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Development of 3D Animated Story Media Through DRTA Strategy to Improve Reading Comprehension Skills of Elementary School Students

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Abstract

Reading comprehension is a fundamental literacy skill that supports students' learning across various subjects. However, observations in elementary schools show that many students still struggle to understand narrative texts due to limited comprehension skills and the lack of engaging and innovative learning materials. At the same time, technological advancements provide opportunities to develop digital learning media that can enhance motivation and comprehension. One promising innovation is the use of 3D animated stories, which can present narrative content in a more vivid, interactive, and meaningful way. This study aims to develop 3D animated story learning media integrated with the Directed Reading Thinking Activity (DRTA) strategy to improve the reading comprehension skills of fourth-grade elementary school students. The research employed the ADDIE development model and was conducted at an elementary school in Kudus Regency, Central Java, Indonesia. The developed product consists of 3D animated learning media and a learning guidebook. Validation results from media experts, subject matter experts, and elementary school learning device experts indicated that the product was highly valid. Field testing showed an improvement in students' reading comprehension, as reflected by higher posttest scores compared to pretest scores. The effectiveness test revealed a high N-Gain value of 0.73. In addition, practicality assessments through student and teacher questionnaires produced very positive results, with scores of 94% and 87.5%, respectively. These findings indicate that 3D animated stories integrated with the DRTA strategy are effective and practical for improving elementary students' reading comprehension, particularly in narrative text learning.

Keywords

Development of 3D Animation Media; DRTA (Directed Reading Thinking Activity) Strategy; Reading Comprehension

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1. INTRODUCTION

In recent years, educators at all levels of education have increasingly integrated technology into their teaching practices. The use of learning technology represents a crucial step in keeping educators

responsive to the rapid advancements in technology. Learning innovation is essential for educators to develop effective strategies that achieve learning objectives. Digital-based learning content—such as illustrated texts, videos, and audio—has become increasingly relevant as an effective approach, as it fosters student motivation, strengthens interest, and facilitates deeper and more meaningful understanding. Reading comprehension, as an advanced reading skill in Indonesian language learning, is one of the key competencies that must be strengthened. As stated by Setyaedhi (2023), teachers must remain at the forefront by mastering technology to respond to learning challenges. Empirical data on reading comprehension, therefore, becomes a crucial foundation for this study (Setyaedhi, 2023).

Field problems identified through observations, interviews with teachers, and documentation in Grade IV of SD 3 Jekulo reveal significant limitations in learning narrative texts. The unavailability of varied learning media makes teachers rely solely on textbooks, making it difficult to align students' reading comprehension abilities. Teachers reported that limited skills in modifying learning media contributed to suboptimal learning processes. Students also experienced difficulties in identifying the roles of characters, conflicts, resolutions, and moral messages in the narrative texts presented. Furthermore, the mastery of narrative text comprehension remained low, as only 60% of students achieved the minimum expected level of proficiency. These conditions demonstrate a clear need for learning media that can enhance comprehension and support learning activities more effectively.

The urgency to develop appropriate and engaging media is supported by previous research on reading comprehension. Salsabila and Apoko (2025) highlight the importance of designing interactive audio-visual content to achieve optimal learning results (Salsabila & Apoko, 2025) . Similarly, Kholisna and Sukasih (2025) emphasize the need for innovative technology-based media to address students' difficulties in understanding narrative texts (Kholisna & Sukasih, 2025). Learning through 3D animated videos also offers advantages, as the content becomes easier and faster to understand (El-Mashad & Hamed, 2022). These studies collectively underline the importance of implementing technology-enhanced media to strengthen students' reading comprehension.

Innovative learning technologies, such as 3D animated stories, support student engagement and comprehension. Habók et al. (2024) demonstrate that technology influences reading strategies and comprehension in language learning (Habók et al., 2024). Lukcyhasnita et al. (2025) note that 3D animated stories enhance reading enjoyment and make characters appear more lifelike (Lukcyhasnita et al., 2025), while Pratama et al. (2020) affirm that children highly prefer 3D animation (Pratama et al., 2020). Media based on story animations can simplify complex information (Reinita & Mihalova, 2024), support the needs of teachers and students (Marsela & Suhendi, 2021), and improve learning outcomes in elementary schools (Samosa et al., 2021). Students' reading comprehension skills also show improvement after exposure to animated story videos (Christian Catapang & Medina, 2021). Additionally, the use of modern 3D animated video platforms provides advantages in terms of functionality and usability (Johari et al., 2023).

