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DEVELOPMENT OF AN AUGMENTED REALITY-BASED STUDENT WORKSHEET FOR FANTASY STORY LEARNING IN JUNIOR HIGH SCHOOL

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Abstract: Innovation in instructional media for prose fiction learning remains limited, as many teachers experience difficulties in integrating digital technology to support students' critical thinking and language proficiency. This study aims to develop and evaluate Augmented Reality (AR) based Student Worksheets (LKPD) for teaching fantasy stories to Grade VII students at SMP Negeri 21 Palembang. The study employed a Research and Development (R&D) approach using the ADDIE model and involved 34 students in a limited field trial. The feasibility of the AR-based LKPD was assessed through expert validation, including material, media, and language aspects, which resulted in validation scores of 91%, 95%, and 98%, respectively, indicating that the product was highly valid. The effectiveness of the LKPD was evaluated using pretest and posttest assessments. The results showed a substantial improvement in students' learning outcomes, with the mean pretest score increasing from 57.09 to 91.03 in the posttest, representing an improvement of 33.94 points. This increase reflects enhanced critical thinking skills and language proficiency, particularly in students' comprehension and analysis of prose fiction texts. The Augmented Reality based LKPD is feasible, practical, and demonstrates strong potential to improve students' critical thinking skills and language proficiency in prose fiction learning. This instructional media can serve as an alternative digital learning resource and is recommended for further development and broader implementation to support innovative language learning at the junior high school level.
Keywords: *Augmented Reality (AR); Student Worksheets (LKPD); critical thinking skills; language proficiency; prose fiction learning.*

INTRODUCTION

21st-century education demands a more innovative, creative, and technology-based learning approach to improve the quality of student learning processes and outcomes (Dash, 2022; Pujiati, 2023; Toheri et al., 2019). In this context, technology is not only a tool to increase learning efficiency but also a means to motivate students by creating more contextual and engaging learning experiences (Bereczki & Kárpáti, 2021; Song et al., 2024). One of the biggest challenges in education today is how to deliver learning that can bridge students' needs for learning experiences that are in line with current developments (Nafi'a et al., 2022; Aristiadi, 2019; Meylani et al., 2025). This is particularly relevant in language learning, particularly in literary materials such as prose fiction, which tend to be abstract and imaginative (Godsk & Møller, 2025; Mar et al., 2021; Xu et al., 2022).

Fictional prose, including short stories and novels, is a form of literature that serves not only as entertainment but also as a means of character education, enhancing critical thinking, and developing empathy (Ameen et al., 2022; Oktaviani & Chan, 2023; Ratih & Arsih, 2024). Through literary studies, students can develop language skills and enrich their perspectives on social and moral life (Ardena & Fatimah, 2021; Cui, 2025; Mohammadzadeh et al., 2020). However, the practice of teaching fictional prose at the junior high school level, such as that at SMP Negeri 21 Palembang, often still relies on lectures and assignments that are less interactive.

As a result, students often perceive literary learning as monotonous and difficult, particularly because learning activities do not sufficiently support analytical engagement, interpretation, and critical reflection on narrative elements (Shalini, 2025; Fadilah et al., 2023; Thornbury, 2023).

Observations and preliminary interviews with Indonesian language teachers at SMP Negeri 21 Palembang indicate that student enthusiasm and participation in teaching fictional prose remains low. One of the main causes is the lack of engaging learning media capable of stimulating students' imagination and interest in the world of fiction (Fitria, 2024; Rose, 2019; Atmojo, 2020). Existing teaching materials tend to focus on content delivery and recall-based tasks rather than on scaffolding higher-order thinking processes such as interpretation, inference, and evaluation, which are essential components of critical thinking in literary analysis (Kiong, 2022; Rokhayati & Widiyanti, 2022; Nurpratiwi, 2024). This poses a significant challenge in providing contextual and relevant learning to meet students' current needs.

Student Worksheets (LKPD) are a learning tool that can help guide students toward independent learning and conceptual discovery (Meylani et al., 2025; Islamiyati et al., 2024; Sari & Alizar, 2023). These worksheets generally lack explicit instructional scaffolding that encourages students to question, analyze, and evaluate fictional texts critically, making them less responsive to students' visual, interactive, and higher-order learning needs in the digital era (Agaard et al., 2022; Rose & Meyer, 2019; Olszewski & Crompton, 2020). Therefore, innovation is needed in developing more interactive, technology-based LKPDs (Reddy et al., 2020; Meylani et al., 2025; Zusniarni et al., 2024).

