics can improve comprehension, literacy, and learning outcomes by providing contextual and enjoyable learning experiences. At the same time, folklore can strengthen students' cultural awareness and support character development (Simanjuntak et al., 2024; Setiawan et al., 2022).

One promising source of local wisdom is Baduy folklore. The Baduy community, as one of the indigenous communities in Banten, possesses rich cultural traditions, values, and ways of life. Their folklore reflects important moral lessons, such as simplicity, honesty, harmony with nature, respect for tradition, social responsibility, and spiritual awareness. These values are highly relevant to character education and can be integrated into literacy learning. Ardianto and Subekhi emphasize the important role of folklore in shaping the character of the younger generation, particularly through stories that contain local wisdom and moral messages (Ardianto & Subekhi, 2024). Therefore, using Baduy folklore in e-comics can help students develop not only English literacy skills but also cultural identity and character values. Furthermore, studies indicate that critical literacy grounded in local wisdom within Banten's indigenous communities has a positive correlation with students' expository writing skills (Ardianto & Subekhi, 2024). This suggests that local cultural content can support students' ability to understand, evaluate, and produce texts. By engaging with folklore, students can learn how to identify themes, analyze characters, interpret moral values, and express opinions in written form. In English learning, this approach may also encourage students to use language for meaningful communication rather than merely memorizing vocabulary or grammatical structures.

In addition to the integration of folklore, the use of technology is another important issue in improving literacy learning. Augmented Reality, or AR, offers an opportunity to make e-comics more interactive and immersive. Assemblr-based AR enables three-dimensional visualizations that can bring characters, objects, and story settings to life. Through AR, students can experience learning materials in a more dynamic way, as visual elements can appear in 3D form and be explored from different angles. This type of interaction can increase students' attention, curiosity, and engagement during the learning process (Masduk et al., 2022; Zhou et al., 2023; Shihab et al., 2023).

The use of AR in education has been reported to improve learning effectiveness because it supports multisensory learning. Students are not only reading text but also observing visual objects, interacting with digital elements, and connecting abstract information with concrete representations. Several studies have demonstrated that AR can significantly improve students' learning outcomes and literacy skills (AlAli & Al-Barakat, 2024; Rizki et al., 2024). In the context of English literacy, AR-based e-comics may help students understand vocabulary, plot, characterization, and cultural meaning more easily because the learning experience becomes visual, contextual, and interactive.

Based on these issues, this research aims to develop an innovative AR-based e-comic incorporating Baduy folklore as a contextual learning medium for students. The development of this medium is expected to address several problems: low literacy achievement, limited innovation in teaching materials, lack of contextual cultural content, and the need for technology-enhanced learning. By combining e-comics, Baduy folklore, and Assemblr-based AR, the learning material can provide students with a meaningful, engaging, and culturally relevant experience. Ultimately, this research is expected to contribute to the improvement of students' English literacy skills while also promoting cultural appreciation and character development.

RESEARCH METHOD

Research Design

This study employs a Research and Development (R&D) design because the main objective of the research is not only to investigate an existing educational phenomenon, but also to develop, validate, and evaluate an instructional product. R&D is appropriate for this study since the research aims to produce an Augmented Reality-based e-comic integrating Baduy folklore as a learning medium for improving elementary students'

English literacy skills. This design allows the researcher to systematically identify learning needs, design a product based on those needs, develop the product, test it in the classroom, and revise it based on empirical data and expert judgment. Therefore, the chosen design is suitable for addressing the research objective, namely to develop an innovative, contextual, and technology-enhanced English learning medium and examine its validity, practicality, and effectiveness (Spatioti et al., 2022).

The development procedure follows the ADDIE model, which consists of Analyze, Design, Development, Implementation, and Evaluation stages (Feng, 2023). The ADDIE model is selected because it provides a clear and systematic framework for developing instructional media. In the analysis stage, the researcher analyzes the curriculum, teaching modules, learning materials, student competencies, and the need for more engaging English literacy materials. This stage also includes an analysis of Baduy folklore as the cultural content to be integrated into the e-comic, supported by a literature review on Augmented Reality, e-comics, local wisdom, and English literacy.