Effective reading comprehension requires not only attractive media but also appropriate learning strategies. Avivah et al. (2022) emphasize that applying the right strategy improves students' comprehension (Avivah et al., 2022)DRTA (Directed Reading Thinking Activity) is a strategy that guides students to make predictions, verify information, and reflect on what they read. Ardhian (2020) states that DRTA is an effective strategy for addressing comprehension difficulties. Empirical evidence also supports its effectiveness: animated video media used within DRTA can enhance reading comprehension skills (Gae et al., 2021), and the strategy itself contributes to increased comprehension performance (Al-Janaydeh & Al-Jamal, 2024). This suggests that DRTA is compatible with media that requires students to interact with narrative information.

Although many studies have explored reading comprehension, the DRTA strategy, and the use of animated media, no previous research has specifically integrated 3D animated storytelling media into the step-by-step procedures of the DRTA strategy for learning narrative texts in elementary schools.

Existing research generally employs 2D animations, conventional videos, or DRTA as standalone strategies without utilizing technologically advanced media. The present study fills this gap by developing 3D animated narrative media designed explicitly to support each phase of DRTA, serving as a confirmation tool for students' predictions, comprehension checks, and reflection processes.

The novelty of this research lies in the development of 3D animated storytelling media tailored to the DRTA strategy, creating an integrated technological–pedagogical approach. This integration supports the enhancement of reading comprehension skills in accordance with the learning needs of fourth-grade elementary school students. It aligns with the independent curriculum's emphasis on literacy development.

Based on the problems and research gaps that have been described, this study aims to analyze the needs in the development of 3D animated story media through the DRTA strategy, develop 3D animated story media in accordance with the steps of the DRTA strategy for narrative text learning, test the validity and feasibility of the developed media, and assess the level of practicality and effectiveness of its use in improving the reading comprehension skills of school students basis.

2. METHODS

This study uses a research and development (R&D) method based on the ADDIE development model. This model is flexible, thereby assisting in the development of effective learning support tools. The ADDIE model process consists of five main stages, namely analysis, design, development, implementation, and evaluation, which are interrelated to ensure that learning runs smoothly and achieves the expected objectives (Yu et al., 2021). The procedural stages of this research development are oriented towards the ADDIE development model stages. The stages of the ADDIE development model are illustrated in Figure 1.