Augmented Reality (AR) offers an innovative solution that can address these issues (Lubis & Wangid, 2019; Ntumba et al., 2023; Xu, 2024). AR is a technology that allows users to view virtual objects projected onto the real world in real time, enabling students to experience a more immersive and engaging learning experience (Kye et al., 2021; Sabon et al., 2022; Saphira & Prahani, 2022). While previous studies have demonstrated that AR-based learning media can enhance motivation and conceptual understanding, most existing AR applications in education are designed primarily for visualization purposes and do not explicitly embed pedagogical scaffolding to support critical thinking processes, particularly in the context of literary analysis (Al-Ansi et al., 2023; Ho et al., 2022; Nurdiana, 2020). Setting elements or characters in a story can be realized in the form of 3D models that can be explored, or the storyline can be presented through interactive animations that facilitate understanding.

The development of information and communication technology provides significant opportunities for education to improve the quality of learning (Wiwin et al., 2022; Tristiana et al., 2024; Oktaviani & Marliana, 2021). One technology currently being widely utilized is Augmented Reality (AR), which combines the real world with virtual elements in the form of real-time three-dimensional images, videos, or animations (Islamiyati et al., 2024; Saphira & Prahani, 2022). The use of AR in learning can increase the appeal of material, aid in the visualization of abstract concepts, and encourage active student engagement in learning activities (Lampropoulos et al., 2022; Downie & Proulx, 2022; Riwayatiningsih et al., 2025). Several previous studies have shown that AR-based learning media are effective in increasing student motivation and learning outcomes, particularly for visual and narrative materials.

Furthermore, although AR has been widely implemented in science and mathematics education, the development of AR-integrated LKPDs specifically designed for junior high school prose fiction learning remains limited, especially those that systematically guide students through critical thinking activities such as identifying narrative structures, analyzing character development, interpreting themes, and evaluating moral messages (Saphira & Prahani, 2022; Heni & Haryadi, 2023; Pujiastuti & Haryadi, 2023). This indicates a clear research gap between the technological potential of AR and its pedagogical application for fostering critical thinking in literary learning.

Based on this gap, this study focuses on the development of an Augmented Reality–assisted LKPD that is intentionally designed to scaffold students' critical thinking skills in fictional prose learning at SMP Negeri 21 Palembang. The novelty of this study lies not merely in the integration of AR technology, but in the pedagogical design of the LKPD, which embeds structured critical thinking tasks such as analysis, interpretation, and evaluation within AR-supported learning activities. It is expected that this AR-based LKPD can enhance students' engagement, understanding, and appreciation of

literary texts in a more meaningful and enjoyable way. In addition, the findings of this study are expected to contribute to the development of interactive, technology-based instructional materials that align with the needs of language learning in the digital era.

METHOD

This research is a development research or Research and Development (R&D) (Neuman, 2019; Sugiyono, 2021). Research and development is defined as a scientific method for examining, designing, producing, and testing the validity of the resulting product (Creswell, 2022; Bougie & Sekaran, 2019). This research developed a product in the form of a Student Worksheet (LKPD) assisted by Augmented Reality (AR) on fictional prose (fantasy stories) to improve the critical thinking skills of students at SMP Negeri 21 Palembang.

The development of this LKPD uses the ADDIE development model. The ADDIE model has five stages: (1) Analysis, (2), Design, (3) Development, (4) Implementation, and (5) Evaluation.

The study was conducted at SMP Negeri 21 Palembang, involving Grade VII students. A total of 34 students participated in the limited field trial. In addition, three expert validators consisting of a material expert, a media expert, and a language expert were involved in assessing the feasibility of the developed LKPD.

During the analysis stage, researchers identified learning problems in fictional prose instruction, including low student engagement and insufficient development of critical thinking skills. Data were collected through classroom observations and preliminary interviews with Indonesian language teachers.

In the design stage, learning objectives and competencies were determined based on the curriculum. The structure of the LKPD was designed to include learning activities that encourage analysis, interpretation, and evaluation of fantasy stories. The integration of AR features was planned to support students' understanding of narrative elements such as characters, setting, plot, and moral values.