In the design stage, the researcher designs the structure of the Augmented Reality-based e-comic, including the storyline, learning objectives, English literacy content, visual elements, character design, and learning activities. The design also includes the preparation of research instruments, such as interview guides, observation sheets, learner response questionnaires, and expert validation sheets. In the development stage, the researcher creates the flowchart, storyboard, and prototype of the Baduy folklore-based e-comic. The product is then validated by experts in English teaching media, and revisions are made based on their feedback.

The implementation stage involves trying out the developed e-comic with elementary school EFL learners who are involved in English lessons. This stage is intended to examine students' responses to the product and observe how the media functions in the learning process. In the evaluation stage, the researcher analyzes data related to the validity, practicality, and effectiveness of the product. The results of expert validation, learner responses, observation, and interviews are used to determine whether the Augmented Reality-based e-comic is feasible and beneficial for English literacy learning.

Participants

The participants of this study consist of 47 elementary school EFL learners and 3 experts in English teaching media. The 47 learners are selected because they are actively involved in English lessons and represent the intended users of the developed Augmented Reality-based e-comic. They are elementary school students learning English as a foreign language, and their involvement is important because the product is designed to support their English literacy development through visual, narrative, cultural, and interactive learning experiences.

The selection criteria for student participants include their enrollment in elementary-level English lessons, their participation in classroom learning activities during the research period, and their ability to use or interact with digital learning media with teacher guidance. The students are selected from a class or learning group that is relevant to the target context of the product implementation. Since the study focuses on English literacy learning at the elementary level, the participants are expected to have basic English learning experience, although their literacy proficiency may vary.

The demographic information of the learners is described generally in relation to their educational level and learning context. They are elementary school students studying English as a foreign language in a formal classroom setting. Their age, gender, and English proficiency level may be recorded as supporting demographic data, but these characteristics are not used as the main basis for grouping participants unless required

during data interpretation. The main focus is their role as target users of the AR-based e-comic.

The 3 expert participants are involved in validating the quality and feasibility of the product. They are selected based on their expertise in English teaching media, instructional material development, educational technology, or English language teaching. Their role is to evaluate the e-comic in terms of content appropriateness, media design, language use, cultural relevance, visual quality, and suitability for elementary school learners. The involvement of experts is essential to ensure that the product is pedagogically appropriate, technically feasible, and culturally meaningful before and after classroom implementation.

Research Instruments

The instruments used in this study include interview guides, observation sheets, learner response questionnaires, and expert validation sheets. The interview and observation instruments are used to collect qualitative data, while the questionnaires and validation sheets are used to collect quantitative data related to the practicality and validity of the developed product. The interview guide is developed to obtain deeper information about the learning needs, students' responses, teacher perspectives, and expert feedback regarding the use of the Augmented Reality-based e-comic. The interview questions are arranged based on the research objectives and the indicators of English literacy learning, media practicality, cultural integration, and technology-supported learning. The interview is semi-structured, allowing the researcher to ask prepared questions while also giving space for participants to provide additional explanations. This format is appropriate because it enables the researcher to explore participants' opinions, difficulties, and suggestions in more detail.

The observation sheet is developed to record students' behavior, engagement, participation, and interaction during the implementation of the e-comic in English lessons. The observed aspects include students' attention to the learning media, participation in reading activities, interaction with Augmented Reality features, responses to Baduy folklore content, and involvement in literacy-related tasks. The observation sheet helps the researcher identify whether the product supports meaningful and engaging learning experiences in the classroom. The learner response questionnaire is developed to measure students' perceptions of the practicality and attractiveness of the AR-based e-comic. It covers aspects such as ease of use, visual appeal, story clarity, language comprehensibility, motivation, enjoyment, and usefulness for English literacy learning. The expert validation sheets are designed to assess the quality of the product from the perspectives of content, media, language, and cultural appropriateness. These validation sheets use a Likert scale ranging from 1 to 5, enabling expert judgments to be converted into quantitative scores.