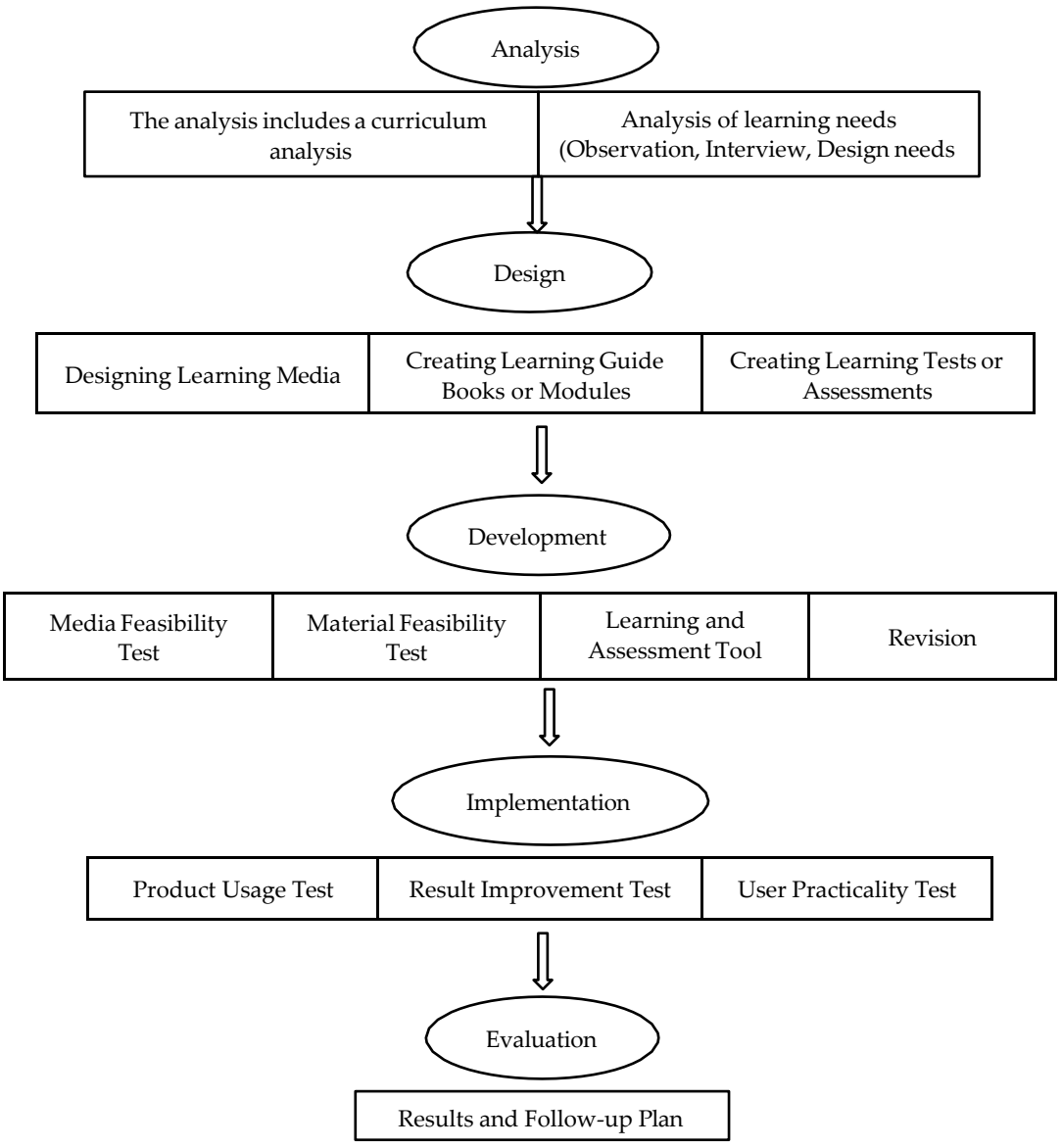


Figure 1. Stages of the ADDIE Development Model

This research was conducted at SDN 3 Jekulo Kudus, Central Java, Indonesia. This research only reached the user testing stage. The research was conducted from May to early August 2025 at SDN 3 Jekulo Kudus, involving 15 fourth-grade elementary school students (3 boys and 12 girls) as the research subjects. The subjects of this study were one fourth-grade teacher, one subject matter expert validator, two media expert validators, and two elementary school learning device experts. Data collection techniques in this study included questionnaires, interviews, and tests to measure perceptions and media usage. Data analysis was descriptive and quantitative. Qualitative data were analyzed based on comments, suggestions, and expert validators obtained from questionnaire respondents. Quantitative data were analyzed using a Likert scale. The scale was used to assess perceptions in measuring the level of agreement or disagreement with a particular subject or target object (Sugiyono, 2020). The questionnaire instrument used for validation by subject matter experts, media experts, and learning device experts is a questionnaire based on LORI (Learning Object Review Instrument) V2. The LORI instrument has nine aspects for examining a particular learning activity, including the use of learning objects such as learning media integrated into a specific learning plan (Aguilar, 2020).

The scores obtained in the analysis stage of the feasibility test and practicality test results were analyzed descriptively and quantitatively using equations from the study (Suryati et al., 2022) It is as follows:

$$P = \frac{\Sigma x}{\Sigma xi} \times 100\% \quad (1)$$

Remarks:

P : Percentage

$\sum x$: Total Acquisition Score

$\sum xi$: Number of Criterion Scores (Maximum)

The calculation of the validation test results can be performed using the formula above, which produces quantitative descriptive data converted into percentages (%). The meaning of these percentages is then categorized to determine the eligibility status of the developed product. The eligibility criteria are outlined in Table 1.

Table 1. Product Eligibility Criteria

Criteria	Percentage Range
Very Feasible	81% – 100%
Feasible	61% – 80%
Quite Feasible	41% – 60%
Less Feasible	21% – 40%
Not Feasible	0% – 20%
(Corrected according to appropriate classification; adapted from Nurida Ulinuha et al., 2020)	

(Nurida Ulinuha et al., 2020)

Data collected on the practicality of determining student and teacher responses to product use were gathered through questionnaires. The analysis criteria for the questionnaire are presented in Table 2.

Table 2. Interpretation Categories for Student and Teacher Questionnaire Scores

Score	Score Range
81% - 100%	Excellent
61% - 80%	Good
41% - 60%	Fair
0% - 40%	Poor

(Sugiyono, 2020)

This study uses a quantitative descriptive method. Design with a one-group pretest-posttest design to see the results of significant differences due to the intervention (Fauziyah & Dari, 2024). Data collection was conducted using a pre-test and post-test research design. Normal data analysis was performed using the Shapiro-Wilk test, considering the relatively small sample size. The significance was then tested using a nonparametric Wilcoxon test with the IBM SPSS version 21 application.

Supporting evidence for the observed increase in the difference between pretest and posttest is provided by the n-gain test. The calculated data yielded gain scores to assess the improvement in reading comprehension skills during the learning process. The data on the acquisition of reading

comprehension improvement scores in small group tests were analyzed descriptively and quantitatively using the equation from Hake 1998 adapted from the study (Wahyono et al., 2022):

$$g = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}} \; x\,100\% \quad (2)$$

Keterangan:

S_{post} : Final Test Score

S_{pre} : Initial Test Score

S_{maks} : Ideal Maximum Score

Data on improvements in reading comprehension after obtaining gain scores through the above formula calculation were then converted into category meanings. The interpretation of gain acquisition categories is presented in Table 3.