The development stage involved producing the AR-assisted LKPD and integrating digital content into the worksheets. The product then underwent expert validation to ensure its feasibility in terms of content accuracy, media design, and language use.

The implementation stage consisted of a limited classroom trial in which students used the AR-based LKPD during prose fiction learning activities. This stage aimed to assess the practicality and initial effectiveness of the product.

The evaluation stage focused on assessing the quality of the LKPD based on expert validation results, student response questionnaires, and learning outcome data obtained from pretest and posttest assessments.

The Augmented Reality features were developed using [insert software/platform, e.g., Assemblr EDU / Unity with Vuforia]. The AR content was accessed through [Android-based mobile devices] by scanning visual markers embedded in the LKPD. When scanned, the markers displayed 3D objects, animations, and visual representations of fantasy story elements, such as characters and story settings. These AR components were designed to support students' exploration and analysis of fictional prose content in an interactive learning environment.

The instruments used in this study included: (1) Expert validation sheets, used by material, media, and language experts to assess the feasibility of the LKPD. (2) Student response questionnaires, used to evaluate the practicality and usability of the AR-based LKPD during classroom implementation. (3) Pretest and posttest instruments, designed to measure students' critical thinking skills in fictional prose learning. The test items were aligned with critical thinking indicators, including analysis, interpretation, inference, and evaluation.

All validation instruments and test items are provided as appendices to support transparency and replicability of the study.

Quantitative data obtained from expert validation and student responses were analyzed descriptively using percentage scores and mean values. Learning outcome data from the pretest and posttest were analyzed by comparing mean scores to determine the extent of improvement after using the AR-based LKPD. To examine whether the improvement in learning outcomes was statistically meaningful, a paired-sample t-test was applied [or Wilcoxon signed-rank test if the data were not normally distributed]. The level of significance was set at $\alpha = 0.05$.

RESULTS AND DISCUSSION

This research aims to produce a product in the form of a Student Worksheet (LKPD). This research falls into the R&D (Research and

Development) category using the ADDIE (Analyze, Design, Development, Implementation, Evaluation) model.

Analyze

Before conducting the research, the researcher analyzed the curriculum, students, and materials. This was done to determine what the researcher needed to develop the product. The details of the three analyses are as follows:

Curriculum analysis was conducted to determine the curriculum used in the teaching and learning process. The curriculum used at SMP Negeri 21 Palembang, especially for grade VIII, is the Independent Curriculum. The Independent Curriculum emphasizes meaningful, learner-centered learning, and encourages students to be more active in the learning process. Researchers also analyzed the Elements, Learning Outcomes (CP), and Learning Objectives (TP) listed in the Learning Objective Flow (ATP) of the Indonesian Language Independent Curriculum, particularly those related to the material of Prose Fiction Fantasy Stories.

Student analysis was conducted to determine the characteristics and problems experienced by students during Indonesian language learning. Based on the analysis results, researchers found several problems, namely: a) Lack of student interest in learning, especially in fantasy story material, due to lack of motivation and a lack of learning media that can attract students' attention. b) Lack of interesting and interactive teaching materials, so students tend to be passive and less enthusiastic in analyzing the elements of fantasy stories.

Initial research revealed that student learning outcomes were still low because the teaching materials used were unable to increase learning interest. Therefore, an alternative solution is needed in the form of developing Augmented Reality-based Student Worksheets (LKPD).

Cover LKPD



Figure 1. *LKPD cover*

Foreword and table of contents



Figure 2. *Instructions for using LKPD*

Learning Outcomes (CP) and Learning Objectives (TP)

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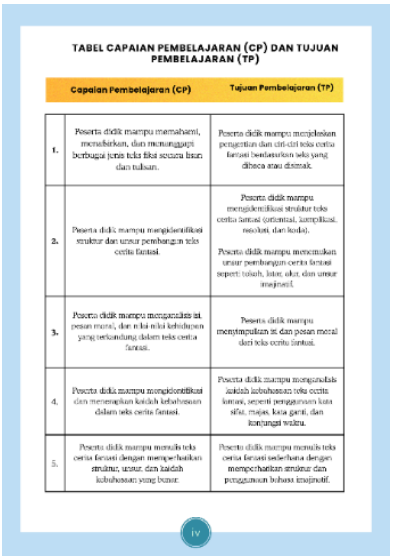