To ensure validity, the instruments are developed based on the research objectives, relevant theoretical concepts, and indicators of instructional media quality, English literacy, and local wisdom-based learning. The instruments are reviewed by experts to ensure that the items are clear, relevant, and appropriate for the research context. Revisions are made based on expert suggestions before the instruments are used in the main study. Reliability is supported through the use of clear indicators, consistent scoring criteria, and systematic procedures for collecting data. For qualitative instruments, reliability is strengthened through triangulation between interview results, observation data, and expert feedback.

Data Analysis

The data in this study are analyzed using both quantitative and qualitative approaches. Quantitative data are obtained from learner response questionnaires and expert validation sheets. These data are analyzed by calculating the percentage scores to

determine the validity and practicality of the developed Augmented Reality-based e-comic. The scores from expert validation and learner responses are converted into percentages. The percentage results are then interpreted based on predetermined criteria, such as very valid, valid, fairly valid, less valid, or invalid for expert validation, and very practical, practical, fairly practical, less practical, or impractical for learner responses. This analysis helps determine whether the product is appropriate for classroom use and whether students respond positively to the media. Since the validation instruments use a 1–5 Likert scale, the results can show the degree of agreement or approval toward each aspect of the product, including content, media design, language, cultural relevance, and usability.

Quantitative data from student responses are used to identify the practicality of the e-comic during implementation. A high percentage indicates that students find the media attractive, understandable, easy to use, and useful for English literacy learning. Meanwhile, expert validation results are used to determine the feasibility of the product before broader use. If the validation score does not meet the expected criteria, the product is revised based on expert comments and suggestions. Qualitative data are obtained from interviews, observation notes, and expert feedback. These data are analyzed descriptively through data reduction, data display, and conclusion drawing. In the data reduction process, the researcher selects and organizes important information related to students' needs, learning problems, responses to the e-comic, difficulties during implementation, and suggestions for product improvement. The data are then displayed in descriptive form to show patterns and themes emerging from the interviews and observations.

The qualitative analysis is used to support and explain the quantitative findings. For example, if the learner response questionnaire shows a positive percentage, interview and observation data can explain why students felt interested or motivated when using the AR-based e-comic. Similarly, expert comments are analyzed to identify parts of the product that need revision, such as visual layout, language difficulty, cultural accuracy, AR features, or learning activities. By combining quantitative and qualitative analysis, the research obtains a more comprehensive understanding of the validity, practicality, and potential effectiveness of the Augmented Reality-based e-comic incorporating Baduy folklore for elementary EFL learners.

RESULTS AND DISCUSSION

Research Findings

What does the design of the augmented reality e-comic based on Baduy folklore look like to improve learners' English literacy enhancement?

The design of the Augmented Reality-based e-comic was developed through the ADDIE stages, beginning with an analysis of classroom needs. The analysis showed that learning was still dominated by one-way instruction, especially in rural contexts, where teachers tended to control most classroom activities and students had limited opportunities to engage actively. The teaching materials used in the classroom were also considered less contextual because they were mostly textbook-based and not sufficiently connected to students' daily lives. Therefore, the product was designed as a digital, visual, and culturally contextual learning medium that could make English literacy learning more meaningful, concrete, and engaging for elementary EFL learners. The use of Augmented Reality was considered suitable because elementary learners still need visual support to understand abstract concepts and language content more easily.

In the design phase, the e-comic was structured as a digital teaching material that combines narrative text, dialogue, illustrations, local culture, and AR-based visualization. The product was designed using a standardized format, including Times New Roman font, 12-point size, 1.5 line spacing, and A4 layout. The content incorporated Baduy folklore, including visual representations of the Baduy community in Kanekes and the "Seba

Baduy” tradition. These cultural elements were intended to help learners connect English literacy activities with local wisdom and familiar cultural contexts. The design process involved preparing a storyboard, organizing learning materials, arranging page-by-page flow, developing illustrations, and integrating AR elements into the e-comic pages.

The final design of the product can therefore be described as a culturally integrated AR e-comic that presents English literacy material through visual storytelling. It includes usage instructions, learning objectives, competency indicators, reading materials, practice exercises, and supporting references. The visual and narrative features are intended to support reading comprehension, vocabulary development, contextual understanding, and student motivation. Meanwhile, the AR feature adds interactive three-dimensional visualization, allowing learners to experience the story more concretely. This design is aligned with the R&D method because the product was not only created, but also validated, implemented, evaluated, and revised based on expert judgment and learner responses.