Tabel 3. Interpretasi N-Gain Score

N-Gain Index	Interpretation
N-Gain ≥ 0,7	High
0,3 ≤ N-Gain < 0,7	Medium
N-Gain < 0,3	Low

(Hake, 1999)

The validation instruments used in this study underwent expert testing to ensure content validity. The LORI-based questionnaires were assessed by one subject matter expert, two media experts, and two learning device experts. Their evaluations ensured that the instrument items appropriately measured aspects of content quality, presentation, usability, and pedagogical alignment.

Reliability testing was conducted using Cronbach's Alpha after the validation questionnaires were administered in the limited trial. The reliability coefficient exceeded 0.70, indicating that the instrument had acceptable internal consistency and was suitable for use in measuring expert assessments and user responses. Thus, both the validity and reliability of the instruments met the required standards for research and development studies.

3. FINDINGS AND DISCUSSIONS

Findings

Needs Analysis in The Development of 3D Animated Storytelling Media

The analysis includes an examination of the Indonesian language curriculum in fourth-grade elementary school, focusing on the content of narrative texts and an assessment of learning needs. Phase B fourth-grade elementary school with targets for reading comprehension skills. The parts of a narrative text, starting from the orientation, complication, and resolution, to the important message or values of the story. This can be achieved by directly interviewing teachers about the learning media used in reading lessons. The result is that learning media in elementary schools are still limited to using government-issued textbooks. The content of story media in textbooks remains unchanged and is presented solely with pictures and text. The strategies used in learning, particularly in the context of reading, still require effective reading comprehension strategies. So far, teachers have only used direct learning strategies. The results of the questionnaire on students' needs regarding 3D animated story media design are presented in Table 4.

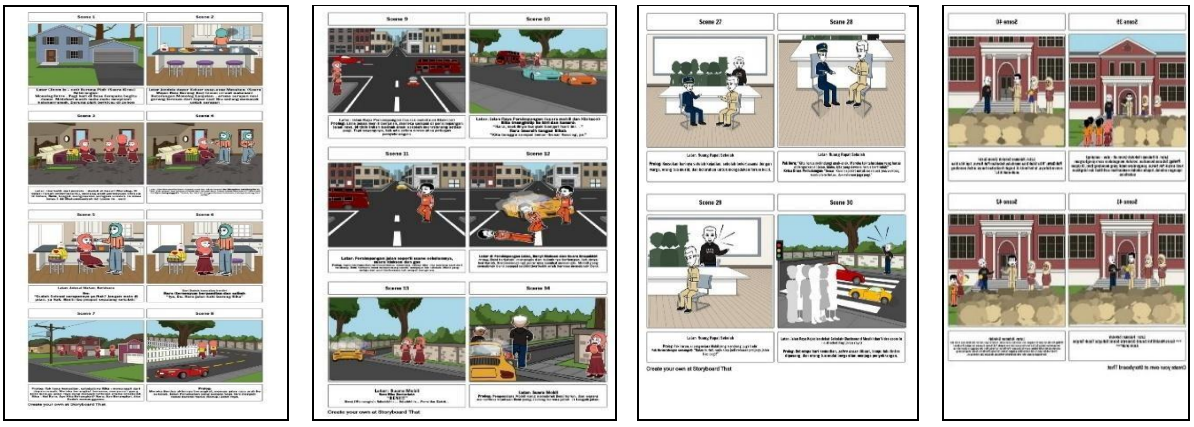
Table 4. Results of Questionnaire on 3D Animated Story Media Design Requirements

Needs Aspect	Design Requirements Description	Percentage of Responses
Media Design	The form of animated video learning materials or media.	100%
Media Design	Accessible on computers/other devices.	80%
Media Design	Colorful learning media.	93%
Media Content	Topic of stories about caring for others.	73%
Media Content	Stories are more interesting when there is dialogue/conversation	100%
Media Content	Contains messages that can be applied to students' lives	86%
Learning Materials	Prefer stories when accompanied by videos	100%
Learning Materials	Avoid sentences that are too difficult to understand	100%
Learning Strategies	Prefer group work with classmates	86%
Learning Strategies	Worksheets in the form of boxes/columns	100%

The result of a questionnaire that formed the basis for creating 3D animated media for learning. The table indicates that the chosen material or media is an animated video. The media can be displayed on digital devices. The story topic is about caring for others, so it is titled “Small Steps, Big Lessons.” The story contains values that can be applied in students' lives. These results were derived from teacher interviews and field observations that addressed the design needs of the students. Therefore, the researcher employed a 3D animated story media design approach, utilizing the DRTA strategy, as a development product in this study. Animated media that pays attention to the learning needs of the user and is designed for learning. Research relevant to the results of this study can provide good targets in accordance with the learning needs of students. Animated videos require facilitators or teachers who are familiar with the characteristics of the class, which will certainly add to the learning experience in accordance with needs so that student creativity increases and interaction skills improve (Kleftodimos, 2024); & (Armita & Ain, 2025).