Figure 3. *CP and TP*

Critical thinking indicators and learning guides

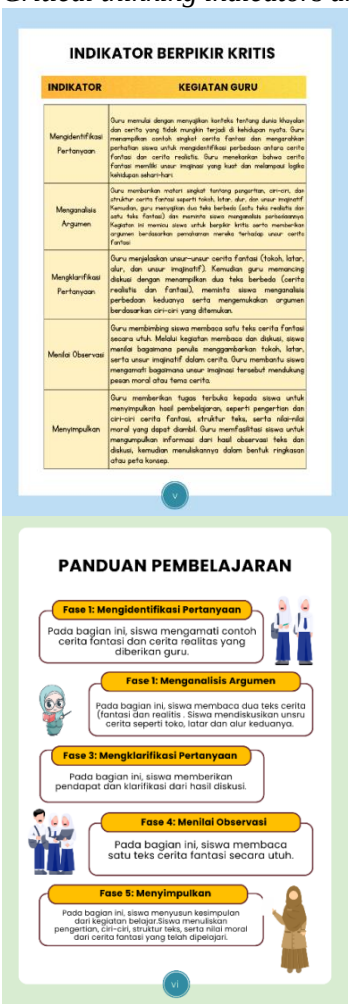


Figure 4. Critical thinking indicators and learning guide

Prayer before studying



Figure 5. *Prayer before studying*

LKPD instructions



Figure 6. *LKPD instructions*

Summary of material





Figure 7. *Summary of material*

LKPD contents page

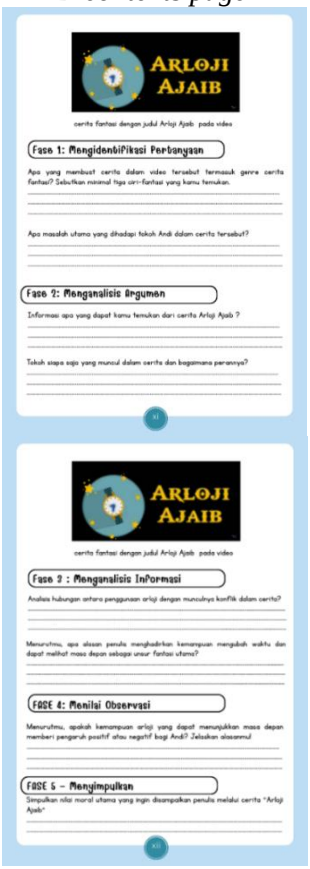


Figure 8. *LKPD contents page*

LKPD *display in several applications*

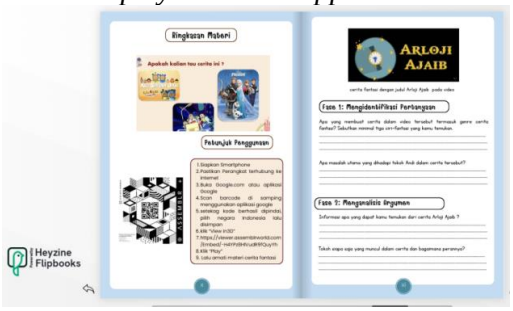


Figure 4.9 LKPD display on the Heyzine Flipbook application

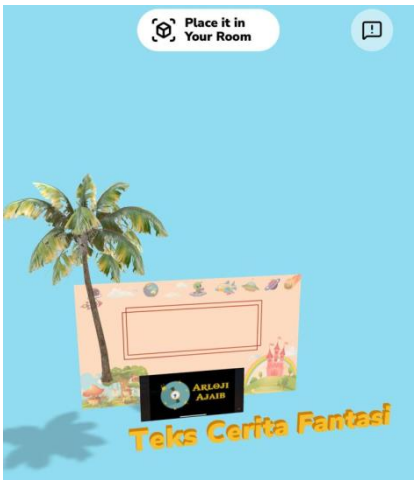


Figure 10. *Display of material in augmented reality*

Expert validation results

To obtain reliable research results, particularly regarding the Student Worksheet (LKPD), this study involved three experts: a linguist, a media expert, and a language expert. Based on the three experts' assessments, the LKPD product was deemed highly feasible and ready for implementation in learning. However, the experts provided several suggestions for improvements to refine the LKPD.