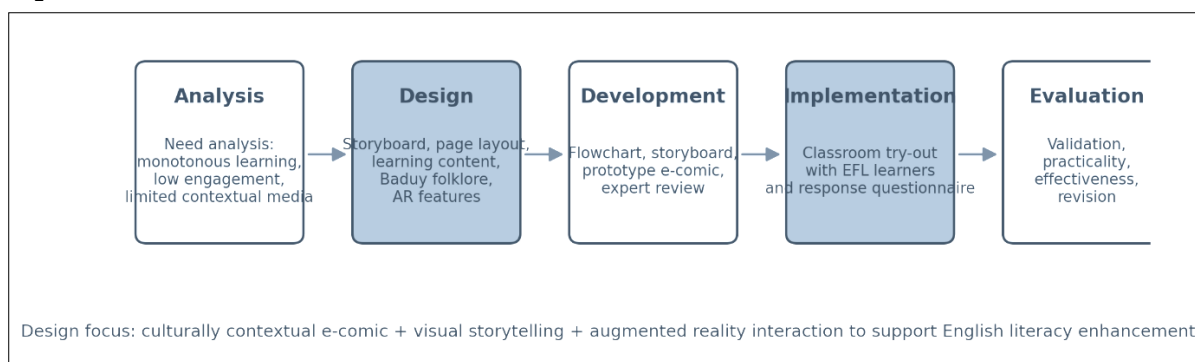


Figure 1. The Design of AR-Based E-Comic Integrated with Baduy Folklore

Figure 1 illustrates the design process of the Augmented Reality-based e-comic based on Baduy folklore through the ADDIE development model. The chart shows that the product was developed systematically, beginning with the analysis of learners' needs and classroom problems. In this stage, the study identified that English learning was still dominated by conventional instruction, limited student engagement, and teaching materials that were not strongly connected to students' real-life context. Therefore, the design of the e-comic was directed toward creating a more contextual, visual, and interactive learning medium.

The design stage in Figure 1 indicates that the e-comic was planned through several important components, including storyboard development, page layout, learning content organization, integration of Baduy folklore, and the inclusion of Augmented Reality features. This means that the e-comic was not merely designed as a digital reading text, but as a complete learning medium that combines narrative, visuals, cultural content, and technology. The use of Baduy folklore gives the material local cultural relevance, while AR features help present the content in a more concrete and attractive form for elementary EFL learners. The development, implementation, and evaluation stages show that the product was refined through expert review, classroom try-out, learner responses, and revision. This indicates that the design of the e-comic followed the principles of Research and Development, where the product must be validated and tested before being considered feasible. In addition, Figure 1 shows that the AR-based e-comic was designed as a culturally contextual and technology-supported medium to improve learners' English literacy by making reading activities more meaningful, engaging, and visually understandable.

Answer to Research Question: How is the quality of the augmented reality e-comic based on Baduy folklore to improve learners' English literacy enhancement?

The quality of the Augmented Reality-based e-comic was examined through expert validation, student response questionnaires, and pretest-posttest results. In the development stage, the product was validated by three experts consisting of a media expert, a content expert, and a cultural expert. The validation covered language, culture, and media aspects. The language aspect obtained an average score of 88.6%, the cultural aspect obtained 89.6%, and the media aspect obtained 91.3%. The overall validation score reached 92%, which placed the product in the “very high” category. These results indicate that the e-comic is highly feasible in terms of language suitability, cultural relevance, and media quality.

The practicality of the product was shown through the student response questionnaire during the implementation stage. The learners gave a positive response of 84%, indicating that the AR-based e-comic was considered attractive, useful, and feasible as English learning material. This result suggests that the combination of Baduy folklore, digital comic format, and AR visualization successfully supported students' interest and participation in English literacy learning. The classroom observation also showed that the digital material helped overcome monotonous learning conditions by providing clearer visualization, cultural relevance, and more engaging learning activities.