Development of 3D Animated Story Media through DRTA Strategy

The design results developed include: creating narrative text, compiling storyboards, and producing 3D animated videos, along with learning tools (teacher and student guidebooks and learning assessments). The narrative stories were adapted from the learning content of textbooks for Indonesian language students in Semester 1 2025 on the theme of “Look Around.” The title of the modified story is “Small Steps, Big Lessons”. Next, create a storyboard using a web application called "Storyboardthat". The storyboard serves as a guideline for creating 3D animated videos. Storyboard fragments from several scenes are shown in Figure 2. The expectations align with the theme/topic presented in the narrative story. Research (Hong et al., 2025); (Zhong et al., 2025) Explaining storyboards as the foundation for creating 3D animated videos, starting with preparing the script, determining the story's theme, setting, characters, and roles, as well as scripting scenes with narration. Then, in line with (Zulfan et al., 2022) The goal of animated content should be more planned by using storyboards. The goal is to design characters, incorporate spatial objects into the story, integrate sound, and produce content holistically.



(a) (b) (c) (d)

Figure 2. Storyboard excerpts (a) The orientation section of the story; (b) The complication section of the story; (c) Conflict resolution; (d) Coda

Figure 2 shows the storyboard was created using the web-based application "Storyboardthat". The storyboard was used as a media design to direct the creation of the storyline in the form of an animated video. The total storyboard consists of 42 scenes. Creating a storyboard is crucial for facilitating researchers in designing a 3D animated video. The next step in creating a 3D animated video story media is to use the web application "Plotagon". The 3D animated video story media display is shown in Figures 3 and 4.

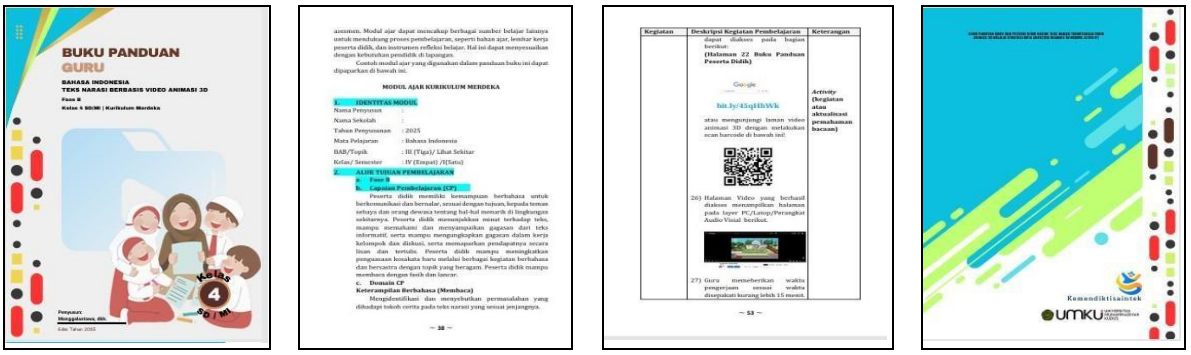
(e) (f) (g)

Figure 3. Several parts of the 3D animated story: (e) scene orientation, (f) & (g) scene complications

(h) (i) (j)

Figure 4. Several parts of the 3D animated story: (h) & (i) scene about resolution, (f) coda scene

The overall length of the 3D animated video is 13 minutes. This animated video is based on the results of an analysis of students' design needs, as determined through a questionnaire previously distributed to them. Research by (Jing, 2024); (Kwangmuang et al., 2024)It states that attractive visual designs and 3D animations motivate students in reading activities, making it easier for them to understand the content or comprehend the information.



(k) (l) (m) (n)

Figure 5. Sections of Teacher's Guidebook on 3D animated stories; (k) Front cover; (i) Learning plan identification section; (m) Procedure for accessing 3D animated videos; & (n) Back cover

(o) (p) (q) (r)

Figure 6. Sections of the Student Guidebook on 3D animated stories; (k) Front cover; (i) Picture and reading prediction section; (m) Video access procedure; & (n) Back cover

Figure 5 is the teacher's guidebook contains information on media concepts, language learning strategies, narrative texts, lesson planning modules, media use, and learning assessment. Figure 6 illustrates that the book contains material and instructions on utilizing 3D animated stories within the context of narrative texts. This guidebook provides conceptual information about narrative text material and steps for implementing the DRTA strategy, starting from predicting the title and images, reading the story, and confirming reading comprehension of the text using 3D animated learning videos.

Validity of 3D Animated Stories through DRTA Strategy

The results of the feasibility test for this 3D animated story media include validation tests conducted by two media experts, two subject matter experts, and two experts in elementary school learning tools. The results of the media validation test are presented in Table 6.