Critical thinking ability results

The results of critical thinking skills in Augmented Reality-based LKPD on fictional prose material obtained posttest results of grade VII students, SMP Negeri 21 Palembang of 91%. This is relevant to critical thinking skills as one part of learning outcomes. This increase indicates a significant development in students' critical thinking skills. This is in accordance with the theory put forward by (Ennis & Philosophy Documentation Center, 2011), that critical thinking is reasonable and reflective thinking that focuses on deciding what to believe or do. Thus, the increase in results reflects success in encouraging students to think critically logically, reflectively, and make decisions based on a deep understanding of the material being studied.

Through Augmented Reality-based Student Worksheets (LKPD), students not only passively receive material but are also involved in activities that encourage them to analyze, evaluate, and reflect on the information obtained. These results are also supported by research by Yosepha Patricia (2024) which states that there is a significant increase in students' critical thinking skills after using technology-based learning media.

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This improvement in critical thinking skills aligns with constructivist learning theory, which states that the use of interactive and contextual learning media can help students construct knowledge independently. This is consistent with research findings from The Commonwealth Scientific and Industrial Research Organization (1997), which explains that Augmented Reality, a technology that combines the real and virtual worlds, is capable of providing a more realistic and engaging learning experience for students. Through Augmented Reality-based Student Worksheets (LKPD), students not only passively receive information but are also actively involved in the learning process, exploring three-dimensional objects, and analyzing the process of photosynthesis.

This improvement also demonstrates that Augmented Reality-based student worksheets (LKPD) can be an alternative solution for improving the quality of learning, particularly in developing critical thinking skills. Students become more motivated, engaged, and able to develop higher-order thinking skills, which are essential for facing the challenges of the 21st century.

It was concluded that the use of Augmented Reality-based Student Worksheets (LKPD) on fictional prose material was proven effective in improving the critical thinking skills of seventh-grade students at SMP Negeri 21 Palembang. This media is worthy of being developed and applied more widely in the learning process to improve the quality of education in the future.

1) Implementation

After conducting one-on-one trials and small group trials, the next step is field trials, this is useful for testing the effectiveness of product use.

This trial was conducted in one class of 35 students to determine the comparison and improvement of students' understanding of fictional prose material before and after using Augmented Reality-based LKPD learning media. After implementing the product in the class, the researcher conducted a post-test to determine the effectiveness after using the product, but before that, the researcher also conducted a pre-test on the students.

This pre-test was conducted previously on October 22, 2025, and a post-test was also conducted on October 29, 2025. The field test was conducted on 35 students. Initially, a pre-test was given on the fictional prose material (fantasy stories). Next, a post-test was conducted on the fictional prose material (fantasy stories). The results of the trial test are as follows.

Table 1. *Field trial results*

No	Name	*Pret est*	*Posttest*
1	AZHW	70	80
2	AN	40	95
3	AKH	50	95
4	AI	38	85
5	ATA	50	95
6	ARA	60	95
7	APS	70	95
8	AD	60	80
9	AZP	60	95
10	CRR	70	95
11	ERQ	40	95
12	FY	80	95
13	FRD	50	95
14	IG	30	85
15	KNA	50	85
16	CRR	70	95
17	MLDAG	40	95
18	MAAB	40	95
19	MIS	55	85
20	MRI	38	85
21	MSN	60	90
22	MAAF	70	90
23	MFS	70	95
24	MFF	80	100
25	MH	40	95
26	NKV	60	90
27	NJ	70	90
28	NAZ	70	80
29	SGA	70	95
30	RF	60	90
31	DAA	40	90
32	RSA	65	90
33	SZW	60	90
35	VK	65	90
Amount		1941	3095
Average		57.09	91.03
Presentation		57%	91%

The table above shows that the pretest score was 54.58, which is considered less valid, while the pretest score was 83.33, which is considered valid. The table above indicates that the learning process has improved.

Evaluation

Based on the research results from the results of the student response questionnaire regarding the practicality of LKPD and*posttest*The quality of the developed LKPD is based on validity and practicality. The developed LKPD is declared practical and valid for use based on validation conducted by experts, namely language experts, material experts, and media experts.

This study aimed to develop and examine the feasibility, practicality, and initial effectiveness of an Android-based Student Worksheet (LKPD) integrated with Augmented Reality (AR) for teaching fantasy prose to Grade VII students at SMP Negeri 21 Palembang using the ADDIE development model. The discussion interprets the development outcomes, learning results, and their theoretical implications, and compares them with relevant previous studies.