The effectiveness of the product was supported by the improvement in students' English literacy achievement. The average pretest score was 41.20%, while the average posttest score increased to 77.30% after the implementation of the e-comic. This shows an improvement of 33.10%, indicating that the product contributed positively to learners' English literacy enhancement. Based on these findings, the AR-based e-comic incorporating Baduy folklore can be considered valid, practical, and effective for use as an English literacy learning medium for elementary EFL learners.

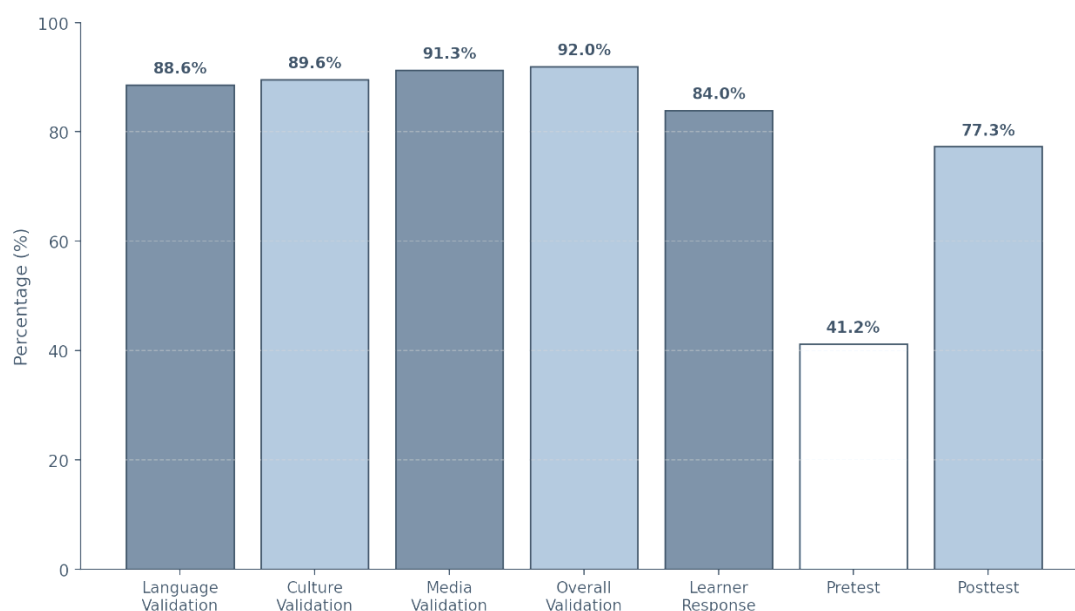


Figure 2. The Quality of AR-Based E-Comic Integrated with Baduy Folklore

Figure 2 presents the quality summary of the Augmented Reality-based e-comic based on Baduy folklore. The chart shows that the product received high validation scores from experts in three main aspects: language, culture, and media. The language aspect obtained 88.6%, the cultural aspect obtained 89.6%, and the media aspect obtained 91.3%.

These results indicate that the e-comic was considered appropriate in terms of English language use, cultural representation of Baduy folklore, and digital media design. The highest score was found in the media aspect, suggesting that the visual design, layout, and AR-based presentation were especially strong.

The overall validation score reached 92%, placing the product in the “very high” category. This means that the e-comic was judged by experts to be highly feasible for use as English learning material. The student response score of 84% also shows that learners responded positively to the product. This suggests that students found the AR-based e-comic interesting, practical, and helpful for learning English literacy. The positive learner response strengthens the evidence that the product is not only valid from the experts’ perspective, but also acceptable and engaging for the target users. Figure 2 also shows the improvement in learners’ English literacy achievement. The average pretest score was 41.2%, while the average posttest score increased to 77.3% after the implementation of the e-comic. Based on the chart values, this represents an increase of 36.1 percentage points, showing a substantial improvement after learners used the AR-based e-comic. This finding indicates that the product has the potential to support English literacy enhancement by combining visual storytelling, local cultural content, and interactive AR features. Therefore, Figure 2 confirms that the developed e-comic is valid, practical, and effective as a learning medium for elementary EFL learners.