Table 5. Media Validation Results

LORI Aspects and Achievement Indicators	**Assessment Score**	
	Media Expert I	**Media Expert II**
Content Quality: Graphics, sound elements	4	4
Content Quality: Ratio across multiple platforms	4	4
Content Quality: Artistic illustrations.	3	3
Content Quality: Dynamic animation	3	4
Content Quality: Sound quality	4	4

LORI Aspects and Achievement Indicators	Assessment Score	
	Media Expert I	Media Expert II
Learning Goal Alignment: Context in Elementary Schools.	4	4
Motivation: Increasing interest.	4	3
Presentation Design: The smoothness and integrity	4	4
Presentation Design: Visualizing easy-to-understand	4	4
Presentation Design: To increase the appeal	4	3
Interaction Usability: To achieve goals and complete tasks	4	3
Accessibility: Access by links/barcodes in the guidebook	4	4
Reusability: Suitable for elementary school children	4	4
Standards Compliance: Ensuring adherence to non-discriminatory practices.	4	4
Standards Compliance: Ethically, safely, and responsibly for educational.	4	4
Total Score	**114**	
Criterion Score	**120**	
Percentage	**95%**	

Table 5 shows the results of media validation tests conducted after the development process of 3D animated video learning media. The results of the media expert validation consisted of 9 LORI aspects, which were then developed into 15 achievement indicators for the overall aspects. Overall, the validation results reached 95%, which falls into the "highly feasible" category. Therefore, it can be used for the learning application stage.

Table 6 presents the results of the material validation test for the 3D animation story design and its accompanying guidebook. The results of the subject matter expert validation for the Indonesian language in elementary schools consisted of 9 LORI aspects, which were then developed into 15 achievement indicators for overall aspects. Overall, the validation results reached 92.5%, which falls into the "highly feasible" category. Therefore, the media can be used in learning.

Table 6. Material Validation Results

LORI Aspects and Achievement Indicators	Assessment Score	
	Material Expert I	Material Expert II
Content Quality: Narrative stories and 3D animated videos	4	4
Learning Goal Alignment: Identity of guidebooks	4	4
Learning Goal Alignment: Accordance with the curriculum	4	4
Learning Goal Alignment: Integrated with learning objectives	4	4
Learning Goal Alignment: Accuracy of learning objective	3	4
Feedback and Adaptation: Column for answers	3	4
Feedback and Adaptation: Learning Strategies	4	3
Motivation: 3D animated content capable of increasing interest	3	3

LORI Aspects and Achievement Indicators	**Assessment Score**	
	Material Expert I	**Material Expert II**
Motivation: Elementary school has value	4	4
Presentation Design: The graphic, appearance, and sound	3	4
Interaction Usability: Ease of accessing	4	3
Accessibility: Accessing the video and the guidebook	3	3
Reusability: for elementary school reading comprehension skills	4	4
Reusability: Stories can be used in other material sections	4	4
Standards Compliance: Ensuring adherence to non-discriminatory practices.	4	4
Total Score	**111**	
Criterion Score	**120**	
Percentage	**92.5%**	

Table 7. Learning Tool Validation Results

LORI Aspects and Achievement Indicators	**Assessment Score**	
	Learning Tools Expert I	**Learning Tools Expert II**
Content Quality: Contains narrative stories relevant to 3D animation videos.	4	4
Learning Goal Alignment: Completed information.	3	4
Learning Goal Alignment: Relevant to the Curriculum.	3	3
Learning Goal Alignment: Learning indicators relevant	4	4
Learning Goal Alignment: Accuracy of learning objective.	4	3
Feedback and Adaptation: Assessing Reading Skills.	3	4
Feedback and Adaptation: Appropriate with appropriate strategies.	4	4
Motivation: Increases student interest.	3	3
Motivation: Has a value.	4	4
Presentation Design: Integrated with the use of 3D animated story videos.	3	3
Interaction Usability: Ease of use of the guide module	4	4
Accessibility: Provided with instructions for accessing	4	4
Reusability: Facilitate reading comprehension skills	4	4
Reusability: Can be applied in other similar subject areas.	3	3
Standards Compliance: Ensuring adherence to non-discriminatory practices.	4	4
Total Score	**109**	

LORI Aspects and Achievement Indicators	Assessment Score	
	Learning Tools Expert I	Learning Tools Expert II
Criterion Score	**120**	
Percentage	**91%**	

Table 7 shows the results of the elementary school learning tool validation test, which includes teaching modules/lesson plans, learning activities in the user guidebook, and learning assessments. The results of the elementary school learning tool expert validation consisted of 9 LORI aspects, which were then developed into 15 achievement indicators for overall aspects. Overall, the validation results reached 91%, which falls into the "highly feasible" category. Therefore, the teacher and student guidebooks can be utilized in the learning process.