Interpretation of development results

The expert validation results indicate that the developed LKPD achieved a very high level of validity in terms of content, language, and media design. This finding supports the view that instructional products developed through a systematic R&D framework, such as ADDIE, tend to demonstrate strong alignment between learning objectives, materials, and media presentation (Sugiyono, 2021). High validation scores from material, language, and media experts confirm that the LKPD meets curriculum standards and is pedagogically appropriate for Indonesian language learning in the Independent Curriculum context.

The results of the one-to-one and small-group trials further show that the LKPD is practical and easy to use by students. These findings align with previous studies indicating that well-designed digital worksheets can improve learner usability and engagement when they are adapted to students' characteristics and learning contexts (Zusniarni et al., 2024).

Learning outcomes and theoretical interpretation

The descriptive analysis of pretest and posttest scores demonstrates a substantial improvement in students' learning outcomes after the implementation of the AR-based LKPD. Inferential analysis using a paired-sample statistical test confirms that the difference between pretest and posttest scores is statistically significant. This suggests that the AR-based LKPD has the potential to enhance students' understanding of fantasy prose.

From a theoretical standpoint, this improvement can be explained through constructivist learning theory, which emphasizes that learners actively construct knowledge through meaningful experiences (John-Steiner & Mahn, 2020). The AR features embedded in the LKPD allow students to visualize abstract narrative elements such as characters, settings, and plot structures thus facilitating deeper comprehension. This supports Clark and Mayer (2023) multimedia learning theory, which states that learning is more effective when verbal and visual information are integrated coherently.

Furthermore, the LKPD was designed to stimulate critical thinking skills through analytical questions and interpretative tasks. According to Facione (2015), critical thinking involves skills such as analysis, evaluation, and inference, all of which were embedded in the learning activities. The improvement in posttest scores indicates that AR-assisted learning media can serve as an effective scaffold to promote higher-order thinking skills in language learning contexts.

Compared to previous studies on LKPD development and prose fiction learning, this research demonstrates a significant advancement in terms of technology integration. Earlier studies primarily focused on printed or digital worksheets without immersive features, emphasizing student engagement through text-based activities (Umami et al., 2023). In contrast, this study integrates AR as an interactive medium that enriches literary learning experiences.

Consistent with prior research, the findings corroborate that AR-based learning media can increase student motivation, engagement, and conceptual understanding (Islamiyati et al., 2024). However, this study extends existing literature by applying AR specifically to fantasy prose learning, a domain that remains underexplored in technology-enhanced Indonesian language education.

Despite its positive findings, this study has several limitations. First, the field trial was conducted in a single school with a limited number of participants, which may affect the generalizability of the results. Second, the effectiveness of the LKPD was measured through short-term learning outcomes; long-term impacts on critical thinking development were not examined. Third, the study focused exclusively on fantasy prose, so the applicability of the AR-based LKPD to other literary genres remains to be investigated.

Future research is recommended to implement AR-based LKPD in broader educational settings and across different grade levels. Longitudinal studies could also be conducted to examine the sustained impact of AR-assisted worksheets on students' critical thinking skills. Additionally, further research may explore the integration of AR with other instructional strategies to enhance language and literacy learning in the digital era.

CONCLUSION

This study aimed to develop an Augmented Reality (AR) based Student Worksheet (LKPD) for teaching fictional prose to Grade VII students at SMP Negeri 21 Palembang. Based on the results of the development process, it can be concluded that the AR-based LKPD was successfully developed in accordance with curriculum requirements, student characteristics, and learning objectives.

The results of expert validation indicate that the LKPD is valid and practical for use in prose fiction learning. Furthermore, the findings from the limited field trial show that the use of the AR-based LKPD has the potential to improve students' critical thinking skills and learning outcomes, as reflected in the increase in posttest scores compared to pretest scores.

Although the results demonstrate positive outcomes, this study was conducted on a limited scale. Therefore, the findings should be interpreted as indicating the potential effectiveness of the AR-based LKPD rather than definitive evidence of causal impact. Future research is recommended to involve larger samples and experimental designs to further examine the effectiveness of AR-assisted LKPD in enhancing critical thinking in literary learning.

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