Discussion

The findings of this study indicate that the Augmented Reality-based e-comic incorporating Baduy folklore is a valid, practical, and potentially effective instructional medium for enhancing elementary EFL learners’ English literacy. The product was developed through the ADDIE model, beginning with the analysis of classroom problems, followed by design, development, implementation, and evaluation. The analysis phase revealed that classroom learning was still largely dominated by teacher-centered instruction, limited use of interactive media, and learning materials that were not sufficiently connected to students’ real-life and cultural contexts. This finding supports previous studies arguing that low literacy performance among Indonesian students is influenced by monotonous teaching materials, limited contextualization, and the dominance of conventional textbooks (Nurcahyoko et al., 2024; Rohman et al., 2023). Therefore, the development of an AR-based e-comic in this study responds directly to the need for more engaging, contextual, and visually supported literacy materials. This is also consistent with Anwas et al. (2022), who emphasized that the quality of textbooks and learning resources is strongly related to students’ literacy achievement. In this sense, the present study confirms that literacy development should not rely only on printed texts, but should be supported by innovative media that can encourage students to read, interpret, and construct meaning in more active ways.

The design of the developed product also confirms the relevance of the ADDIE model for instructional media development. The e-comic was systematically designed by preparing storyboards, organizing learning materials, arranging page-by-page content, developing illustrations, and integrating AR elements. This finding supports Spatioti et al. (2022), who stated that ADDIE is useful in educational product development because it provides a structured process for identifying needs, designing solutions, developing materials, implementing them, and evaluating their quality. It is also in line with Feng (2023), who found that technology-supported instruction developed through ADDIE can improve learning achievement. In this study, ADDIE allowed the researchers to connect the product design with students’ learning needs, expert feedback, and classroom implementation. Thus, the findings confirm that an instructional product becomes more

pedagogically meaningful when it is developed through a systematic process rather than through media production alone.

The integration of Baduy folklore into the e-comic extends previous research on folklore-based teaching materials. Prior studies have shown that folklore can improve students' comprehension, learning outcomes, and cultural awareness because it presents stories that are familiar, meaningful, and rich in moral values (Setiawan et al., 2022; Simanjuntak et al., 2024). The findings of this study support those conclusions because the Baduy folklore content helped position English literacy learning within a local cultural context. The e-comic included representations of the Baduy community, including the life of the Baduy people in Kanekes and the "Seba Baduy" tradition. This cultural integration is important because students are not only exposed to English vocabulary and reading passages, but also to cultural values, social practices, and local wisdom. This finding is aligned with Ardianto and Subekhi (2024), who argued that folklore can function as a medium for character formation because it contains positive values and moral messages. Therefore, the present study extends earlier work by showing that local folklore can be integrated not only into printed or conventional learning materials, but also into digital and AR-supported English literacy media.

The expert validation results further demonstrate the quality of the developed product. The language aspect obtained 88.6%, the cultural aspect obtained 89.6%, and the media aspect obtained 91.3%, while the overall validation score reached 92%, categorized as very high. These results indicate that the e-comic was considered appropriate in terms of language use, cultural relevance, and digital media design. The highest score in the media aspect suggests that the visual design, layout, and AR-based presentation were particularly strong. This finding supports Widyasari and Nurcahyani (2024), who found that e-comic-based teaching materials can be feasible and useful because they combine visual elements with learning content. It is also consistent with Fadilah (2021), who reported that e-comic teaching materials can support elementary school learning by presenting content in a more attractive and accessible format. However, the validation process also indicates that even a highly feasible product still requires revision based on expert suggestions.

The students' response score of 84% indicates that the AR-based e-comic was positively received by the learners. This finding confirms previous research showing that e-comics can increase students' interest and make learning more enjoyable. Dika and Bektiningsih (2023), for example, found that e-comics improved students' understanding of Indonesian language learning outcomes, while Setiawan et al. (2022) showed that folklore-based e-comics increased fourth graders' learning outcomes. The present study strengthens these findings in the context of English as a foreign language by showing that students also respond positively when e-comics are used for English literacy learning. The positive response may be explained by the combination of narrative text, dialogue, visual images, and culturally familiar stories. For elementary learners, these features can reduce the burden of reading English texts because the pictures and storyline provide contextual clues that support comprehension. This confirms the argument of Widyasari and Nurcahyani (2021) and Fadilah (2021) that e-comics are useful because they present learning materials through a combination of visuals, narrative, and dialogue.