Implementation and Practicality of 3D Animated Media Through The DRTA Strategy on Reading Comprehension Skills

Practical testing was conducted as a follow-up step in the development stage to evaluate the use of media in small group settings. This stage was the third stage in the development model. After going through the revision stage were declared suitable for use. The user test results were obtained through a small-scale product trial involving 15 students in grade IV of SD 3 Jekulo, Kudus. This trial was then evaluated through an analysis of the pretest and posttest results. This study uses a quantitative descriptive method with a one-group pretest-posttest design. Data collection was conducted using pre-test and post-test research. Normal data analysis was performed using the Shapiro-Wilk test, considering the relatively small sample size. The significance was then tested using a nonparametric Wilcoxon test with the IBM SPSS version 21 application.

Table 8. Tests Statistics of Normality Test

Data		Shapiro-Wilk		
		Statistic	df	Sig.
Media Implementation Results	Pre-test Reading Comprehension	.884	15	.054
	Post-test Reading Comprehension	.929	15	.264

Table 8 presents the results of the normality test, with significance values of 0.054 for the pretest data and 0.264 for the posttest data. Both significance values are greater than or equal to 0.05, indicating that the data are normally distributed. Next, a Wilcoxon test was used to compare the means of the two related samples. Then, the significance of the increase in elementary school students' reading comprehension skills was determined as evidence of the effectiveness of using 3D animation media through the DRTA strategy, as assessed by the Wilcoxon test.

Table 9. Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
Post_test - Pre_test	Negative Ranks	0[a]	.00	.00
	Positive Ranks	15[b]	8.00	120.00
	Ties	0[c]		
	Total	15		

Table 10. Wilcoxon Test Statistics

	Post_test - Pre_test
Z	-3.419[b]
Asymp. Sig. (2-tailed)	.001

Calculations using SPSS Statistics, version 22, showed positive ranks of 8.00, indicating improvement among all participants in this class. The Sig. (2-tailed) value table of 0.000 based on the decision-making process showed that the significance value was < 0.05. This demonstrates that the use of 3D animation media, facilitated by the developed DRTA strategy, was significantly effective in enhancing the reading comprehension skills of fourth-grade elementary school students. To support this significant improvement, normalized gain test results are needed to categorize the improvement in reading comprehension skills between the pretest and posttest differences after using 3D animated story media through the DRTA strategy. The results of the reading comprehension improvement test analysis are presented in Table 11.

Tabel 11. N-Gain Result

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
NGain_Score	15	.40	1.00	.7306	.19254
NGain_Persentase	15	40.00	100.00	73.0625	19.25420
Valid N (listwise)	15				

Based on Table 11, the N-Gain Score was 0.73, proving an increase in students' reading comprehension of narrative text material in the high category. The practicality of using 3D animated videos and their guidebooks can be determined using user responses. The results of the student-teacher response questionnaire, following the use of 3D animated story media, are presented in Table 10. Furthermore, it aimed to assess the practicality of the product and analyze the user response questionnaire. The results of the questionnaire for teachers after using 3D animated story media are presented in Table 12.

Table 12. Student and Teacher Response Questionnaire Results

Student Response Questionnaire Results	**Skor**	**Results of Teacher Response Questionnaire**	**Skor**
Feedback and Adaptation	55	Content Quality	3
Feedback and Adaptation	54	Learning Goal Alignment	4
Feedback and Adaptation	60	Feedback and Adaptation	3
Motivation	60	Motivation	4
Motivation	53	Presentation Design	3
Presentation Design	60	Interaction Usability	4
Interaction Usability	54	Accessibility	4
Accessibility	57	Accessibility	3
Accessibility.	55	Reusability	3
Accessibility	54	Standard Compliance	4
Score Obtained	**562**	**Score Obtained**	**35**
Maximum Score	**600**	**Maximum Score**	**40**
Percentage	**94%**	**Percentage**	**87.5%**

Table 12 shows data on student responses and teacher responses, indicating the practicality of using 3D animation-based media. The results of the student support and teacher questionnaires showed positive results of 94% and 87.5%, respectively, in the excellent category. The DRTA strategy can have a positive impact on facilitating students' reading comprehension. The strength of the learning steps in the DRTA strategy procedure lies in its approach, where students are asked to make predictions about the pictures and titles in the reading material and then solve problems through reading comprehension activities. (Cahyono et al., 2025). Study by (Agao-Agao, 2023); (Safitri et al., 2022); (Satriani et al., 2022) Relevant researchers also explain that the DRTA strategy creates a positive space for understanding.