The use of Augmented Reality in the e-comic also supports and extends previous findings on technology-enhanced learning. Previous studies have shown that AR can create interactive and immersive learning experiences by providing three-dimensional visualizations and allowing students to interact with learning objects (Masduk et al., 2022; Zhou et al., 2023; Shihab et al., 2023). In the present study, AR was used to make the Baduy folklore content more concrete and visually engaging. This is especially relevant for elementary learners, who often need concrete representations to understand abstract ideas,

unfamiliar vocabulary, and story meanings. The findings support AlAli and Al-Barakat (2024), who found that AR technology can enhance primary school students' creative reading skills, and Rizki et al. (2024), who reported that digital 3D AR technology can improve early childhood literacy abilities. The present study extends these findings by combining AR not only with general reading materials, but also with e-comic storytelling and indigenous cultural content. Thus, the novelty of this study lies in the integration of three elements: English literacy, Baduy folklore, and AR-based digital visualization.

The effectiveness of the product is reflected in the improvement of students' English literacy scores. The average pretest score was 41.20%, while the average posttest score increased to 77.30% after the implementation of the e-comic. This improvement shows that the product had a positive influence on learners' English literacy achievement. The gain suggests that the e-comic helped learners understand texts more effectively through visual scaffolding, cultural familiarity, and interactive AR experiences. This result confirms previous studies stating that digital comics and AR-supported media can improve learning outcomes and literacy skills (Dika & Bektiningsih, 2023; AlAli & Al-Barakat, 2024; Rizki et al., 2024). It also supports Simanjuntak et al. (2024), who found that folklore teaching materials assisted by digital comics can support elementary students' learning. Nevertheless, this study does not necessarily contradict previous research; rather, it expands the existing body of knowledge by applying AR-based e-comics to English literacy enhancement among elementary EFL learners. The results suggest that literacy learning becomes stronger when students are supported through multimodal media that combine reading, visual interpretation, cultural meaning, and technology-based interaction.

The findings of this study confirm that innovative digital media can help address the literacy challenges faced by elementary learners. They also show that literacy improvement should be understood as a result of several connected factors: appropriate instructional design, relevant cultural content, attractive media presentation, student engagement, and expert-validated material quality. Compared with previous studies, this research confirms the benefits of e-comics and AR, supports the educational value of folklore, and extends the discussion by integrating Baduy folklore into an AR-based English literacy product. The study therefore contributes to the development of culturally responsive and technology-enhanced English learning materials.

CONCLUSION

This study concluded that the Augmented Reality-based e-comic incorporating Baduy folklore was successfully developed through the ADDIE model and produced a contextual, interactive, and culturally meaningful English learning medium. The design process began with the identification of classroom needs, particularly the lack of engaging teaching materials, the dominance of teacher-centered instruction, and the limited connection between English learning content and students' daily lives. Through the design and development stages, the product was structured as a digital e-comic containing narrative text, dialogue, illustrations, Baduy cultural elements, literacy activities, and AR-based visualization. The integration of Baduy folklore enabled students to encounter English literacy materials through stories and values rooted in local wisdom, while the AR features provided more concrete and engaging visual experiences. Therefore, the product design is considered appropriate for elementary EFL learners because it combines reading activities, visual support, cultural relevance, and interactive technology.

The quality of the developed product was demonstrated through expert validation, student responses, classroom implementation, and pretest-posttest results. The validation results showed very high feasibility in language, culture, and media aspects, with an overall validation score of 92%. Student responses also showed a positive result of 84%, indicating that learners found the AR-based e-comic attractive, practical, and useful for

English literacy learning. Furthermore, students' English literacy achievement improved from 41.20% in the pretest to 77.30% in the posttest, showing that the product contributed positively to literacy enhancement. Based on these findings, the AR-based e-comic incorporating Baduy folklore can be considered valid, practical, and effective as an English learning medium. The study also suggests that combining local culture and educational technology can support literacy learning while strengthening students' appreciation of cultural identity and local wisdom.

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