This study uses 3D animated stories, which are used after students have completed reading comprehension. Reading comprehension is confirmed using 3D animated videos as a means of confirming students' understanding of what they have read. The researcher used 3D animation media because this media has several advantages in attracting reading interest and can project abstract concepts that are difficult to understand into simpler ones. Narrative text stories projected in the form of animated videos appear more vivid, so that readers of the narrative do not have difficulty understanding the chronological flow of the text. Penelitian oleh (Yulanda Sari et al., 2021); (Azhimia, 2023); (Asyidiq et al., 2020) It is relevantly confirmed that narrative stories packaged in 3D animation have a positive effect on the ease of reading and understanding certain content or texts.

Discussion

The product development in this study demonstrates that the design process follows the systematic flow of the ADDIE model, which emphasizes a continuous unit of needs analysis, design, development, implementation, and evaluation. In the analysis stage, learning needs were identified through observation, interviews, and the use of design needs questionnaires. This finding aligns with Branch's (2009) theory, which states that the analysis stage in ADDIE not only maps learning objectives but also identifies competency gaps, student conditions, and available learning resources. The analysis of these needs is the basis for the formulation of product designs that are more appropriate and contextual.

The design stage then produces a media development plan, prepares modules or manuals, and develops assessment instruments for use. This is in line with the view of Dick, Carey, & Carey (2015) that instructional design should produce a blueprint that describes the learning flow, material structure, and evaluation strategies (Dickey, 2006). In this study, product design not only focuses on the presentation of content, but also on the suitability between learning objectives, media, and evaluation tools, so that it is consistent with the principle of constructive alignment (Biggs, 1999) (Biggs, 1999).

The development stage demonstrates that the product has undergone thorough testing through media feasibility tests, material feasibility assessments, and tool feasibility evaluations. Each component is corrected based on expert input, indicating that the revision process runs as a reflective cycle, as suggested by the formative evaluation theory of Tessmer (1998) (Tessmer, 1998). The involvement of experts also strengthens the validity of the content, ensuring that the media and materials meet standards of quality, accuracy, and usefulness. Expert feedback is then used to refine the product before implementation.

At the implementation stage, the product is tested through use trials, learning outcome improvement tests, and user practicality tests. The findings show that the product can be easily used by learners and educators, reflecting the achievement of usability aspects. Theoretically, this is consistent with the concept of practicality according to Nieveen (1999), which emphasizes that a medium is said to be practical if it can be used with a minimum level of support and still achieves its learning function (Nieveen, 1999). In addition, the improvement in learning outcomes at this stage reinforces that the media functions effectively, in line with the instructional objectives that have been designed.

In the final evaluation stage, the implementation results are reviewed to determine overall effectiveness and follow-up plans. Evaluation includes not only the cognitive achievement of the

learners, but also the user's response and potential for further development. This aligns with Kirkpatrick's (2006) perspective, which holds that learning evaluation should encompass reactions, learning, behavior, and outcomes. Thus, the evaluation process in this study ensures that the products developed are not only feasible and practical, but also have an impact on improving the quality of learning in a real context (Kirkpatrick & Kirkpatrick, 2006).

Overall, the discussion of this research demonstrates that the ADDIE approach offers a systematic, iterative, and evidence-based framework for developing learning products. The strong relationship between needs analysis, instructional design, feasibility testing, measurable implementation, and comprehensive evaluation ensures that the final product has both a solid theoretical foundation and high practical relevance. This model has been proven to produce learning media or instruments that meet needs, are academically valid, and are effective in improving learning outcomes.

4. CONCLUSION

This research employed the ADDIE development model, with the scope limited to the analysis, design, development, and user testing stages. The analysis process, conducted through observations, interviews, and questionnaires, revealed that students experienced difficulties in understanding narrative texts due to limited reading comprehension skills and the lack of varied and innovative learning media. The needs analysis further indicated that students and teachers required engaging 3D animated narrative media integrated with the DRTA strategy.

The development stage produced 3D animated story content supported by a storyboard, learning videos, teacher and student guidebooks, and assessment instruments. Expert reviews on media, content, and learning tools indicated that all components met the criteria for feasibility, demonstrating that the developed media aligns with pedagogical, technical, and curricular requirements.

Implementation through field testing demonstrated an improvement in students' reading comprehension performance. The learning process became more engaging, and both teachers and students responded positively to the practicality of the media, confirming that the product is easy to use and supports instructional goals. The effectiveness of the media is reflected in the overall improvement in learning outcomes and the positive user experience, showing that the integration of DRTA and 3D animated narratives provides meaningful support in enhancing students' comprehension of narrative texts.

This study contributes to the literature by demonstrating a practical model for integrating DRTA with 3D animated storytelling media. However, further research is needed to strengthen generalizability. Future studies may employ experimental designs with larger and more diverse populations, compare the media with other instructional strategies, or investigate its use in various text genres and grade levels. Researchers may also examine long-term impacts on literacy development or investigate how individual differences in learning styles influence the effectiveness of 3D animated media.

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